DEPARTMENT OF VETERANS AFFAIRS

Tele-ICU Implementation in VISN 23: Lessons Learned for VA's Rural Hospitals

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Introduction

Telemedicine Intensive Care Unit (Tele-ICU) programs provide critical care support to clinicians working in geographically dispersed intensive care units (ICU). Tele-ICU programs differ, but typically involve assisting bedside staff in patient monitoring and management using an array of technologies that connect a central monitoring center with the bedside care team. These programs are commonly implemented with goals of improving patient outcomes and reducing treatment variability.

Available data about the impact of Tele-ICU systems is complex.[1,2] Certain studies have demonstrated that Tele-ICU coverage is associated with improved guideline adherence, lower rates of preventable complications, lower hospital and ICU mortality, and shorter hospital and ICU lengths of stay,[3] but other studies demonstrated little benefit.[2,4] Although initial assessments report high levels of staff acceptance of Tele-ICU,[5] other studies identify poor utilization among physicians as a potential intervening factor influencing the effectiveness of Tele-ICU programs.[4]

Within the 126 acute-care hospitals of the Veterans Administration (VA), there is substantial variation in organization of ICUs. Delivery of high quality ICU care in VA is made more difficult by the chronic national shortage of Critical Care Physicians (i.e., intensivists) and Nurses.[6,7] This shortage is a particular challenge for geographically isolated rural hospitals both within VA and the private sector.

Key Findings

- Tele-ICU is a complex, multi-dimensional intervention that transforms almost every aspect of how an ICU functions.
- Standardizing guidelines, pathways, and protocols is an essential co-intervention to the Tele-ICU program.
- Strong support of the Tele-ICU from local ICU and faculty leadership is vital.

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In an effort to overcome this shortage of intensivists, extend the reach of the existing workforce, and reduce treatment variability, VHA has increasingly turned to Tele-ICU. Currently four VISNs are in the process of implementing Tele-ICU programs: VISNs 10, 12, 19, and 23. While the programs being implemented in each VISN differ in a number of regards (e.g., use of technology, staffing, hours of operation) all have a single objective of improving the quality of care delivered to acutely ill Veterans.

Over the past 18-months an ongoing evaluation of the VISN 23 Tele-ICU program implementation has been made possible with support from the VA Office of Rural Health, Veterans Rural Health Resource Center—Central Region. In the following sections we will: 1) briefly describe VISN 23; 2) provide an overview of the Tele-ICU program and implementation timeline; 3) discuss benefits and concerns cited by VISN 23 bedside staff; and 4) describe key lessons learned for other health systems interested in Tele-ICU programs.

Background

VISN 23 Overview

VISN 23 serves more than 400,000 enrolled Veterans across the Upper Midwest and Central Plains states and is the third largest and the third most rural VISN in VA.[8,9] VISN 23 includes three tertiary care hospitals (Iowa City, Minneapolis, and Omaha), five smaller hospitals offering secondary care (Des Moines, Fargo, Ft. Meade, Sioux Falls, and St. Cloud), and one primary care hospital (Hot Springs). All but St. Cloud and Hot Springs have ICUs (Figure 1).

The eight ICUs in VISN 23 vary substantially in their structural and organizational characteristics (Table 1). Five of the eight ICUs have physicians who are certified in critical care medicine, while the ICUs serving rural populations (Fargo, Ft. Meade, and Sioux Falls) do not. Two of the three Level 3 ICUs also do not have critical care certified nurses. The more rural ICUs have less access to respiratory therapists and pharmacists than the larger ICUs; assistive personnel also are not available at the majority of Level 2 and 3 ICUs.

VISN 23 Tele-ICU Overview

The Tele-ICU system links patients and bedside clinical teams spread across VISN 23's eight ICUs to intensivists and critical care nurses located in the Tele-ICU monitoring center at the Minneapolis

Figure 1. VISN 23: VA Midwest Health Care Network Map[8]

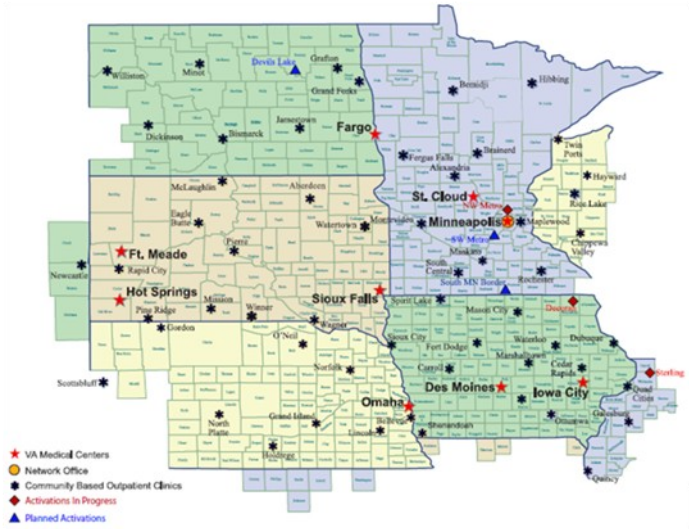


Table 1. Characteristics of VISN 23 ICUs[10,11]

	Minneapolis VA		Des Moines VA	Iowa City VA	Omaha VA	Fargo VA	Ft. Meade VA	Sioux Falls VA
ICU Level	Level 1		Level 2	Level 2	Level 2	Level 3	Level 3	Level 3
ICU Type	MICU & CCU	SICU	Mixed	Mixed	Mixed	Mixed	Mixed	Mixed
# Intensivists (#FTEE)	6 (6)		2 (2)	7 (2.6)	8 (1)	0	0	0
%RNs with CCRN Certification	21%	14%	8%	17%	11%	0%	0%	20%
#ICU Beds (#Operational)	10 (8)	13 (13)	9(6)	10(10)	16(11)	4 (4)	4 (4)	6 (6)
On-call In-House Coverage for Evenings, Nights, Weekends	Resident only	Resident only	Resident, Medical Officer on Duty	Resident only	Resident, Medical Officer on Duty	Medical Officer on Duty	Attending physician only	Resident only
# Assistive Personnel FTEE (e.g., nursing assistant)	3	3	1	0	0	0	0	1
Pharmacist & Respiratory Therapist Dedicated to ICU	Yes	Yes	Yes	No	Yes	No	No	No

VA. Monitoring center staff review changes in patients' status through real-time access to patients' physiological bedside monitors, electronic health records, ICU flow sheets, and digital imaging scans (PACS) (Figure 2). A two-way audio-video link facilitates telecommunication between care teams and video assessment of patients. Depending on the level of support provided, the monitoring center can contact the bedside ICU staff if they observe clinical deterioration of a patient, concerning laboratory or radiology results, or have a diagnostic or therapeutic intervention to recommend. Alternatively, bedside staff can initiate contact with the support center if they have questions or would like a consultation.

Planning for the Tele-ICU program began in 2008 and the system came on-line in 2011. Tele-ICU monitoring in VISN 23 went live in August, 2011 and all VISN 23 ICU beds were active in February 2012. The program recently expanded to include one additional hospital outside of VISN 23 (Spokane, WA). Once fully operational, the VISN 23 program will monitor 80 ICU beds.

.Methods

Between July, 2011 and February, 2012 our team of physicians, anthropologists, and social scientists interviewed 96 key stakeholders involved in various aspects of the VISN 23 Tele-ICU Program. Our overarching objective was to

understand perceptions of the benefits and challenges of the Tele-ICU program.

We visited the monitoring center in Minneapolis and 5 ICUs in 4 of the VISN 23 Medical Centers, as well as conducted phone interviews with ICU administrators and other key staff at two additional VISN 23 Medical Centers. Our interviewees included: Monitoring Center Physicians and Nurses, Physicians, ICU Nurses, Respiratory Therapists, ICU Nurse Managers and ICU Directors, and Clinical Information System/ Anesthesia Record Keeping/Tele-ICU Coordinators.

Findings

Tele-ICU: Key Benefits

1. Improved access to intensivists. Rural VAMCs have great difficulty in recruiting and retaining intensivists and often are forced to rely upon hospitalists without advanced training in critical care. Bedside nurses and physicians reported that the Tele-ICU provided timely access to experienced intensivists.

2. Assistance to physicians working weekend and evening shifts. At smaller rural VAMCs, it is not uncommon for a single physician to cover the entire hospital and emergency department. The Tele-ICU program was seen as providing important support to these physicians by assisting in the management of ICU patients.

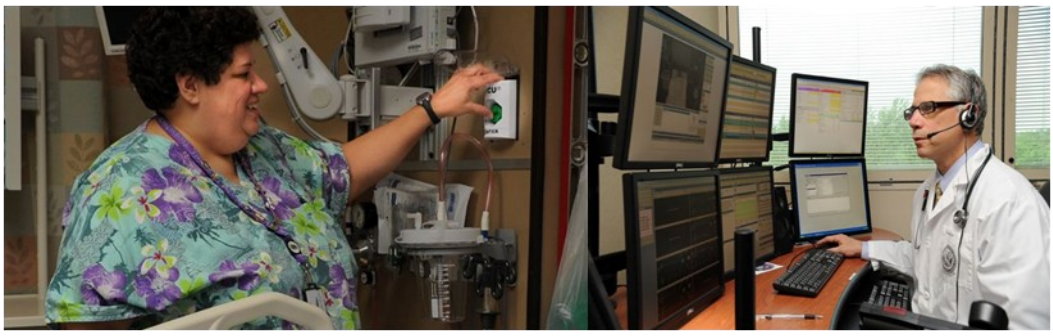
3. Supporting bedside nurses during emergencies. Because of low patient census, rural ICUs often are minimally staffed. The Tele-ICU nurses can take over certain tasks during emergencies, such as video assessments of stable patients, recording codes, and calling physicians, so that the bedside nurses can safely attend to the critical situation.

Tele-ICU: Important Concerns

1. A need for dedicated staff to support and champion the Tele-ICU program. Among rural ICUs, resources allocated to coordinating local implementation of the Tele-ICU varied. A full-time point-person to coordinate the implementation of the Tele-ICU was identified as a useful component of the Tele-ICU's execution and early utilization.

2. The complexity of updating guidelines and protocols associated with the Tele-ICU Program. Bedside staff reported concern that Tele-ICU physicians and nurses may not fully understand the constraints under which small rural ICUs operate. Specific concerns included the complexity of balancing ICU capabilities and developing and adopting standardized protocols and procedures across ICUs with varying access to resources.

Figure 2. Tele-ICU Connecting Bedside ICU Staff and Minneapolis-Based VISN 23 Monitoring Center



Conclusions

VISN 23 embarked on an ambitious plan to implement a state-of-the-art Tele-ICU program to improve critical care. With support from the VA Office of Rural Health, a detailed evaluation of the impact of this program on front-line providers in small rural VAMCs has found that:

- The Tele-ICU is a complex, multi-dimensional intervention that transforms almost every aspect of how an ICU functions. It is important to dedicate time and resources to educate staff about the Tele-ICU before, during, and after implementation.
- Standardizing guidelines, pathways, and protocols is an essential co-intervention to the Tele-ICU program. It is important to engage bedside physicians and nurses in developing and implementing these protocols as the Tele-ICU is being developed in order to address site-specific constraints and leverage opportunities.
- Strong support of the Tele-ICU from local ICU leadership is vital. ICUs with academic affiliations also require support from faculty leadership.

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