



Building a Case for Tele-Critical Care to Improve Quality

Telemedicine in critical care has been intensely watched and widely debated in the literature. As the field of telemedicine has advanced, the ability of critical care services to be delivered beyond the physical boundaries of the intensive care unit (ICU) has increased. Consequently, there has been some debate about what to call this service. Recently, the Society of Critical Care Medicine (SCCM) Tele-ICU Committee has recommended that the traditional term tele-ICU be updated to tele-critical care (TCC), defined as critical care services delivered using communications technologies from anywhere to anywhere. This term better represents the profession today and how it will carry into the future.

The American College of Critical Care Medicine Task Force on Models of Critical Care highlighted the importance of an intensivist-led, multidisciplinary team as well as protocols, outcome measures, and

institutional support as building blocks for high-quality critical care.¹ These are also the building blocks of successful TCC programs. Collaboration among TCC team members is essential to achieve optimal care practices.² In a study by Lilly et al,³ early intensivist involvement and improved adherence to best practices, both facilitated by TCC, were associated with lower mortality and reduced length of stay.

Kahn et al⁴ found three program elements that determined TCC service effectiveness:

- TCC leadership in relationship building, clinical decision-making, and conflict resolution
- Perceived value of telemedicine influenced by staff satisfaction and a clear understanding of operations
- Organizational characteristics that allowed proactive involvement by the TCC team

This article outlines various perspectives on the successes and challenges of TCC in improving care quality as related by members of the SCCM Tele-ICU Committee.

Hybrid Model Perspective (Academic/Community)

The relationship between the TCC-originating (remote) site and the TCC-receiving (local) site is important in developing a one-team approach that delivers appropriate, responsive, and consistent care of tangible value woven into exemplary bedside practice.⁴ In some scenarios, the TCC model links tertiary center remote sites to community hospital local sites. This paradigm shift in care delivery for both locations brings a host of complex challenges, primarily the comprehension and assimilation of highly advanced technology into daily community ICU care practice, followed by effective communication with the bedside team.

TCC fosters a detailed self-assessment before implementation and continuously thereafter to leverage opportunities for growth while maintaining current areas of excellence. Staff at Barnes-Jewish Hospital in St. Louis, Missouri, USA, evaluated their observed and expected ICU mortality and length of stay ratios before TCC implementation. After TCC implementation, they used analytics derived from the TCC service to identify areas of deficiency in each local ICU, and then developed a site-specific "hot list"—a nurse-driven protocol to drive change successfully.⁵ The TCC service has brought structure, standardization, collabo-

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ration, and improved patient safety to these community hospital units, while case complexity and volume have shown an upward trend.

Care quality can be individualized to each institution in the TCC network and can include more than ICU mortality and length-of-stay metrics. Some quality initiatives supported by the Barnes-Jewish Hospital network have included cardiac surgery rapid extubation protocols, best practice compliance, and mentoring newly hired nurses, with positive results. Future plans for this TCC system include establishing a regionalized logistics center to improve patient flow and care coordination, incorporating advanced practice providers and critical care fellows into the care team, and providing examples to new ICUs and emergency departments.

A Nursing Perspective

Critical care nurses are an integral component of TCC programs, practicing at both TCC remote and local sites, and their collaboration is essential. In 2013, the American Association of Critical-Care Nurses recognized TCC as a specialty and published guidelines for nursing practice.⁶ Then, in 2018, it issued a consensus statement to share best practices and provide recommendations for TCC implementation.⁷

Challenges of TCC for local site nurses, although not limited to nursing, include acceptance of technology and concerns about privacy. Goran⁸ describes how the reassuring or threatening nature of TCC is dependent on hospital culture and transparency of program goals. Concerns can be mitigated with a structured TCC implementation plan that includes involvement of key stakeholders at remote and local sites.

Additionally, TCC can provide alternative staffing solutions for a strained and aging nursing workforce, further contributing to the quality of care delivered. TCC staff can assist

Documented TCC nurse interventions have been shown to decrease failure to rescue by

15%



local nursing staff with patient safety through alerts, documentation, and oversight when there are competing clinical priorities, allowing local staff to attend to higher-priority patients in their caseload. TCC nurses also function as mentors to newer nurses. Documented TCC nurse interventions have been shown to decrease failure to rescue by 15%.⁹ TCC also offers experienced ICU nurses a different career option, an alternative to physical bedside nursing and its associated burnout, and TCC provides hospitals an opportunity to retain experienced nurses.

Veterans Health Administration Perspective

Veterans Health Administration (VA) TCC systems began in 2012; today, nearly one in four VA ICU beds are monitored by TCC. The Veterans Integrated Service Network (VISN) 10 program supports 19 medical centers and, in 2018, comanaged nearly 15,000 patients.

To meet the critical care needs of individual VA medical centers, the VISN 10 TCC service customizes care to each facility's particular circumstances. It delivers proactive care that identifies and rectifies potentially consequential physiologic or biochemical derangements and notifies bedside caregivers before untoward trends develop into adverse outcomes.

TCC improves timely access to experienced intensivists, especially in rural areas where ICU physician support may be partial or lacking¹⁰ and provides continuous support to bedside

nurses during acute changes in patient status when bedside physicians are unavailable.¹¹ VA TCC also reduces inter-hospital ICU transfers of moderate and high illness severity patients.¹² Current VA TCC nursing quality initiatives include central line insertion monitoring, quality assurance for glucose control, and deep vein thrombosis and stress ulcer prophylaxis. VA TCC physician initiatives include:

- Remote ventilator rounds accelerating earlier spontaneous awakening and breathing trials
- A collaboration with tele-neurologists to support a tele-stroke program that facilitates early assessment of patients with acute strokes and management of thrombolytic therapies
- A collaboration with tele-nephrologists to assess and manage patients with renal disorders and dialysis therapy assessment

Military Perspective

The military has embraced telemedicine—which it refers to as virtual health—because it enhances local caregivers' ability to deliver medical services beyond their training by engaging remote experts at the point of local need through technology solutions. This serves two purposes in the military: In garrison (ie, care similar to the civilian system), it has been demonstrated that TCC services permit small military community hospitals to increase their illness severity, case complexity, overall patient volume, surgical volume, and

Suggested Reading



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safety culture.^{13,14,15} In deployed operational settings, TCC support enables better clinical decision-making in austere circumstances.^{16,17} It is anticipated that the uniformed services' new Joint Tele-Critical Care Network (JTCCN) will support both garrison and operational TCC missions. An effort is also underway to enhance operational surge capacity by linking the JTCCN with the VA TCC system.

Administrative Perspective

Executive support for both the implementation and ongoing operation of TCC services is essential for long-term success. Such support empowers the TCC team to integrate well within the health system hierarchy so they can overcome cultural and organizational barriers and be instrumental in building bridges between the TCC remote and local teams.⁴ TCC programs need to have administrative guidelines that define responsibilities among its remote and local teams while still accommodating variations in local site needs and culture.⁴ TCC remote site administrative teams must ensure the competency of their

team members by using ongoing performance evaluation, continuing education, credentials, and privileging, and compliance with state licensing regulations, which can be complex when TCC systems span multiple states or countries. The role of the TCC director is imperative for communicating with remote and local hospital executives as well as the care teams themselves.

A Common Theme: Improved Access

In summary, TCC services can be viewed from a variety of perspectives. A common theme is improvement in access to critical care services and consistent delivery of high-quality care. The improved quality extends beyond ICU mortality and length-of-stay metrics to implementation and adherence to specific best-practice protocols; supporting the teams at bedside; and the ability to bring structure, standardization, and collaboration to units, which in turn demonstrates improved volume and successful care for more complex cases.

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