Increasing Quality Through Telemedicine in the Intensive Care Unit

Thomas H. Kalb, MD[a,b,*]

KEYWORDS

• Performance improvement • Process indicator • Outcome indicator
• Culture of safety • Team building • TeleICU data management
• Cross-sectional analysis • Longitudinal analysis

KEY POINTS

- Quality Process Improvement in the ICU requires a system for data collection and analysis, dedicated resources, and a culture of safety that drives the process.
- The TeleICU platform is well equipped to provide all of the elements of successful Quality Process Improvement.
- Hurdles to the successful implementation of a TeleICU directed Quality Process Improvement include loss of data fidelity, strains on resources, and barriers across the TeleICU environment that hinder the development of a culture of safety.
- A completed Quality Process Improvement initiative to direct ventilator rounds across a TeleICU platform is described in some detail so as to point out features that lead to success and possible strategies to overcome the hurdles.

INTRODUCTION

This article explores the hypothesis that a telemedicine intensive care unit (TeleICU) platform is uniquely suited to facilitate quality performance improvement (PI). At the same time, this article also addresses some of the substantial hurdles to overcome that may limit the effectiveness of a TeleICU platform to achieve PI objectives. Lastly, this article describes in some detail the author's experience with an ongoing PI project to improve ventilator management conducted via a TeleICU hub interacting with 11 geographically dispersed ICUs. Using this example to illustrate the concepts, the author hopes to shed some realistic light on the successes and lessons learned so as to generate best-practice guidelines for TeleICU-directed PI initiatives.

Disclosure: No extramural support.
[a] Advance ICUcare Medical Group, 747 Third Avenue, 28th Floor, New York, NY 10017, USA;
[b] Department of Medicine, North Shore/LIJ Hofstra School of Medicine, Manhassat, NY, USA
* Advance ICUcare Medical Group, 747 Third Avenue, 28th Floor, New York, NY 10017.
E-mail address: tkalb@icumedicine.com

Crit Care Clin 31 (2015) 257–273
http://dx.doi.org/10.1016/j.ccc.2014.12.005 **criticalcare.theclinics.com**
0749-0704/15/$ – see front matter

How Is a Telemedicine Intensive Care Unit Platform Aligned with a Quality Performance Improvement Mission?

PI activities can be defined as any systematic, data-driven, clinically focused program that is intended to improve a defined set of processes or outcomes on a defined cohort of patients, often focused on a particular disease or illness.[1] For example, in the case of ventilator-associated pneumonia, a *process indicator* might measure the timeliness, accuracy, or incidence of a targeted activity, such as the implementation of appropriate antibiotics, whereas *outcome indicators* measure clinical events, such as the incidence of worsening lung injury scores in patients requiring more than 48 hours of mechanical ventilation.

In general, quality PI activities are conducted daily, folded into clinical activities, often with dedicated stakeholders but almost always with participation of the clinical team. In the ICU setting, PI programs have taken many guises and have focused on a diverse array of clinical activities. Often, ICU PI initiatives stem from an effort to bolster adherence to best-practice guidelines that have been vetted and endorsed by expert panels, such as the Surviving Sepsis guidelines promoted by the Society of Critical Care Medicine (SCCM) or the standards for deep vein thrombosis (DVT) prophylaxis as published periodically by the American College of Chest Physicians. In other instances, successful PI initiatives are driven by more local issues, such as tackling throughput bottlenecks, to identify and overcome local dynamics that limit efficiency and successful patient triage.[2]

TeleICU is conducive to quality PI by virtue of the natural alignment of the TeleICU basic tool kit with the required PI implementation package. In all successful PI initiatives, irrespective of the particular focus, 3 domains have been cited as being critical; these same domains are also integral components of most TeleICU systems.[3] These characteristic components can be summarized under the headings of *Good data, Dedicated resources*, and *Team building for a culture of safety*.

Good data

The aphorism *you can't improve what you can't measure* is so often cited in quality PI circles as to be a widely accepted maxim. Having said that, there is no greater challenge in the critical care arena than to capture meaningful data that can be brought to bear on PI objectives. The challenges are daunting, not the least of which stems from the complex physiology of critically ill patients and the heterogeneous mix of disease states that come under the critical care umbrella. With so much going on, so much being measured, and at so rapid a pace, with so few resources available to dedicate to collecting data, information overload and lapses are a given. Simply stated, TeleICU offers a unique solution to provide a comprehensive, prospective, real-time accruing database.

Of the products available to provide TeleICU monitoring services, the proprietary software package by Philips VISICU presently enjoys market dominance and serves as the model to illustrate PI alignment in this article.

The data management software package eCareManager (Philips VISICU, Baltimore, MD) that is the center post of the Philips VISICU platform provides the TeleICU clinician with a uniform display of clinical information by culling multiple sources of electronic medical record (EMR) stream into an organized critical care flow sheet for each patient. This organization is critical to the day-to-day management of large volumes of patients from diverse settings by providing a uniform and concise clinical summary. At the same time, this same information that streams into the TeleICU center for clinical use is also downloaded into a reducible and mineable database that is collected by the software proprietor and used to prepare quarterly performance reports.