



# Measuring intensive care unit performance after sustainable growth rate reform: An example with the National Quality Forum metrics<sup>☆,☆☆</sup>



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## ABSTRACT

**Background:** Performance measurement is essential for quality improvement and is inevitable in the shift to value-based payment. The National Quality Forum is an important clearinghouse for national performance measures in health care in the United States.

**Aim:** We reviewed the National Quality Forum library of performance measures to highlight measures that are relevant to critical care medicine, and we describe gaps and opportunities for the future of performance measurement in critical care medicine.

**Conclusion:** Crafting performance measures that address core aspects of critical care will be challenging, as current outcome and performance measures have problems with validity. Future quality measures will likely focus on interdisciplinary measures across the continuum of patient care.

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## 1. The National Quality Forum is important to critical care medicine

In 2009, as part of the Patient Protection and Affordable Care Act, the US Department of Health and Human Services contracted the National Quality Forum (NQF) to “establish a portfolio of quality and efficiency measures that will allow the federal government to more clearly see how and whether health care spending is achieving the best results for patients and taxpayers” [1]. These measures are the tools that the federal government uses to assess high-value care, and they will grow in importance over the next few years. With the recent passage of H.R.2 (Medicare Access and CHIP Reauthorization Act of 2015), which effectively repealed the Sustainable Growth Rate formula, value-based payment models have been prioritized and further incentivized [2]. By 2018, 90% of all Medicare payments will be performance based [3]. Starting in 2019, Medicare payments will be based on whether the physician elects to join in the alternative payment program or the merit-based incentive payment system. Under the alternative payment program, physicians can participate in accountable care organization or

patient-centered medical homes and are paid by the rules of their organization. The merit-based incentive payment system program will pay physicians based on performance in 4 subcategories: clinical quality, resource utilization, clinical practice improvement, and meaningful use of electronic health record technology. Top performers stand to receive an annual performance adjustment of up to 10% [4].

Critical care medicine is an important target for the NQF's work in establishing measures for high-value health care as the costs are very high. In 2010, the average intensive care unit (ICU) cost per day was estimated to be \$4300. This accounted for 13.2% of hospital costs, 4.14% of national health expenditures, and 0.74% of the gross domestic product [5]. Here, we highlight NQF-endorsed measures relevant to critical care medicine, present challenges/opportunities for performance measurement in critical care nationally, and present context for future intersections of critical care medicine and performance measurement in the NQF.

## 2. What kinds of measures are intended for the NQF?

The science of performance measurement is relatively new and evolving. Within the NQF library, performance measures are selected from several candidate measures to satisfy specific scopes and aims. Endorsed measures are intended to exhibit strong validity between theoretical and empirical definitions, demonstrate statistically robust measurement properties, and address previously prioritized national

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health strategies for which there is evidence of an existing gap in performance [1]. The NQF measures are preferably useful not only for quality improvement efforts within a single hospital but also for benchmarking performance across many hospitals. These are demanding criteria, particularly if they are applied to patients who have dynamic and diverse diseases and who commonly require simultaneous and coordinated care from multiple medical specialists, nurses, respiratory therapists, pharmacists, and other health care professionals.

### 3. What measures does the NQF hold for critical care medicine?

Because the library of measures in the NQF is under regular review and updating, 3 of the authors (AN, JH, and US) scrutinized the current library (as of January 3, 2016) of 627 NQF performance measures to evaluate the extent to which critical care medicine is represented. We strictly defined *critical care medicine* as pertaining to patient care in the ICU. From among all identified measures, we found only 10 that were unambiguously attributable to critical care medicine (Table 1). These measures included both process (ie, what the physician does rather than how the patient does) and outcome measures (ie, how the patient's health status changes after health care) and address core aspects of critical care medicine including documentation of patient care preferences, ICU mortality, ICU length of stay (LOS), prolonged intubation, postoperative respiratory failure rate, thromboembolism prophylaxis, urinary tract infection, central venous catheter–related infection, and management of severe sepsis and septic shock, including the timing of blood cultures. In addition, we identified other measures that address processes or outcomes that are likely (but not certain) to occur in the ICU or to involve intensivists. We present examples of these diverse measures that include process and outcome measures (Table 1). The extent to which critical care practitioners affect performance on these measures would vary greatly according to the hospital setting and the practice patterns of physicians within a particular hospital given the diverse way care is delivered across health systems [6].

### 4. What are the shortcomings of current NQF measures for critical care?

One outstanding finding from our review is that the current library of critical care medicine–specific measures does not address some core aspects of critical care medicine, for example, adherence to stress ulcer prophylaxis, delirium screening, and physician and nurse staffing models. Whether this is a shortcoming may depend on how patient care is contextualized. For some, critical care is a specific care episode confined to admission and discharge from an ICU. For others, critical care is part of the arc of illness and recovery embedded within health management. Whether NQF performance measures reflect core aspects of critical care is debatable.

The methods of measuring critical care performance, alone or in the spectrum of care, are important to consider. The NQF library classifies measures according to important dimensions of high-value care, described as National Quality Strategy priorities, such as affordable care, patient safety, and effective communication and care coordination. The NQF also classifies measures according to structure, process, outcome, and efficiency. Selecting a top priority or best type of measure, such as process measures or outcome measures, is challenging for critical care and for other specialties. No strategy priority or measure type—whether structure, process, or outcome—is free from fault or risk of unintended consequences. Although outcomes would seem to refer to real events that are more relevant to patients, many outcome measures (even those most relevant to core aspects of critical care) have problems with validity. Important outcomes for critically ill patients include catheter-related bloodstream infection, pressure ulcers, sepsis, acute renal failure, acute respiratory distress syndrome, infection with hospital-acquired infections, and gastrointestinal tract bleeding to name a few. These outcomes vary by frequency, severity, preventability, and importance and are assessed as impacts on mortality, costs, or patient experience.

The influence of patient experience and, by extension, satisfaction on outcome measures is controversial. In some studies, better patient

**Table 1**  
National Quality Forum performance measures for critical care medicine

Measure no.	Title or topic	Type of measure	Qualifying critical care criterion
Measures specific to critical care medicine			
0129	Risk-adjusted prolonged intubation	Outcome	Mechanical ventilation
0138	Urinary catheter–associated UTI for ICU patients	Outcome	Patients in ICU
0139	Central line catheter–associated bloodstream infection rate for ICU and high-risk nursery patients	Outcome	Patients in ICU
0356	Blood culture timing for patients in the ICU	Process	Patients in ICU
0372	ICU venous thromboembolism prophylaxis	Process	Patients in ICU
0500	Severe sepsis and septic shock: management bundle	Process	ICU disease
0533	Postoperative respiratory failure rate	Outcome	Patients in ICU
0702	ICU LOS	Outcome	Patients in ICU
0703	ICU: in-hospital mortality rate	Outcome	Patients in ICU
1626	ICU patients with care preferences documented	Process	ICU patients surviving 48 h
Measures potentially relevant to critical care medicine			
0119	Risk-adjusted operative mortality for CABG	Outcome	Commonly ICU patients
0120	Risk-adjusted operative mortality for aortic valve replacement	Outcome	Commonly ICU patients
0121	Risk-adjusted operative mortality for mitral valve replacement	Outcome	Commonly ICU patients
0122	Risk-adjusted operative mortality for mitral valve replacement + CABG	Outcome	Commonly ICU patients
0123	Risk-adjusted operative mortality for aortic valve replacement + CABG	Outcome	Commonly ICU patients
0128	Antibiotic prophylaxis duration for cardiac surgery	Process	Commonly ICU patients
0213	Percentage of cancer patients admitted to ICU in final 30 d	Process	Outcome is ICU admission
0300	Controlled blood glucose after cardiac surgery	Surrogate	Commonly ICU patients
0346	Iatrogenic pneumothorax rate	Outcome	Procedure common to ICU patients
0353	Failure to rescue 30-d mortality (risk adjusted)	Outcome	Commonly ICU patients
0467	Acute stroke mortality rate	Outcome	Commonly ICU patients
1716	NHSN facility-wide inpatient hospital-onset MRSA bacteremia outcome	Outcome	Commonly ICU patients
1717	NHSN facility wide inpatient hospital-onset <i>Clostridium difficile</i> infection outcome measure	Outcome	Commonly ICU patients
2065	Gastrointestinal hemorrhage mortality rate	Outcome	Commonly ICU patients
2459	In-hospital risk-adjusted rate of bleeding event for patients undergoing PCI	Outcome	Commonly ICU patients
2726	Prevention of central venous catheter–related bloodstream infections	Process	Procedure common to ICU patients

UTI indicates urinary tract infection; CABG, coronary artery bypass graft; NHSN, National Healthcare Safety Network; MRSA, methicillin-resistant *Staphylococcus aureus*; PCI, percutaneous coronary intervention.

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