

VIEWPOINT

Rescuing Failure to Rescue—Patient Safety Indicator O4 on the Brink of Obsolescence

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Measuring outcomes is a critical step toward improving quality of patient care. For example, inpatient deaths following elective surgery are rare, but measuring them is an important first step to find ways to prevent them. One could further argue that, in a well-designed and well-run system, these deaths should never happen. Elective surgery should be offered selectively, and postoperative care should be adequate to rescue patients having minor complications from progressing to major events such as death. **If measurement is an important component of quality improvement and deaths from elective surgery are a highly undesirable event, pairing these consensus-held beliefs is both sensible and meaningful for optimizing patient care.**

This concept explains the Agency for Healthcare Research and Quality's patient safety indicator O4 (PSI-O4), a risk-adjusted measure of in-hospital deaths in surgical patients with serious treatable complications.¹ PSI-O4 has been highlighted as a particularly effective measure because of its high sensitivity for identifying potential quality lapses (eg, patients documented as having an in-hospital death were never found to be miscoded).² Evidentiary support has led to the rapid adoption of the measure for both national quality assessment programs (eg, Centers for Medicare & Medicaid Services Overall Hospital Quality Star Ratings,³ Leapfrog's Hospital Safety Grade Score⁴) as well as public reporting schemes (eg, Medicare.gov Hospital Compare,³ state-based reporting measures such as the Maryland Hospital Acquired Conditions program run by the Health Services Cost Review Commission⁵). Even as other PSI measures, such as PSI-90, have been strongly criticized for their limitations,⁶ PSI-O4 has continued to maintain appeal with quality assessment programs.⁷ However, regardless of how attractive a binary measure of quality, such as in-hospital death, may appear at face value, PSI-O4 is much more problematic for daily quality practice and may lead to serious errors in decision-making by an institution's patient safety leadership.

The rationale behind PSI-O4 stems from a 2-decades-long effort to measure a health care institution's "failure to rescue" performance in surgical patients. Complications happen after surgery, but the relative difference in how many of these complications lead to a catastrophic event may be indicative of overall quality of care.^{8,9} To capture this phenomenon, the PSI-O4 measure intends to quantify the death rate among surgical inpatients with serious treatable complications. While the goal is admirable, the practical execution of the PSI-O4 measure raises a number of issues.

To improve the quality of care provided in our institution, we examine every PSI-O4 event to identify op-

portunities for systematic change, policy modification, and other process improvement efforts. In doing so, we have identified a number of cases in which events captured by this measure do not reflect flaws in the quality of surgical care provided.

First, the greatest discrepancy stems from PSI-O4's stated focus on "operating room procedures." As procedural care continues to expand to environments outside the operating room, the many procedural admissions captured in the PSI-O4 denominator are not a measurement of an institution's surgical care. The measure includes all of a hospital's Centers for Medicare & Medicaid-reported surgical discharges, defined as a discharge with an operating room *International Classification of Disease, Ninth Edition, Clinical Modification* code (or alternatively, an associated Medicare Severity Diagnosis Related Group operating room code) and a procedure performed within 2 days of admission or elective surgical admission.¹ **The measure's population includes patients undergoing therapeutic bronchoscopy, endoscopy, cardiac catheterizations, and angiography often performed by nonsurgeons. Although PSI-O4 is defined as a surgical quality measure, a substantial number of these deaths may have occurred with a patient never cared for by a surgical service and never having entered an operating room.**

Second, the measure excludes patients transferred out but not patients transferred in to avoid misattribution from transfers. However, these exclusions may lead to distorted incentives for both sending and receiving hospitals. For example, between 2016 and the present, the validity of PSI-O4 has been challenged because of the potential for hospitals to game the measure by off-loading sick patients.¹⁰ In addition to the gaming, there also exists a limitation in root cause assignment. Patients transferred may have received poor quality of care or had a complication event at one hospital, yet the death occurs and is attributed to the receiving hospital.

Third, unlike other quality measures, a serious treatable complication present on admission does not preclude it from being counted as a PSI-O4 event. For example, a patient arriving with cardiogenic shock who requires an emergent cardiac procedure (eg, catheterization, mechanical circulatory support) to treat the condition would still be counted as a PSI-O4 case even though the complication (ie, shock) was present before any surgical care was provided. While these in extremis conditions could be excluded by PSI-O4 criteria if they were coded as one's principal admission diagnosis, current coding practice does not allow symptom codes such as shock to be the principal diagnosis. While systematic errors in measurement are

less important when comparing performance on a relative basis, the impact of this flaw in PSI-04 will fall on hospitals receiving high-acuity transfers as they will be admitting a greater proportion of patients who meet inclusion criteria for a PSI-04 event and have a high risk of mortality.

While the National Quality Forum had planned to continue endorsing this quality measure, the Agency for Healthcare Research and Quality has withdrawn it from further consideration given these measurement limitations and has not updated the measure since 2017.¹⁰ Even with measurement imperfections, the greater issue that has not been fully addressed is whether PSI-04 is appropriately targeting admissions for its intention to measure the quality of *surgical* care. Is the purpose of PSI-04 meant to measure overall hospital quality, or is it meant to serve as a specific measure of the surgical care provided? The manner in which admissions and procedures performed by nonsurgeons are included would suggest the former. We believe stakeholders such as patients and payers would be interested in this distinction and that further revision is necessary to delineate high-intensity procedural care provided in an operating room vs the broader swath of procedures provided in myriad procedural settings across an institution.

Like other quality measures, PSI-04 has reached a critical juncture, and we must decide if these limitations can be mitigated. PSI-04 can be rescued, but it will rely on overcoming 2 key hurdles. First, the list of applicable procedures should be revised to reflect what quality experts and surgeons authentically believe are appropriate benchmark surgical procedures. Procedure codes that do not meet consensus definitions for surgical operations meeting the stated intent of PSI-04 should be eliminated from the measure to improve its face validity. Second, when these procedures are accounted for, the attribution methodology needs to be refined so that patient deaths are associated with the root cause and location of care or are not counted in the measure. For example, patients presenting in extremis and patients transferred in because of the complex surgical needs represent 2 groups in the PSI-04 denominator that should—and can—be easily removed.

Physician engagement in quality improvement requires measures we think are accurate, reliable, and actionable. The limitations of quality measures risk a crisis of confidence. In its current state, PSI-04 does not fit these criteria. Simply put, the measure does not meet the intended goal. We must refine PSI-04 to enhance its face validity and attribution or scrap it altogether.

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