

Death to Mortality as a Reported Percutaneous Coronary Intervention Quality Metric

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Public reporting of health care data is not new. Its roots can be traced back to Florence Nightingale, who published mortality rates at British military hospitals during the Crimean War in the hopes that public transparency would lead hospitals with high mortality rates to improve.¹ Fast forward to

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2005, when the Centers for Medicare & Medicaid Services launched the Hospital Compare website to help patients make decisions about where to get health care and encourage hospitals to improve the quality of care that they provide.² Additional mandates for the development of public reporting are contained in the Patient Protection and Affordable Care Act enacted in 2010. Public reporting programs continue to proliferate and now exist in many forms, with reports from (1) federal and state agencies, (2) payers and business consumer groups, (3) databases maintained by professional organizations, (4) independent organizations using their own proprietary analysis and rating schemes, (5) groups focusing on the cost of care, and (6) public websites where patients can rate their personal experiences with physicians. The strongest justification for public reporting is the public's right to know about the quality of care that they are likely to receive. However, for any public reporting program to achieve this goal, the reporting process must be fair and accurate and include meaningful metrics that the public can understand. Although public reporting is intended to help patients make better decisions and identify poor performers, many criticisms have been stated, and data that support the value of public reporting are sparse.³

In this issue of *JAMA Cardiology*, Sandhu and colleagues⁴ evaluate 1 of the metrics reported in several public reporting programs. Percutaneous coronary intervention (PCI)-related mortality is frequently reported because it is easy to define, not affected by subjectivity like an outcome related to symptoms, and readily available from hospital records or other administrative databases. However, the authors provide an additional perspective for why PCI-related mortality is an unpopular and flawed metric for public reporting.

The study cohort was derived from hospitals included in the New York PCI reporting database between 1998 and 2016. The primary analysis evaluated whether a hospital's PCI risk-adjusted observed to expected (O/E) mortality ratio in a given year was associated with the mortality ratio in the following year. The main conclusion from their study was that the O/E mortality ratio regardless of whether it was high or low was only weakly associated with the ratio the following year. The authors used several other models that considered

hospital procedure volume, change in patient severity, and changes to methods made by the state. When these adjustments were used in different models, the finding was unchanged; PCI mortality in the index year was weakly associated with the future result. Hospitals with high PCI-related mortality experienced decreases the following year, whereas the opposite occurred in hospitals with low mortality rates during the index year.

Central to understanding their results is the concept of regression to the mean. Regression to the mean is a statistical construct that describes how results even out over time. Basically, the concept states that if a variable is extreme the first time it is measured, it will be closer to the mean the next time it is measured. Fortunately, elective PCI-related mortality is rare, but when coupled with operators and facilities with low annual volumes, it is a set up for wide swings in mortality rate.⁵ A facility or operator may have a good year or bad year for PCI-related mortality, but over time and as operators and facilities accumulate more procedures, regression to the mean proposes that the mortality rate will approach the reported mean PCI-related mortality rate. Regression to the mean is how the authors showed that the PCI-related mortality rate may be a poor marker of quality of care and a poor metric for public reporting.

What Does This Mean for Hospitals?

Although the authors showed that PCI mortality may be a poor metric for public reporting, that does not mean it should be abandoned as an outcome tracked internally by hospitals. Although the article is based on hospital data, the lesson learned is that facilities should be aware that this concept also applies to individual operators (especially lower-volume operators). Someone with reported high mortality rates 1 year should not immediately be judged a bad operator, because their results in the following year are likely to be better. In some instances, an operator's annual mortality rate is determined not by their judgment or skill but more on how many times they were on call when the patient dying of a myocardial infarction with cardiogenic shock presented. All PCI-related mortalities should be subject to an unbiased internal review, which may be difficult in smaller hospitals with competing physicians. Guidelines for internal peer review exist,⁶⁻⁸ and a process such as a phase of care mortality analysis developed by cardiac surgeons may be helpful.⁹ If peer review cannot be accomplished internally, external review should be considered. It is important that an internal review process include not only physicians but also other

members of the catheterization and care teams, because they may provide additional helpful information. As with any peer review function, the goal is not punitive but to better understand what happened and identify opportunities for improvement. Unfortunately, this process may identify important concerns about an operator that must be addressed. The Joint Commission has defined the Ongoing Professional Practice and Focused Professional Practice Evaluation process, which may be helpful in addition to a facilities' own activity through the medical staff.¹⁰ Several professional organizations offer accreditation programs for cardiac catheterization laboratories. In addition to evaluating the structure and operational performance of a laboratory, individual and random case reviews can be included as an additional option to optimize laboratory performance and assess outcomes and performance of individual operators.

What Does This Mean for Public Reporting?

Public reporting is for the public and accordingly should be presented in a manner that is easy to understand and meaningful. Although everyone understands the meaning of mortality, understanding the nuances of how risk-adjusted mortality rates are determined is not as easy for the public. Moreover, even for a well-established and thoughtful program such as the one in New York, the most recently available data are for the period of 2014 to 2016. Whether that will help a patient's decision today is questionable. A reasonable compromise

between not publicly reporting mortality as an isolated metric yet including it as part of an assessment of program quality is to include mortality as a component of a composite metric. Since 2010, the Society of Thoracic Surgeons has provided the option of publicly reporting composite star ratings for several cardiac surgical operations.¹¹ Operative mortality is 1 of 11 metrics included in the composite, which also includes process metrics. Following this example, a composite metric will soon be available as part of the National Cardiovascular Data Registry public reporting program.¹²

What Does This Mean for the Public?

Mortality due to PCI is important and should be included in a factual and honest discussion of the specific risks and benefits of PCI during informed consent. As demonstrated by Sandhu and colleagues,⁴ PCI-related mortality rates may be subject to randomness, and thus patients should interpret such reported rates with caution. However, I suspect that despite any flaws associated with reporting PCI-related mortality rates in isolation, reporting of this metric will continue. Perhaps when seeing an increased PCI-related mortality rate at a facility based on data several years in the past, more important questions for a patient to ask are, "Are you aware of this, has anything been done to address this, and what is your current mortality rate?" Those questions reflect the purpose of quality improvement, and the answer would be a marker of a quality program.

ARTICLE INFORMATION

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Published Online: September 18, 2019.
doi:10.1001/jamacardio.2019.3232

Conflict of Interest Disclosures: Dr Dehmer reported being the chair of the Public Reporting Advisory Group of the National Cardiovascular Data Registry, a voluntary, unpaid position.

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