

CORONARY

# The Impact of Excluding Shock Patients on Hospital and Physician Risk-Adjusted Mortality Rates for Percutaneous Coronary Interventions



## The Implications for Public Reporting

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### ABSTRACT

**OBJECTIVES** The authors examined the impact of including shock patients in public reporting of percutaneous coronary intervention (PCI) risk-adjusted mortality.

**BACKGROUND** There is concern that an unintended consequence of statewide public reporting of medical outcomes is the avoidance of appropriate interventions for high-risk patients.

**METHODS** New York State's PCI registry was used to compare hospital and physician risk-adjusted mortality rates and outliers from New York's public report models with rates and outliers based on statistical models that include refractory shock patients and exclude both refractory shock and other shock patients.

**RESULTS** Correlations between the public report model and each of the other 2 models were above 0.92 for hospital risk-adjusted rates and were 0.99 for all physician risk-adjusted rates ( $p < 0.0001$ ). There were 11 physicians with lower than expected mortality rates (low outliers) and 41 physicians with higher than expected mortality rates (high outliers) across the 3 time periods in the public report, compared with 10 low outliers and 40 high outliers if all shock patients had been excluded. There was considerable overlap among outliers identified by the 3 models. Findings were similar for hospital outliers.

**CONCLUSIONS** Risk-adjusted hospital and physician mortality rates are highly correlated regardless of whether shock patients are included in public reporting. The numbers of outliers are similar, and outlier changes are minimal, although 10% to 15% of cardiologists who were outliers in either exclusion rule were not outliers in the other one. This information can form a basis for subsequent discussions regarding the exclusion of high-risk patients from public reporting. (J Am Coll Cardiol Intv 2017;10:224–31) © 2017 by the American College of Cardiology Foundation.

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Following the public releases of coronary artery bypass graft (CABG) surgery hospital outcomes data in New York in 1989 and Pennsylvania in 1990, several states now release risk-adjusted mortality rates for hospitals, and some release the same data for cardiologists and surgeons for 1 or more cardiac procedures (1-5). Also, the Centers for Medicare & Medicaid Services (CMS) now releases hospital risk-adjusted outcomes for several medical conditions, as well as risk-adjusted mortality and readmissions data for CABG surgery (6).

Despite the fact that public reporting of health outcomes by governmental agencies and private companies has become commonplace in the last 20 years, there has been considerable concern expressed by hospitals and physicians about its detrimental impact. Perhaps the most troublesome of these concerns is that high-risk patients who can benefit from a procedure are being denied access because of the fear of physicians and surgeons that their risk-adjusted mortality rates will be negatively affected (7-16).

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The current policy for public reporting of risk-adjusted in-hospital/30-day percutaneous coronary intervention (PCI) mortality rates for hospitals and physicians in New York is to include all patients except patients with cardiogenic refractory shock and a subset of patients with anoxic brain injury. However, some cardiologists have questioned whether these exclusions should be expanded to also include patients with nonrefractory shock, referred to as hemodynamically unstable patients in the New York registry.

The purpose of this study was to examine the impact on risk-adjusted mortality rates and outlier status for hospitals and physicians if each of 2 separate changes were made to the current public report: 1) inclusion of the refractory shock patients who are currently excluded; and 2) exclusion of all shock patients.

## METHODS

**DATABASE.** The databases used to conduct the study were New York's Percutaneous Coronary Interventions Reporting System (PCIRS) and New York's Vital Statistics file. PCIRS was created in 1992 for the purpose of evaluating and improving the quality of PCI in New York through the risk adjustment of outcomes and dissemination of reports to hospitals, cardiologists, and the public. It contains demographics; patient risk factors; complications; hospital and cardiologist identifiers; admission, discharge, and

procedure dates; and discharge disposition for all PCI procedures performed in nonfederal hospitals in the state.

Data are audited for completeness and accuracy by matching to New York's acute care hospital administrative database, SPARCS (Statewide Planning and Research Cooperative system), and by reviewing medical records from hospitals. Records are chosen for review each year from a sample of hospitals based on reported prevalences of patient risk factors, accuracy of previous reporting, and time since last audit.

A total of 60 hospitals performed PCI in the state in 2013. Vital statistics data were matched to PCIRS using unique patient identifiers in order to obtain deaths that occurred after discharge but within 30 days following the index PCI procedure.

**PATIENTS.** For each time period included in the analyses, 3 groups of patients were analyzed after having removed non-U.S. residents (because of inability to follow them after discharge) and patients excluded from New York's public reports because of anoxic brain injuries (1): 1) all patients undergoing PCI in the time period except refractory shock patients (the data used in New York's public reports since 2006); 2) all patients undergoing PCI (i.e., refractory shock patients are also included); and 3) all patients undergoing PCI except refractory shock patients and nonrefractory shock patients. Separate analyses were conducted using patients from each of the years 2011 to 2013 for evaluating hospital risk-adjusted in-hospital/30-day mortality rates, and for the years 2009 to 2011 combined, 2010 to 2012 combined and 2011 to 2013 combined for evaluating risk-adjusted in-hospital/30-day mortality rates for physicians. The 3 separate years 2011, 2012, and 2013 were chosen for evaluating hospitals because they were the latest 3 years available with audited data. The 3 overlapping 3-year periods beginning with 2009 to 2011 were chosen because physicians are evaluated using 3 years of data, and these were the 3 latest 3-year periods that were available.

In PCIRS, the data element "refractory shock" is defined as acute hypotension (systolic blood pressure <80 mm Hg) and/or low cardiac index (<2.0 l/min/m<sup>2</sup>) just before commencement of PCI despite pharmacological or mechanical support. Also, ongoing resuscitation warrants the coding of refractory shock. Nonrefractory shock (called "hemodynamic instability" in PCIRS during the time of this study) is defined as requiring pharmacological or mechanical support to maintain blood pressure or

## ABBREVIATIONS AND ACRONYMS

**AMI** = acute myocardial infarction  
**CABG** = coronary artery bypass graft  
**CI** = confidence interval  
**NCDR** = National Cardiovascular Data Registry  
**OR** = odds ratio  
**PCI** = percutaneous coronary intervention  
**PCIRS** = Percutaneous Coronary Interventions Reporting System

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