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# Morbidity and Mortality after Colorectal Procedures: Comparison of Data from the American College of Surgeons Case Log System and the ACS NSQIP

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- BACKGROUND:** Improving the quality of surgical care depends upon collection of robust data. The American College of Surgeons Case Log System enables surgeons to self-report patient risk factors and outcomes. In contrast, the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) uses trained data abstractors to record similar data and uses a strict data collection methodology. The objective of this study was to assess bias in data entry for colorectal cases by comparing data in these 2 registries.
- STUDY DESIGN:** One year of NSQIP (July 1, 2008 to June 30, 2009) and 7 years of Case Log (2003 to 2010) data were examined. Colorectal cases were identified by current procedural terminology code. The frequencies of comparably defined variables were compared, and mortality models were developed using logistic regression. Observed and expected mortality rates were compared.
- RESULTS:** Rates of most risk factor and outcome variables were significantly higher in NSQIP than those in Case Log. NSQIP had a higher unadjusted mortality rate (4.46% versus 3.69%,  $p < 0.001$ ); however, the adjusted odds of mortality was significantly higher in Case Log (odds ratio 1.32,  $p < 0.05$ ). The Case Log model overpredicted mortality in NSQIP by 22%, whereas the NSQIP model underpredicted mortality in Case Log by 12%.
- CONCLUSIONS:** Significant differences exist between risk factor and outcome data in NSQIP and Case Log for colorectal procedures. These differences demonstrate the need for standardized data collection methods, as is required by NSQIP, including use of standard definitions, adherence to a follow-up period for outcomes, and use of audits. These measures would improve the validity of using a self-reported database to evaluate and benchmark performance. (*J Am Coll Surg* 2011; 212:1077–1085. © 2011 by the American College of Surgeons)
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Implicit in the mission of the American College of Surgeons (ACS) is a dedication to improving the care of the surgical patient. Surgeons have a long history of tracking and recording their outcomes for this purpose, and the ACS has developed national multispecialty programs to

facilitate such data collection. These programs include the ACS Case Log System and the ACS National Surgical Quality Improvement Program (NSQIP).

The ACS Case Log (also known as the Practice-Based Learning System) was developed to provide individual surgeons with a uniform format for collecting data on their patients. Surgeons can use the ACS Case Log to compare their results with the aggregated results of thousands of other surgeons, track their own performance over time, and fulfill the requirements for maintenance of certification mandated by the American Board of Surgery.<sup>1</sup> Despite the widespread use of ACS Case Log, the validity and reliability of using this system to measure quality has never been tested. In contrast, the ACS NSQIP is an institution-based surgical outcomes registry that ensures the reliability of data collected by the use of trained data abstractors, strict variable definitions, 30-day follow-up for outcomes, and regular audits. Participating hospitals receive semiannual reports of risk-adjusted outcomes, and the program has been shown to improve the quality of surgical care.<sup>2-4</sup>

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**Abbreviations and Acronyms**

ACS	= American College of Surgeons
ASA	= American Society of Anesthesiology
CHF	= congestive heart failure
NSQIP	= National Surgical Quality Improvement Program
SSI	= surgical site infection

The objective of this study was to compare risk factor and outcome data entered for colorectal cases between the ACS NSQIP and ACS Case Log surgical registries. We compared the frequencies of comparably defined variables, developed statistical models to assess the relationship between risk factors and mortality in each system, and compared observed and expected mortality rates. Our aim was to determine if there is bias in data entry for colorectal cases between ACS NSQIP and ACS Case Log. We hypothesized that risk factor and outcome variables would be reported at a lower frequency in ACS Case Log and that the relationship between risk factors and mortality would differ between the systems owing to differences in data collection methods and rigor.

**METHODS****Data sources**

The sources of data for this study were the ACS NSQIP and ACS Case Log. The ACS NSQIP is an institution-based, multispecialty surgical registry of patient risk factors and postoperative outcomes. Hospital participation in ACS NSQIP is voluntary but does require employment of a full-time surgical clinical reviewer who is trained to use strict data definitions and collection methods. The sampling strategy consisted of collecting data for the first 40 cases performed within consecutive 8-day cycles. General, vascular, and specific subspecialties were included in the sample frame. Data were abstracted from medical records and personal communication between the surgical clinical reviewer and patient. Patient demographics, preoperative risk factors and laboratory values, operative information, and postoperative outcomes within 30 days of the index operation were collected. Hospitals were audited to ensure standardized data collection as well as interrater reliability. Participating hospitals receive semiannual reports with risk-adjusted outcomes from ACS NSQIP that allow them to benchmark their performance with national averages.<sup>2,3</sup>

The ACS Case Log enables individual surgeons to collect and maintain a standardized, personal log of patient risk factors and postoperative outcomes. Cases may be entered regardless of where they were performed, which is an advantage for surgeons who practice at multiple hospitals and/or ambulatory surgical centers. Surgeons report that

they use the ACS Case Log to facilitate the maintenance of certification process mandated by the American Board of Surgery and to better understand their practice patterns and outcomes. Participation is voluntary, and individuals may decide how many cases to enter. Data may be entered regarding patient demographics, preoperative risk factors and some laboratory values, operative information, and postoperative outcomes within 30 days of the index operation; however, the system does not require collection of all of these variables. Data are not audited. Participating surgeons can download personalized reports that compare their results against the aggregated results of thousands of other surgeons.<sup>1</sup>

**Selection of cases and variables**

One year of ACS NSQIP data (July 1, 2008 to June 30, 2009) and 7 years of ACS Case Log data (2003 to 2010) were examined to achieve comparable sample sizes. Colorectal cases were identified by current procedural terminology code, producing 23,568 ACS NSQIP cases and 26,738 ACS Case Log cases. We chose to focus on colorectal procedures because they are frequently performed and have relatively high reported rates of morbidity and mortality compared with other common procedures.<sup>5</sup> Procedure mix was assessed by comparing the distribution of current procedural terminology codes in each system.

The primary outcome of interest was 30-day mortality. In ACS NSQIP, mortality is recorded as a single variable. Surgical clinical reviewers determine mortality through examination of medical records, attempts to contact patients a minimum of 3 times via telephone or mail, and queries of the Social Security Death Index and National Obituary Archives. In ACS Case Log, mortality may be entered as "death within 30 days" or as the 30-day outcome of a postoperative occurrence. For example, after entering the postoperative occurrence "pneumonia," one may optionally indicate if the 30-day outcome of that occurrence was "improved," "unresolved," "worse," or "death." The ACS Case Log mortality rate reported here was thus an aggregate derived from searching the postoperative occurrence fields and from the "death within 30 days" field.

Risk factor and outcome variables with comparable definitions in each system were identified. Variables for risk adjustment of 30-day mortality were selected from this list. In ACS NSQIP, postoperative outcomes are collected strictly within 30 days of the index operation, irrespective of whether the adverse event occurred during the index hospitalization, after the patient was discharged, or after the patient was readmitted to another hospital; data regarding the timing of the complication in relation to the index operation and hospital discharge are also collected. In contrast, the ACS Case Log recommends 30-day follow-up, but it is not required, and there is

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