# Outcome Management in Cardiac Surgery Using the Society of Thoracic Surgeons National Database

***LINDA S. HALPIN,*** *MSN, RN;* ***BRET E. GALLARDO,*** *MIS, CIS;* ***ALAN M. SPEIR,*** *MD;* ***NIV AD,*** *MD*

## ABSTRACT

Health care reform has helped streamline patient care and reimbursement by encouraging providers to provide the best outcome for the best value. Institutions with cardiac surgery programs need a methodology to monitor and improve outcomes linked to reimbursement. The Society of Thoracic Surgeons National Database (STSND) is a tool for monitoring outcomes and improving care. This article identifies the purpose, goals, and reporting system of the STSND and ways these data can be used for benchmarking, linking outcomes to the effectiveness of treatment, and identifying factors associated with mortality and complications. We explain the methodology used at Inova Heart and Vascular Institute, Falls Church, Virginia, to perform outcome management by using the STSND and address our performance-improvement cycle through discussion of data collection, analysis, and outcome reporting. We focus on the revision of clinical practice and offer examples of how patient outcomes have been improved using this methodology. *AORN J* 104 *(September 2016) 198-205.* © *AORN, Inc, 2016. http://dx.doi.org/10.1016/j.aorn.2016.06.017*

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Following the work of Ernest Codman,[1] Avedis Donabedian created what is known as modern-day outcome management. He coined the term *outcome* as part of his health care paradigm for quality assessment, which is composed of three components: structure (ie, the physical setting where health care is delivered, staffing ratios, patient volumes, equipment, information technology), process (ie, what is done for patients based on evidence), and outcome (ie, mortality, morbidity).[2] Unfortunately, it is difficult to use Donabedian's model in today's complex health care environment, in which outcomes vary from institution to institution and from patient to patient, creating endless treatment and outcome possibilities. Therefore, outcome data based on one patient, or a small group of patients, are insufficient to draw inferences related to the quality of health care.[3]

Current outcome management has evolved because of the move to consumer-driven health care, technological advances in medical science, and the subsequent rise in health care costs. Programs that attempted to control costs such as capitation (ie, a set fee paid by insurance companies to providers per patient regardless of the severity of the patient's illness) in the 1980s and today's pay-for-performance/value-based

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purchasing initiative (ie, providers are rewarded for the quality of services provided rather than the quantity of services provided)[4] as a result of health care reform have led to the need for comparative databases and data registries.

Patient population–based registries purchased by institutions provide the data to help health care personnel investigate the structure, process, and outcomes of a given patient population; recognize the effectiveness of treatment protocols; identify the risk factors associated with mortality and morbidity; and examine measures of overall risk–adjusted performance. The use of data registries will help health care personnel measure outcomes of care and continuously compare their data against set national benchmarks. If the results do not meet the set benchmark or target, personnel can implement a plan to improve performance before their data are publicly reported or used for reimbursement. Registries also allow the user to drill down into the data and further explore the reasons why performance is not meeting the set target. For example, if the postoperative length of stay is longer than the set benchmark, a registry allows the user to examine variables such as patient risk factors, complications, and ventilation time so that changes can be made in the process affecting the variable and, thus, improve length of stay.

Having comparable data available to guide health care personnel in quality improvement (QI) initiatives will be of utmost importance in today's health care environment as we move to a reimbursement system based on cost and outcome. The Society of Thoracic Surgeons National Database (STSND) is the premier clinical registry for cardiac surgery, and is one example of a registry that helps health care providers with QI and reimbursement efforts. Predetermined performance measures from the STSND are linked to the Medicare database of the Centers for Medicare & Medicaid Services[5] so that in the near future, providers will need to meet their cost and outcome goals tied to these measures to receive their full reimbursement. In light of these challenges, it will be important to closely monitor the outcome measures that drive payment.

## THE SOCIETY OF THORACIC SURGEONS NATIONAL DATABASE

The STSND was established in 1989 to assist health care providers in their quest for QI. The database houses more than 4.7 million surgical records and gathers its information from more than 95% of the 1,100 groups and institutions that perform cardiac surgery in the United States.[6] The STSND provides a way to look at the structure, process, and outcome of cardiac surgery patients by providing

- a standard format with defined data elements for examining the care of cardiac surgery patients (eg, demographics; risk factors; prior interventions; catheterization laboratory data; operative and other invasive procedure data, such as cross-clamp time, internal mammary artery use, cardiopulmonary bypass/pump time, and complications);
- a tool that can be used to target specific areas of clinical practice improvement by comparison with data from similar hospitals and national benchmarks;
- an accurate look at practice patterns across facilities;
- the ability to access collective national data; and
- the opportunity to participate in national and statewide performance-improvement efforts in cardiac surgery.[6]

Our hospital also participates in a statewide QI effort through the Virginia Cardiac Surgery Initiative, which uses Society of Thoracic Surgeons (STS) data to improve quality for 18 hospitals in the state of Virginia.[7] Involvement in this initiative allows hospitals to improve through use of comparative data on metrics such as incidence of postoperative atrial fibrillation, number of readmissions, blood product use, and ventilation time. Hospital personnel share the process they used to achieve their results, thus offering resources so that other hospitals may improve.

Data collected by participating surgeons and institutions are stored locally at each institution and are submitted to the national database through the Duke Clinical Research Institute on a quarterly basis. The Duke Clinical Research Institute compiles, analyzes, and reports all STS data elements submitted for each institution by participant identification number. Data elements are arranged by patient population, including patients who have undergone the following procedures: isolated coronary artery bypass grafting (CABG), isolated aortic valve replacement, isolated mitral valve replacement, mitral valve repair, and each of these valve replacements/repairs in combination with CABG. Risk stratification models are applied for mortality, morbidity (eg, prolonged ventilation, pneumonia, mediastinitis, renal failure), and length of stay and then adjusted for differences in procedure mix. Participants receive their data reports with benchmarks approximately six months after the end of the current quarter.

After compiling data for 20 years, the STSND committee determined that single-outcome measures were an insufficient basis for comparisons between cardiac surgery programs because of the low event rate of mortality and postoperative complications. In an effort to provide a more comprehensive measurement of the overall quality of a program, the STS developed the composite score. The composite score integrated 11 National Quality Forum measures of quality for CABG