

The Society of Thoracic Surgeons General Thoracic Surgery Database Update on Outcomes and Quality

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The Society of Thoracic Surgeons General Thoracic Surgery Database (STS GTSD) is a voluntary effort that provides participants with semiannual, risk-adjusted performance reports that facilitate quality improvement and comparison of institutional outcomes with national benchmarks. With improved participation in the STS GTSD, increasingly meaningful analyses are available. This year, risk models for lobectomy and esophagectomy for cancer were updated. In addition, we developed the first composite quality measure for general thoracic surgery, a composite measure for lobectomy for lung cancer. Furthermore, international collaboration with the

European Society of Thoracic Surgery has facilitated our understanding of variation between American and European treatment patterns, providing a foundation for future quality improvement initiatives. This article summarizes current aggregate national outcomes in general thoracic surgery and reviews related activities in the areas of quality measurement, performance improvement, and transparency from the STS GTSD over the past 12 months.

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The Society of Thoracic Surgeons General Thoracic Surgery Database (STS GTSD) is the world's largest clinical thoracic surgical database. In 1989, the STS National Database was established as a means to measure, quantify, and compare performance in cardiothoracic surgery. Although data on general thoracic surgical procedures have been included since 1999, the STS GTSD was not established as an independent entity until 2002 [1].

The STS GTSD is a voluntary effort that provides participants with risk-adjusted semiannual performance reports that allow comparison of institutional outcomes against national benchmarks. This year, a composite quality measure for lobectomy for lung cancer was developed, and risk models for lung resection and esophagectomy for cancer were updated. In addition, the STS GTSD Task Force is working to have additional quality metrics receive National Quality Forum (NQF) endorsement, the gold standard for health care quality.

International collaboration with the European Society of Thoracic Surgery (ESTS) has also been a recent focus of the STS GTSD. Efforts have included harmonization of terminology and definitions between the two databases, and facilitating an intersocietal comparison of pulmonary resection practices and short-term outcomes [2, 3]. This review summarizes all national aggregate outcome, quality measurement, and improvement initiatives from the STS GTSD over the past 12 months.

Database Participation and Aggregate Outcomes

Similar to the STS adult cardiac and congenital heart surgery databases, participation in the STS GTSD has increased each year since its inception in 2002, with 261 participants contributing to the data harvest in 2014 (Fig 1) [4]. As of November 9, 2015, the STS GTSD included data from 892 surgeons (868 thoracic and 24 general surgeons) at 274 US institutions in 44 states, for a total of 438,603 operations (Fig 2). In addition, nine surgeons in the United Arab Emirates have agreed to contribute data; however, no international data have been harvested to date. Centers in two additional countries have contracts pending and will likely contribute data soon. Among other benefits of participating in the STS GTSD, performing a quality project using the STS database meets the criteria for the American Board of Thoracic Surgery maintenance of certification part IV. Table 1 summarizes the STS GTSD aggregate outcomes for lobectomy, pneumonectomy, and esophagectomy.

Harmonization of Definitions With ESTS

The STS GTSD and ESTS database were independently created for the purpose of objectively measuring processes and outcomes with the goal of improving the quality of thoracic surgical care. However, direct comparison of the databases was difficult owing to significant differences in variables included and data definitions. To facilitate efficient and accurate intersocietal collaboration, members of the STS GTSD and ESTS Database Task Forces worked to standardize terminology and harmonize

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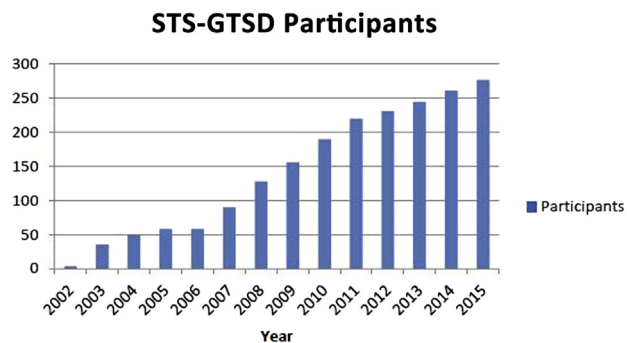


Fig 1. The Society of Thoracic Surgeons General Thoracic Surgery Database (STS-GTSD) participation, 2002 to 2015.

definitions. The result was a comprehensive review outlining the newly defined common terminology, history, and aims of the two databases [2]. In addition, participation, methods of data collection, important publications, and the future visions of the societal databases were reported. A list of agreed upon definitions that were not present in both databases was also included; use of these data fields in future versions of the databases will depend on individual database committee decisions.

The first project comparing the STS GTSD and ESTS database was examining the variation in pulmonary resection practices and short-term outcomes [3]. Between 2010 and 2013, 78,212 patients underwent pulmonary resection and their data were captured in the STS ($n = 47,539$) or ESTS databases ($n = 30,673$). This analysis demonstrated that a greater percentage of patients in the STS GTSD were female, had undergone previous cardiothoracic surgery, and had preoperative thoracic radiation. In addition, patients in the STS GTSD had higher American Society of Anesthesiologists (ASA) classifications and Zubrod scores, consistent with the greater observed incidence of obesity, hypertension, congestive heart failure, and coronary artery disease. More patients in the STS GTSD underwent thoroscopic procedures (62.5% versus 21.8%, $p < 0.001$) and sublobar resections (43.3% versus 31.1%, $p < 0.001$), despite a

similar proportion of surgeries performed for primary lung cancer (Table 2). Although the distribution of pathologic T stage was similar between databases, fewer patients had pathologic N2 or M1 disease at the time of surgery in the STS GTSD.

Comparing outcomes, patients in the STS GTSD had a shorter hospital length of stay, despite being reintubated more often and having more frequent atrial arrhythmias. Thirty-day mortality was higher in the STS GTSD for patients who underwent wedge resection (1.9% versus 0.1%, $p < 0.05$). However, STS GTSD mortality was lower for lobectomy (1.4% versus 2.6%, $p < 0.05$) and pneumonectomy (4.9% versus 7.3%, $p < 0.05$) compared with the ESTS GTSD.

It must be noted that data auditing is not randomly or routinely performed in the ESTS. Only general thoracic surgical units eligible for institutional accreditation currently undergo data auditing in Europe. That adds some uncertainty regarding the quality of the ESTS data and potentially decreases the validity of any comparisons with the audited and highly accurate STS GTSD data.

Although some discrepancies due to regional influences are expected, variation in outcomes suggests the opportunity for quality improvement initiatives. These data provide the basis for further investigation with stage-specific, risk-adjusted analyses to better understand the causes of variation in specific patient populations. With the recent efforts to link the STS GTSD with longitudinal survival data from the Centers for Medicare and Medicaid Services, comparisons of intersocietal variation will become increasingly informative [5].

Lobectomy for Lung Cancer Composite Score

Composite performance measures have been developed in cardiac surgery by the STS Quality Measurement Task Force for coronary artery bypass graft surgery, aortic valve replacement, and coronary artery bypass graft surgery plus aortic valve replacement [6–8]. These measures have been made available to the public for the purpose of comparing the quality of care between programs [9]. However, until this year, no such measure has been developed in general thoracic surgery. Because lobectomy is the most common major thoracic procedure in the STS GTSD, it was chosen to create the first thoracic composite quality measure.

To develop a thoracic composite quality measure based on observed to expected mortality and major complication rates, the STS GTSD was queried for all patients who underwent lobectomy for lung cancer between July 1, 2011, and June 30, 2014 [10]. That identified 20,657 patients for analysis from 231 institutions. Participant-specific risk-adjusted rates of major morbidity and 30-day mortality were estimated in a Bayesian hierarchical model. Mortality was weighted approximately four times greater than a major complication, consistent with the previously reported adult cardiac surgery quality measures [8]. Covariates in this model were based on the most recently published lung cancer resection risk model [11], and included age, sex, year of operation, body mass

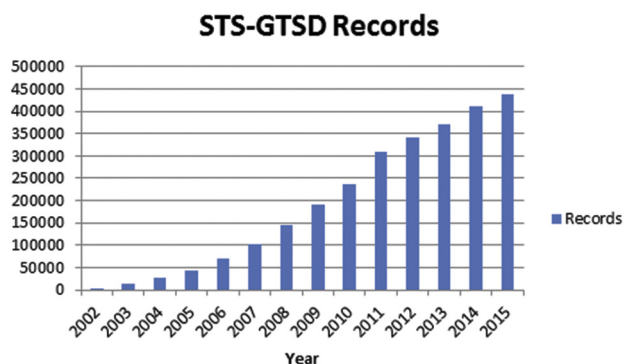


Fig 2. Number of records included in The Society of Thoracic Surgeons General Thoracic Surgery Database (STS-GTSD), 2002 to 2015.

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