Database Audit in Thoracic Surgery

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KEYWORDS

• Quality metrics • Thoracic surgery • National database • Audit

KEY POINTS

- The Society of Thoracic Surgeons General Thoracic Surgery Database (STS-GTSD), the world's largest clinical thoracic surgical database, was established in 2003 as a voluntary registry and provides participant institutions with risk-adjusted outcomes compared with national benchmarks for the purpose of quality improvement.
- An external independent annual audit of the STS-GTSD was initiated in 2010 to assess the completeness, accuracy, and quality of the data collected, to demonstrate reliability and credibility.
- In the most recent audit completed in late 2015, 25 participant sites were randomly selected, and 25 total cases randomly selected at each site, including 20 lobectomy procedures and up to 5 esophagectomies where available.
- The accuracy of the 2015 audited data as measured in 40 individual data elements, 4 categories of like variables, and overall was high, ranging from 96.3% to 99.25%, and demonstrated a continued upward trend when compared with prior years.
- The audit process is essential in validating the quality of the data and adding credibility and value to any voluntary clinical database, and additionally serves as an important tool for quality process improvement, education, and to improve patient care.

In 1989, The Society of Thoracic Surgeons (STS) created a national voluntary cardiac surgery database as a means of supporting national quality improvement efforts.[1] In 2003, a separate national voluntary clinical database was launched by the STS encompassing procedures specific to the practice of general thoracic surgery: The General Thoracic Surgery Database (GTSD).[2] All 3 components of the STS national database, including adult cardiac surgery, general thoracic surgery, and congenital heart surgery, provide participants with risk-adjusted regional and national benchmarks and provide data for research used to improve patient care processes and clinical outcomes. The database has also been used to develop predictive risk models and to support regional and national quality improvement efforts. Combined, the STS national database represents the largest repository of patients and clinical data pertaining to cardiothoracic surgery in the world.

Although administrative data are easier and less costly to collect than clinical data, administrative data has been shown to be less accurate and relevant than specialty-specific, procedure-specific, risk-adjusted clinical data as collected by the STS national database.[3–5] However, voluntary clinical databases must be proven accurate and complete before they are accepted as credible information sources. This is best achieved by external validation through an independent audit. The STS Adult Cardiac Surgery Database (ACSD) has been validated annually by an independent audit since 2006. The number of STS-ACSD sites audited increased from 3% in 2007 to 8% in 2013. As of 2015, the audit included 10% of STS-ACSD participating sites. To avoid

resampling, STS-ACSD participating sites were eligible for audit only every 3 years. Selected STS-ACSD variables, especially those included in risk models and outcome variables, are audited at selected sites for accuracy by comparing participant submissions with data reabstracted from original patient records in the audit process. Across all variable categories, the aggregate agreement rates for more than 100,000 data elements audited each year across multiple sites ranged from 94.5% in 2007 to 97.2% in 2012.[6]

With steady and substantial growth of participants contributing data to the GTSD since its inception in 2003, an external independent annual audit was initiated in 2010 to assess the completeness, accuracy, and quality of the data collected, thereby establishing reliability of the GTSD.

The audit process was patterned initially after the audit performed to validate the STS-ACSD, with specific parameters developed within the GTSD and audit taskforces.[7,8] An independent firm was contracted to conduct the first audit: 10 sites, approximately 5% of the 222 participating sites, randomly selected by the STS from the GTSD. Subsequent audits included more sites each year as participation in the GTSD increased and a larger proportion of participants, 10%, were randomly selected for audit. A total of 20 cases are randomly selected at each site for audit. The first 3 audits focused on lobectomy for lung cancer. Thirty-two specific individual data elements, within 7 categories of variables, were initially selected based on defined quality care measures, specific data elements essential for risk stratification within the predictive models, or variables important to the data collection processes[9] (**Box 1**). The GTSD taskforce reviews audit results annually and modifies the list of individual data elements to be included in the subsequent year audit as needed to insure the audit remains appropriate, relevant, and sufficient to achieve the stated objectives. Beginning with the fourth audit completed in 2013, the scope was broadened to include up to 5 esophagectomy procedures, in addition to 15 to 20 lobectomy procedures, audited at each site. Inclusion of esophagectomy procedures dictated that the list of individual data elements audited be modified to include variables specific to esophagectomy for cancer. Also, important and relevant changes in clinical practice, including the introduction of new technology such as positron emission tomography-computer tomography (PET-CT), endobronchial ultrasonography (EBUS), or endoscopic ultrasonography (EUS) in the staging of lung or esophageal cancer, or identification of potentially important quality metrics, such as the number of

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Box 1
Individual data elements (32) within 7 (VII) categories comprising the 2010–2011 audits

I. Admission
  1. Admission status
  2. Surgeon National Provider Identifier

II. Preoperative risk factors
  3. Cigarette smoking

III. Procedures
  4. PFT performed
  5. PFT-FEV performed
  6. PFT-FEV predicted
  7. Zubrod score
  8. Category of disease, primary
  9. Date of surgery
  10. Operating room entry time
  11. Operating room exit time
  12. Procedure start time
  13. Procedure end time
  14. ASA classification
  15. Procedure
  16. Patient disposition
  17. Lung cancer

IV. Postoperative events
  18. Postoperative events occurred
  19. Postoperative air leak greater than 5 days
  20. Postoperative initial ventilator support greater than 48 hours
  21. Postoperative atrial arrhythmia requiring treatment
  22. Postoperative myocardial infarction

V. Discharge
  23. Discharge date
  24. Discharge status
  25. Status at 30 days

VI. Pathologic staging lung cancer
  26. Lung cancer, T (tumor)
  27. Lung cancer, N (nodes)
  28. Lung cancer, M (metastases)

VII. Quality measure
  29. Intravenous antibiotics ordered within 1 hour
  30. Cephalosporin antibiotic ordered
  31. Prophylactic antibiotic discontinuation order
  32. Deep venous thrombosis prophylactic measures

Abbreviations: ASA, American Society of Anesthesiologists; FEV, forced expiratory volume of air; PFT, pulmonary function tests.