Understanding Differences in Administrative and Audited Patient Data in Cardiac Surgery: Comparison of the University HealthSystem Consortium and Society of Thoracic Surgeons Databases

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BACKGROUND: The University HealthSystem Consortium (UHC) administrative database has been used increasingly as a quality indicator for hospitals and even individual surgeons. We aimed to determine the accuracy of cardiac surgical data in the administrative UHC database vs data in the clinical Society of Thoracic Surgeons database.

STUDY DESIGN: We reviewed demographic and outcomes information of patients with aortic valve replacement (AVR), mitral valve replacement (MVR), and coronary artery bypass grafting (CABG) surgery between January 1, 2012, and December 31, 2013. Data collected in aggregate and compared across the databases included case volume, physician specialty coding, patient age and sex, comorbidities, mortality rate, and postoperative complications.

RESULTS: In these 2 years, the UHC database recorded 1,270 AVRs, 355 MVRs, and 1,473 CABGs. The Society of Thoracic Surgeons database case volumes were less by 2% to 12% (1,219 AVRs; 316 MVRs; and 1,442 CABGs). Errors in physician specialty coding occurred in UHC data (AVR, 0.6%; MVR, 0.8%; and CABG, 0.7%). In matched patients from each database, demographic age and sex information was identical. Although definitions differed in the databases, percentages of patients with at least one comorbidity were similar. Hospital mortality rates were similar as well, but postoperative recorded complications differed greatly.

CONCLUSIONS: In comparing the 2 databases, we found similarity in patient demographic information and percentage of patients with comorbidities. The small difference in volumes of each operation type and the larger disparity in postoperative complications between the databases were related to differences in data definition, data collection, and coding errors. (J Am Coll Surg 2016;223:551−558. © 2016 by the American College of Surgeons. Published by Elsevier Inc. All rights reserved.)

To handle ever-increasing health care costs, reimbursement assessments have become oriented toward quality, making quality evaluation a core component of the health care industry. Clear definitions and accurate data are necessary for reliable assessments.[1] In cardiovascular surgery, the Society of Thoracic Surgeons (STS) database has been a robust and dependable source of outcomes evaluation because it focuses on cardiovascular surgical procedures and has a degree of data auditing. However, despite the reliability of clinical databases, many organizations, such as the University HealthSystem Consortium (UHC) (now Vizient, Inc), use administrative databases to evaluate quality and to gauge reimbursement, owing to ease of access and cost-effectiveness.

Administrative databases are derived from billing information and discharge coding, and several studies have highlighted discrepancies in the data compared with prospective clinical databases.[2-4] Nevertheless, previous studies comparing the UHC and STS databases have focused on prediction of operative death and risk stratification,[5] and investigations have not addressed the important issue of accuracy of data entry. To determine whether

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Abbreviations and Acronyms

AVR    = aortic valve replacement
CABG  = coronary artery bypass grafting
CDB    = clinical database
MVR    = mitral valve replacement
STS    = Society of Thoracic Surgeons
UHC    = University HealthSystem Consortium
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surgeons, hospital administrations, and insurance companies are working with concordant data in determining health care quality, we aimed to compare demographic and outcomes information in these 2 databases.

METHODS
Cohort selection
After obtaining permission from the Mayo Clinic IRB, we gathered data from the UHC and STS databases for patients who underwent isolated or combined aortic valve replacement (AVR), mitral valve replacement (MVR), and coronary artery bypass grafting (CABG) surgery between January 1, 2012, and December 31, 2013, at Mayo Clinic in Rochester, Minnesota. The patients excluded from analysis were those undergoing valve repairs and transcatheter procedures; the analysis included emergency cases, endocarditis cases, and cases of patients with previous cardiac procedures.

Clinical cohort
The clinical cohort was the STS database. Clinical information was obtained from our prospective adult (aged 18 years or older) cardiac surgical database. The database is maintained by trained data abstractors,[1] and patients were identified by date of surgery.

Administrative cohort
Using the same time interval, we obtained the administrative cohort's data from the UHC Clinical Database (CDB) for patients aged 18 years or older. The ICD-9-CM procedure codes 35.21 and 35.22 for AVR, 35.23 and 35.24 for MVR, and 36.10 to 36.19 for CABG were selected for these techniques, done as either primary procedures or secondary procedures. Patients are included in UHC CDB in accordance with their discharge dates. To obtain comparable cohorts, we selected patient data from the UHC CDB by date of surgery. To be certain, the patients included were from the same time period, we made adjustments in patient selection to account for the fact that UHC CDB reports are based on fiscal year rather than calendar year.

Data collection and analysis
Data were collected independently from the 2 databases in aggregate. The databases were compared according to volume of cases, both isolated and combined; demographic information of age and sex; physician specialty code, which was checked to determine the number of times a noncardiothoracic surgeon was given credit for the operation; occurrence of comorbidities and the different comorbidities recorded by each database; occurrence of postoperative complications and the different complications recorded by each database; and in-hospital death.

Descriptive statistics were used to summarize the data, including count and percentage for categorical variables and mean and SD for continuous variables. Disparity in volume was calculated by the difference between the number of cases in the STS and UHC databases divided by the total number of cases in the STS database, expressed as a percentage.

RESULTS
Volume
During the years from January 1, 2012, through December 31, 2013, the UHC database contained 1,270 AVRs, 355 MVRs, and 1,473 CABGs; the audited STS database contained 1,219 AVRs, 316 MVRs, and 1,442 CABGs. The disparity between the databases was 4% for AVR, 12% for MVR, and 2% for CABG. When data from both databases were merged by medical record number and date of surgery, 1,200 AVRs (95%), 304 MVRs (83%), and 1,423 CABGs (95%) were present in both databases.

Among patients having AVR, 20 cases (2%) were present in the STS database that were not found in the UHC database, and 74 cases (6%) were in the UHC data but not in the STS data (Table 1). Of these latter 74 cases, 55 were in the STS congenital database and were not included in our clinical cohort. For MVR, 12 cases (3%) were in the STS database alone and 51 (14%) were found only in the UHC database. Of the latter 51 cases, 34 were in the STS congenital database. For CABG, 19 cases (1%) were found only in the STS database and 50 (3%) in the UHC database. Of the 50 cases in the UHC database alone, 14 were in the STS congenital database and 12 were CABG revisions and reoperations that were coded separately in the STS and were excluded from the selected STS cohort. The other disparities occurred because of procedures being missed or miscoded in the data used by the UHC CDB and errors in date entry.