Heterogeneity in Trauma Registry Data Quality: Implications for Regional and National Performance Improvement in Trauma

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BACKGROUND: Led by the American College of Surgeons Trauma Quality Improvement Program, performance improvement efforts have expanded to regional and national levels. The American College of Surgeons Trauma Quality Improvement Program recommends 5 audit filters to identify records with erroneous data, and the Georgia Committee on Trauma instituted standardized audit filter analysis in all Level I and II trauma centers in the state.

STUDY DESIGN: Audit filter reports were performed from July 2013 to September 2014. Records were reviewed to determine whether there was erroneous data abstraction. Percent yield was defined as number of errors divided by number of charts captured.

RESULTS: Twelve centers submitted complete datasets. During 15 months, 21,115 patient records were subjected to analysis. Audit filter captured 2,901 (14%) records and review yielded 549 (2.5%) records with erroneous data. Audit filter 1 had the highest number of records identified and audit filter 3 had the highest percent yield. Individual center error rates ranged from 0.4% to 5.2%. When comparing quarters 1 and 2 with quarters 4 and 5, there were 7 of 12 centers with substantial decreases in error rates. The most common missed complications were pneumonia, urinary tract infection, and acute renal failure. The most common missed comorbidities were hypertension, diabetes, and substance abuse.

CONCLUSIONS: In Georgia, the prevalence of erroneous data in trauma registries varies among centers, leading to heterogeneity in data quality, and suggests that targeted educational opportunities exist at the institutional level. Standardized audit filter assessment improved data quality in the majority of participating centers. (J Am Coll Surg 2016;222:288–295. © 2016 by the American College of Surgeons. Published by Elsevier Inc. All rights reserved.)

The American College of Surgeons (ACS) Committee on Trauma has been one of the principal driving forces behind the rapid maturation of performance improvement (PI) processes in trauma centers. Each subsequent edition of the *Resources for the Optimal Care of the Trauma Patient* includes more and more extensive requirements for a center's PI process.[1] Quality PI, however, is founded in quality data capture, which, on an institutional level,

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Collaborators in the GRIT Study Group are listed in the Appendix.

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Abbreviations and Acronyms
ACS = American College of Surgeons
GCOT = Georgia Committee on Trauma
NTDB = National Trauma Data Bank
PI = performance improvement
TQIP = Trauma Quality Improvement Program

relies on standardized and dependable data abstraction. With the advent of the ACS Trauma Quality Improvement Program (TQIP), another step in the evolution of PI has occurred. In fact, ACS TQIP, as a tool for national benchmarking among centers across the country, allows individual institutions to understand the quality of the care they are providing compared with national norms.[2]

In the same way that reliable data abstraction is required for effective institutional-level PI, data homogeneity is required for quality cross-institutional benchmarking. Also, differences in how centers capture and interpret data, as well as enter data points, can strongly affect how each center appears compared with its compatriot institutions.[3-5] As the National Trauma Data Bank (NTDB) grew in size, it was found that different definitions were being used for various data points by both individual centers and various state governments and the National Trauma Data Standard was created in an attempt to standardize a data dictionary.[6] Unfortunately, it is well recognized that many of these data definitions still leave room for interpretation and can be captured differently by different centers.[7]

During the past several years, the trauma centers within the state of Georgia developed a collaborative of the state's trauma medical directors and trauma program managers in an effort to standardize and improve trauma care in the state and to create a foundation for statewide PI. This effort has been led by the Georgia chapter of the Committee on Trauma (GCOT) and the Georgia Committee for Trauma Excellence, a longstanding work group of the state's trauma program managers. As part of the effort to create a statewide PI process, all trauma centers in the state enrolled in ACS TQIP. In the last several years, ACS TQIP provided the state of Georgia with a series of reports amalgamating all the trauma centers in the state into a single report, in addition to each center's individual report. After discussion and analysis, concerns were raised by several centers about data quality and homogeneity. Among other efforts, the state collaborative developed a system for standardized use of a set of audit filters (Table 1), with monthly reporting to the GCOT. The 5 standardized audit filters are recommended by ACS TQIP and designed to identify patient records with potential erroneous data. We hypothesized that standardized audit filter analysis would uncover variable error rates among registries within the state and would improve data quality during the study time period.

METHODS

From July 2013 through September 2014, Level I and II trauma centers in the state of Georgia performed routine audit filter analysis of their trauma registries. Charts flagged by audit filters were individually reviewed within the institution's PI process to determine whether erroneous abstraction had occurred, and the nature of any error was identified. The chart reviews were performed by the individual institution's trauma program manager and trauma medical director and the elements of the reviewed charts varied based on the audit filter. Each directed review was performed specifically to identify whether or not the detail captured by the audit filter was correct or incorrect. For example, if a record was flagged for a potential missed complication, the chart was reviewed for any missed complication. Similarly, if a record was flagged for a missed comorbidity, the record was reviewed for the presence of any and all comorbidities. Finally, the mortality audit prompted a review of the record for the accuracy of the injury data (to determine if the true Injury Severity Score was >16) and to ensure that the mortality end point was correct. The final determinations of whether or not the data were abstracted incorrectly and the nature of the error were made by the trauma program manager and trauma medical director. The deidentified summary data listed in Figure 1 were provided to the GCOT in a standardized format for collation and analysis on a monthly basis. No organized educational activity directed at registry personnel or frontline providers of trauma care was performed by the collaborative during the study time period. For more than a decade, all trauma registries within the state of Georgia have been served by the same vendor (Digital Innovation, Inc), which allowed for the development of a single standardized report that provided a homogenous dataset.

The audit filters used are listed in Table 1. Each is designed to flag charts at high risk for erroneous data abstraction. The audit filter panel was originally described by the Michigan Trauma Quality Improvement Program and is recommended by ACS TQIP as a useful tool for registry data validation.[8] Three audit filters are focused on commonly seen complications, one on a patient population expected to have comorbidities and one on unexpected mortality.

Data were collated by the one author (CJD) and analyzed on a monthly and quarterly level. Data submission began in July 2013 and the study period ended in