NSQIP-Based Quality Improvement Curriculum for Surgical Residents

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BACKGROUND: General surgery training has historically lacked a standardized approach to resident quality improvement (QI) education aside from traditional morbidity and mortality conference. In 2013, the ACGME formalized QI as a component of residency training. Our residency chose the NSQIP Quality In-Training Initiative (QITI) as the foundation for our QI training. We hypothesized that a focused curriculum based on outcomes would produce change in culture and improve the quality of patient care.

STUDY DESIGN: Quality improvement curriculum design and implementation were retrospectively reviewed. Institutional NSQIP data pre-, during, and post-curriculum implementation were reviewed for improvement.

RESULTS: A QITI project committee designed a 2-year curriculum, with 3 parts: didactics, focused on methods of data collection, QI processes, and techniques; review of current institutional performance, practice, and complication rates; and QI breakout groups tasked with creating "best practice" guidelines addressing common complications in our NSQIP semi-annual reports. Educational presentations were given to the surgical department addressing reduction of cardiac complications, pneumonia, surgical site infections (SSIs), and urinary tract infections (UTIs). Twenty-four residents completed both years of the QITI curriculum. National NSQIP decile ranks improved in known high outlier areas: cardiac complications, ninth to fourth decile; pneumonia, eighth to first decile; SSIs, tenth to second decile; and UTIs, eighth to third decile. Pneumonia and SSI rates demonstrated statistical improvement after curriculum implementation ($p < 0.003$).

CONCLUSIONS: Implementing a QITI curriculum with a full resident complement is feasible and can positively affect surgical morbidity and nationally benchmarked performance. Resident QI education is essential to future success in delivering high quality surgical care. (J Am Coll Surg 2017;224:868–874. © 2017 by the American College of Surgeons. Published by Elsevier Inc. All rights reserved.)

National organizations such as Health and Human Services, the Agency for Healthcare Research and Quality, and the National Quality Strategy recognize quality as a key component of contemporary health care.[1,2] Hospital and surgeon participation in the American College of Surgeons (ACS) NSQIP has enabled risk-adjusted national benchmarking of surgical morbidity and prompted quality improvement (QI) efforts on a national scale.[3] These improvements in quality correspond with increased patient satisfaction and reduction in health care costs.[4,5]

Traditionally, morbidity and mortality conferences (M and M) served as an internal audit and QI process for the surgical community, but beyond this confidential self-review, formal education was sparse.[6,7] In 2013, the ACGME formalized requirement of resident participation in QI processes and education, reiterating the deficit of resident QI education.[8,9] The surgical milestones outlined surgery-specific objectives,[10] yet a formal or national curriculum remained underdeveloped. A survey of general surgery program directors in 2012 captured the current

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Abbreviations and Acronyms

ACS = American College of Surgeons
M and M = morbidity and mortality
QI = quality improvement
QITI = Quality In-Training Initiative
SSI = surgical site infection
UTI = urinary tract infection

state and attitude toward QI education of surgical residents: 85% identified QI education as "essential to future professional work in the field of surgery," but only half of residents at each program participated in a QI effort beyond the M and M conference.[11]

The ACS Quality In-Training Collaborative authored a foundational curriculum—the Quality In-Training Initiative (QITI)—as an early framework for QI education during surgical residency. The QITI pilot study demonstrated that such a program was feasible and effective.[12,13] At Scott & White Medical Center, our objective was to design, implement, and measure a QITI-based curriculum that provides exposure and application of QI processes during residency training. We hypothesized that a focused curriculum based on outcomes would produce a change in departmental QI culture and improve quality of patient care.

METHODS

Scott & White Medical Center is a 640 bed, tertiary referral, and level I trauma center located in central Texas, with more than 2 million outpatient visits and 50,000 surgical procedures performed annually. As part of the Baylor Scott & White Health, Scott & White Medical Center is the flagship hospital for the central Texas region. It is the primary institution for the Texas A&M University-Scott & White General Surgery Residency Program, approved by the ACGME Residency Review Committee to graduate 6 chief residents annually.

Quality improvement curriculum development and implementation

A QI curriculum for the general surgery residency was designed and implemented during the 2013−2014 and 2014−2015 academic years. The QITI was designated as the working foundation, given its strength as a structured surgery-based curriculum with incorporation of resident-specific NSQIP reporting and practical application of QI education.[10,11] Curriculum objectives were: Educate residents about QI processes, tools, and techniques; improve departmental awareness of NSQIP metrics and surgical morbidity; and provide sustainable framework for quality metric acquisition and review using NSQIP data. Our findings are reported using the Squire 2.0 guidelines.[14]

Clinical outcomes as related to quality improvement curriculum implementation

Institutional NSQIP semi-annual reports provided performance benchmarking data of postoperative morbidity from before (2012), during (2013, 2014), and after pilot curriculum implementation (2015). With Institutional Review Board approval, NSQIP data from these time periods were retrospectively reviewed to determine if quality metrics improved.

Control charts for proportions[15,16] were used to explore the effect of our QI curriculum on the rates for cardiac complications, pneumonia, SSIs, and UTIs. For each of the complications, the rates for 2012, 2013, and 2014 were used to estimate average rates and control limits. Upper and lower limits were set at 3 standard deviations from mean rate to achieve an average false alarm rate (a change in rates out of the usual rates), of 1 in 371 samples. Values outside the control limits indicate that changes in the rate are not due to chance ($p < 0.003$). R software v3.1.0 was used for the creation of the graphs and estimation of rates.

RESULTS

Curriculum development and timeline

A QITI curriculum committee was created with 5 members—the NSQIP surgeon champion, the residency program director, 2 upper level residents, and 1 junior resident. A 2-year curriculum was designed with 3 primary components: didactics, NSQIP data review, and QI breakout groups. Our curriculum incorporated all general surgery residents along with preliminary and surgical subspecialty interns (plastic surgery, otolaryngology, and urology). Protected educational time was provided quarterly during the 2-year period, with more frequent meetings during the didactic portion. Curriculum planning was undertaken in the months before the start of our pilot QITI curriculum (July to August 2013).

Didactics, as outlined below, were given over 5 months (August to December 2013). A break was taken from QITI activity in January 2014 to allow for American Board of Surgery In-Training Examination (ABSITE) preparation. Education resumed in February, with focus on NSQIP data interpretation, documentation, and variable definitions (February to June 2014). July 2014 marked the start of year 2 of the curriculum. QI breakout groups were formed and tasked with providing departmental and "best practice" presentations at M and M