

The American College of Surgeons Trauma Quality Improvement Program

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• ACS TQIP • Benchmarking • TRISS

The American College of Surgeons Trauma Quality Improvement Program (ACS TQIP) is a recent addition to the many quality improvement collaboratives that have been established in surgery. On the background of a well-established trauma center and its performance improvement activities, ACS TQIP offers the potential to further advance trauma care and offers participating centers the opportunity to better understand their strengths and areas for improvement. The rationale for ACS TQIP's development, implementation challenges, and potential for advancing the quality of trauma care are described.

WHY EVOLVE? A HISTORY OF TRAUMA PERFORMANCE IMPROVEMENT AND A PLACE FOR ACS TQIP

Continuous quality improvement is an integral component of trauma center care. This striving for high-quality care is complex, given the nuances in defining quality. In 1966, Avedis Donabedian,¹ the renowned public health pioneer, described 3 distinct aspects of quality in health care: outcome, process, and structure. Outcome

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measures were challenging as a sole indicator of quality, given that in many cases outcomes might not be modifiable. Alternatively, “a particular outcome might be irrelevant, as when survival is chosen as a criterion of success in a situation which is not fatal but likely to produce suboptimal health,¹” a challenge in reports from the Trauma Quality Improvement Program (TQIP) and in other literature pertaining to outcomes following severe traumatic brain injury.²

Donabedian¹ suggested that given the limitations associated with outcome assessment, it might be more meaningful to examine the process of care itself. He justified the use of process evaluation by the assumption that knowledge of whether medicine was properly practiced is important. If so, then quality care was delivered. He described a third approach to quality assessment, focusing on not the process, but the setting in which the care was provided or the structure.¹ The structure is concerned primarily with the adequacy of facilities and equipment; the qualifications of medical staff and their organization; the administrative structure and operations of programs and institutions providing care; and fiscal organization. The underlying assumption focusing on structure is that given the proper resources, good medical care will follow. Furthermore, structure is simple and deals with information that is relatively concrete and accessible. Unfortunately, this paradigm assumes that there is a relationship between structure, process, and outcome.

Structure, Process, and Outcome in the Context of Injury Care

In the context of injury care, measures of structure, process, and outcome are key elements of quality and have been recognized as such since the beginning of the trauma center verification process. In 1976, the ACS Committee on Trauma published “Optimal Hospital Resource for Care of the Seriously Injured,” which described the general requirements for a trauma center.³ By 1987, updates to this document outlined key structures required to provide high-quality care to the injured patient.⁴ There was less focus on process and outcome. However, a multidisciplinary performance improvement process with a registry and a process for reviewing care delivery and outcomes were built into the structure. Appreciating the challenges in evaluating process and outcome, the Committee on Trauma provided assurances that the process and the outcome would be evaluated internally on an ongoing basis, while the integrity of this process was assured through the verification process.

The resultant trauma center performance improvement programs borne of these requirements served injured patients very well. Several processes of care believed to be important to outcome were evaluated routinely using a variety of audit filters that served to identify cases requiring review. More recent evidence suggested that these easily captured filters might not necessarily identify opportunities for improvement because outcomes among patients meeting filter criteria are not necessarily poor.^{5,6} Reviews (both structured and unstructured) of sentinel events, mortality, and morbidity allowed centers to identify opportunities for improvement. The registry made it possible to routinely assess indicators that might call for a more focused review if the incidence of a particular event was greater than in previous years. This approach assured that a center’s performance was consistent over time, but raised questions as to whether consistency is a high enough goal for which to strive.

Assessing outcomes objectively was challenging, but the introduction of the Trauma Score–Injury Severity Score (TRISS) allowed centers to identify patients with unexpected outcomes.⁷ TRISS provides statistical comparisons of actual and expected numbers of survivors for each institution, and uses a regression model based on age (≤ 54 , > 54), mechanism of injury (blunt vs penetrating), Injury Severity Score (ISS), and the Revised Trauma Score (comprising the Glasgow coma scale [GCS],

systolic blood pressure, and respiratory rate). Regression coefficients for TRISS were widely disseminated and used. Although this is one method of evaluating performance, the regression coefficients, and thus the probabilities of survival, are those estimated from the Major Trauma Outcomes Study and so reflect expected outcomes over 1982 to 1987,⁸ not the outcomes with contemporary trauma care. In addition, the injured population has changed significantly, with a greater number of comorbidities and a broader age distribution than in the 1980s. Clearly, a 55-year-old patient differs markedly from an 85-year-old patient with the same injuries. Using TRISS, these patients would have the same estimated probability of survival. If the quality of trauma care was to evolve, a higher bar than care provided in 1982 and a means of identifying centers that were not only consistent but also at the leading age of trauma care are needed.

External Benchmarking and Striving for Best in Class: the Next Stage of Trauma Performance Improvement

ACS TQIP, through the reports provided to participating centers, allows centers to compare their processes and outcomes to their peer centers. This external benchmarking provides an opportunity to advance the care of injured patients. Broadly defined, benchmarking is a systematic comparison of structure, processes, or outcomes of similar organizations, used to identify the best practices for the purposes of continuous quality improvement.⁹ External benchmarking compares performance between organizations, provides more appropriate information about whether or how much of a performance issue an organization might have, and offers information about realistic goals for improving performance. If a peer organization can perform at a certain level, then that level is likely achievable in one's own institution.

External benchmarking takes quality improvement to a higher level. In most circumstances, we believe that our performance is equal to (or better than) our peer institutions. If a benchmarking exercise shows that this is not the case, it provides an opportunity to better focus performance improvement efforts. It also indicates how to improve, so long as the benchmarking exercise identifies who has achieved superior results. This second point is only advantageous if the exercise, whether it is a regional or national collaborative, enables networking between centers.

External benchmarking provides insights into the unwitting innovators. Centers' practices evolve over time in response to internal and external pressures and resources, case mix, and practitioners' interests. In time, practices might diverge from the average center. If the practice divergence provides an advantage, this advantage is likely to go unnoticed. The variability in outcomes (or processes) becomes evident through external benchmarking, leading to an exploration of the underlying practices that provide this advantage. External benchmarking capitalizes on the variability to identify best practices, only a fraction of which might be identified through other means. It provides opportunities to test ideas for further evaluation in the form of before-and-after studies or randomized controlled trials.

A CASE FOR ACS TQIP

The ACS TQIP was conceived in 2008 through a small working group assembled by the ACS Committee on Trauma. Its goal was to build on the foundations and infrastructure of trauma performance improvement as laid out in the ACS Optimal Resources Guide for Care of the Injured Patient and by the Committee on Trauma Subcommittees (Performance Improvement and Patient Safety, National Trauma Data Bank, Verification), local performance improvement activities, and national

initiatives such as the Society of Trauma Nurses' Trauma Outcomes and Performance Improvement Course. The goal was to enable transformational change in trauma quality improvement.

The impetus for change came from the accruing evidence of the effectiveness of large national collaboratives that were based on (1) standardized data, (2) feedback to centers, and (3) a network that would allow for the sharing of challenges and best practices (**Fig. 1**). For example, prompted by a 1986 congressional mandate, the Veterans Health Administration (VHA) conducted the National Veterans Administration Surgical Risk Study (NVAIRS), beginning in 1991, with the aim of developing and validating risk-adjustment models for the prediction of surgical outcome and the comparative assessment of the quality of surgical care among multiple facilities. NVAIRS provided the critical tools necessary to monitor surgical outcomes and provide feedback to centers. Based on this foundation, the National Veterans Administration Surgical Quality Improvement Program (NSQIP) was established in 1994 with the goal of monitoring and improving the quality of surgical care in the VHA. The VA NSQIP was quite successful, with a reported 9% reduction in mortality and 30% reduction in morbidity over a 3-year period.¹⁰

Given the success of VA NSQIP, expansion began into the private sector as a pilot in 1998.¹¹ The ACS then received funding from the Agency for Healthcare Research and Quality (AHRQ) through a patient safety grant in 2001. This initiative supported the participation of 14 private sector hospitals funded by the AHRQ as well as 4

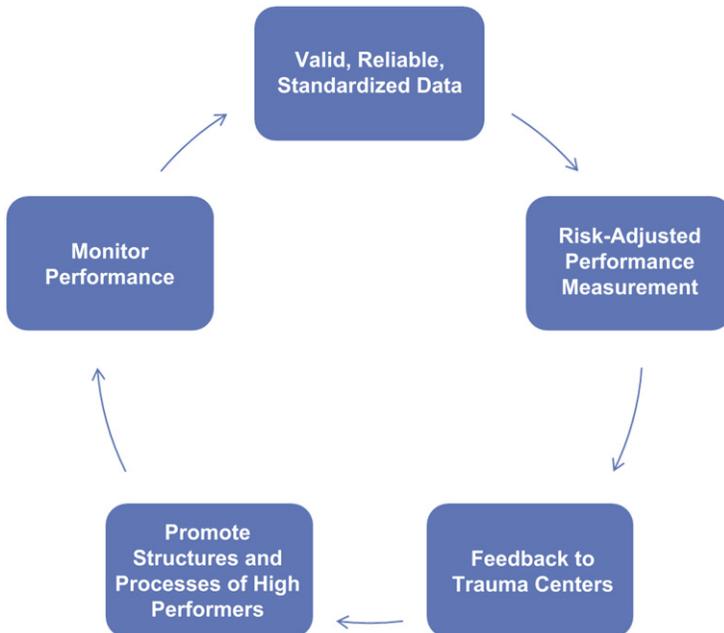


Fig. 1. The conceptual framework of continuous quality improvement underlying ACS TQIP and other quality collaboratives. High-quality data provide the opportunity to provide valid risk-adjusted performance measures back to centers. These institutions then review their performance in the context of their environment and seek areas to improve, if necessary relying on strategies used by high-performing centers. Performance is monitored and the loop continues.

community hospitals funded by the Partners Healthcare Corporation of Massachusetts.¹² Significant improvements in morbidity and mortality between 2001 and 2004 in this small program prompted the ACS to establish ACS NSQIP in 2004. A review of 3 years' experience with ACS NSQIP demonstrated that two-thirds of hospitals had significant improvements in mortality and 80% had improved their complication rates.¹³ The greatest improvements were evident in the worst-performing hospitals, but high-performing centers also demonstrated improvement.

FROM ACS NSQIP TO TQIP

Simply incorporating trauma patients into NSQIP was not possible. ACS NSQIP had created a data infrastructure where none previously existed. In addition, it required a well-trained surgical clinical reviewer to collect and submit data. By contrast, each trauma center had a trauma registry, a team of registrars to collect the data, and a means of aggregating these data through the National Trauma Data Bank. To avoid creating a parallel data infrastructure and costly duplication, it was decided to use the existing infrastructure and work toward data standardization. This decision moved the process forward rapidly to allow the development of a 2-year pilot study involving 23 level 1 and level 2 trauma centers. This pilot study provided risk-adjusted outcomes for all patients with an ISS of 9 or more in the participating centers. To better understand opportunities for improvement, ACS TQIP also provided outcomes separately for patients injured through penetrating mechanisms, those with multisystem blunt trauma, and those with severe single-system injuries. This work confirmed that there was substantial variability across similarly designated centers, and a center that was high-performing for one patient population might very well have room for improvement for another patient population.^{14,15}

CHALLENGES TO THE DEVELOPMENT AND IMPLEMENTATION OF ACS TQIP

To be successful, a large national collaborative requires interested participants. The success of ACS NSQIP and the long-standing interest in performance improvement in the trauma community assured that there was a place for ACS TQIP. However, the 2 fundamental challenges in moving forward related to data quality and risk adjustment to address differences in case mix across centers. Each of these challenges and solutions are now described.

Data Standardization and Quality

Trauma registries are critical structural components of trauma centers, and are essential to injury surveillance and performance improvement activities. The first hospital registry was developed in Chicago as early as 1969, which ultimately expanded as a statewide registry by 1971.¹⁶ The use of registries expanded significantly over the next several years, and registries were often developed by interested local experts with some expertise in database design. The database fields incorporated into the registries were those that were thought to be important or of interest to a particular center. This approach addressed local performance improvement needs and served the injury community extremely well, with a proliferation of publications on injury and injury care in the wake of the recognition of injury as a disease worthy of study.¹⁷ Over time, several registry vendors entered the market, all of whom offered user-friendly features related to data entry, injury coding, report writing, and customizable fields. Each registry evolved based on local needs and served a unique role in the trauma center, becoming a registry that other surgical (or medical) services often looked on with curiosity and envy.

By 2006, with each registry evolving based on local needs, the extent of variation across registries was extraordinary.¹⁸ Inclusion criteria were inconsistent, with states variably requiring inclusion of drowning victims, differing minimum length of hospital stay, deaths in the emergency department (ED) (or deaths on arrival), and same-level falls. There was even variation in the definition of inclusion criteria, with 13 different definitions across states for same-level falls. This variability in case ascertainment posed problems in comparing outcomes across centers. For example, centers including elderly patients with isolated hip fractures tended to have lower risk-adjusted mortality than centers that did not include such patients.¹⁹ This lower risk-adjusted mortality was no longer evident if this patient population was excluded from the analysis, which shows the challenge in risk adjustment when there is no overlap in selected patient populations across centers.

Different definitions and guidelines for coding also posed challenges. For example, across states there were 11 different coding conventions for recording of injury time when it was unavailable, and many variations on what constituted the ED GCS score, with 15 states requiring the initial score, 8 states requiring the initial and the last, 1 state the worst, 1 state the best, and another state the initial and worst. Injury coding in the context of a vignette also varied across registrars. Together, this lack of standardization limited any assurance that comparisons across centers were valid.

A means of responding to these challenges came with the development of the National Trauma Data Standard (NTDS). The NTDS version 1.0 was disseminated in 2006, after stakeholders representing physician professional organizations, state trauma program managers, trauma registry vendors, and others in the trauma community sought to identify the most critical core elements for a trauma registry. The NTDS also provided uniform field definitions, a source hierarchy outlining where the elements of the field should be found in the medical record, and the extensible markup language for each field, assuring a standard means of structuring, storing, and transporting information across platforms. Data submission from each center also required each record to pass through a validator with different error levels. This validator provided edit and logic checks to limit the potential for missing and out-of-range data. The introduction of the NTDS was the enabler, providing the first opportunity to compare data across centers.

There remain some challenges to data quality despite the NTDS. For example, the authors explored how deaths in the ED were classified among participating TQIP centers in 2009 using the NTDS field "ED death." Options in NTDS version 1 included declared dead on arrival (DOA) with minimal or no resuscitation attempt (no invasive procedures attempted), death after failed resuscitation attempt (failure to respond within 15 minutes), or died in ED (other than failed resuscitation attempt). In this analysis, more than 6% of patients labeled DOA had time to death in excess of 30 minutes from arrival, with some centers having more than 40% of their DOAs pronounced dead after 30 minutes. More than 10% of patients categorized as DOA were either intubated, had chest tubes inserted, or other procedures performed, and a similar number had documented blood pressure or respiratory rates. These findings varied considerably across centers. In their early reports, the authors excluded patients identified as DOA, but now appreciate the possibility that excluded patients might very well not be dead on arrival. The authors have now evolved to report risk-adjusted mortality both inclusive and exclusive of patients who die in the ED, and have defined a "signs of life" field on arrival to the ED to better capture unsalvageable patients. Subsequent work has demonstrated that this degree of misclassification has negligible effects on the risk-adjusted mortality.²⁰

The evolution of TQIP has also allowed identification of other areas in which aggregated data quality can be improved. With the introduction of NTDS, many registrars

had to map their existing fields to NTDS fields. An example of this mapping process might occur with the field called “primary method of payment,” where there are 10 options. However, local registries might be far more granular with a greater number of options. The mapping process requires the vendor and client to identify which fields would map to the 10 existing fields in NTDS. If this mapping is not done correctly, there is the potential for misclassification or, more frequently, missing data. This particular issue is most relevant for complications and comorbidities. These 2 fields are a particular focus of attention, as both are important for risk adjustment and outcome assessment.

Ongoing registrar training and data quality assessments are a part of ACS TQIP. Each month, TQIP provides the registrars from participating centers with educational opportunities focused on the problem areas identified through assessments of data quality. In addition to education, TQIP provides the centers with data quality reports, and in 2012 will begin external validation of the data. This external validation process will require expert abstractors to review medical records at participating centers and compare these data with those submitted to TQIP. These site visits will be geared toward identifying areas where additional education or standardization is required.

The focus on data quality has been critical for TQIP. The authors think that these approaches lead to greater confidence in the validity of the reports, which in turn leads to a greater follow-through once the areas for improvement have been identified. Furthermore, the lessons learned in standardizing data and data quality will extend beyond the TQIP centers to include all centers contributing data to the National Trauma Databank.

Risk Adjustment in ACS TQIP

Once the data quality and standardization concerns were addressed, risk adjustment was a lesser challenge. There are a large number of published risk-adjustment methodologies in trauma care. Although most methodologies have been used to predict mortality and are useful at the center level, many can be modified to provide valid interfacility comparisons by assuring comparison of “apples to apples.” There are wide variations in case mix across centers as a result of several factors. A trauma center located in the core of a large city might receive patients with very short prehospital times in comparison with a center that might serve a wide geographic area and receive many patients through transfer from a nontrauma center. The degree of physiologic derangement at the time of arrival to the trauma center depends on the interval between arrival and definitive care as well as the quality of preliminary care. Local rates of violent crime and penetrating injury, recreational opportunities, local industry, and proximity to major highways also affect the types of injuries cared for in trauma centers. Registry inclusion criteria and differing policies or philosophy related to pronouncing death in the field or in the ED might result in patients at some centers never receiving care in others. All of these factors and more must be considered in developing risk-adjustment models that balance risk of death and complications across centers.

Although there are a large number of published approaches to mortality risk-adjustment models, they all have their limitations. Risk-adjustment models should account for systematic differences in patients’ characteristics across centers, but most modeling approaches are dependent on the centers having comparable risk profiles.²¹ Regression modeling assumes that there is an overlap of risk distribution. If a group of centers systematically excludes a population of patients included at other centers, then this overlap cannot occur. In the case of TQIP participating centers, this is most evident in the inclusion of elderly patients with isolated hip fractures. Some

centers routinely include these patients in their registries and thus need benchmarking data, whereas others do not. Ignoring the lack of overlap in this patient population leads to biased mortality estimates.¹⁹ As a result, TQIP excludes this population from most analyses and provides a specific detailed report focusing only on these patients for those who require this information. Similarly, there are limitations with overlap across centers in patients who either present DOA or who die shortly after ED arrival. To overcome this limitation, data with and without these very early deaths are presented.

Although very complex risk-adjustment models are necessary to account for differences in case mix, it seems that ISS, age, the first ED systolic blood pressure, head Abbreviated Injury Scale (AIS) score, mechanism of injury, gender, and abdominal AIS are the most important factors considered in mortality modeling. TQIP models consider these factors along with the first ED GCS motor score,²² ED pulse rate, transfer status, and the worst AIS in each body region. Modeling also brings in the *International Classification of Diseases, Ninth Revision* (ICD-9) injury codes using the ICD-9-based ISS.^{23–25} The resultant mortality models have an excellent ability to discriminate between survivors and deaths (c-statistic of 0.93) and excellent calibration, the ability of the model to accurately predict expected rates of death across all levels of risk. Separate risk-adjustment models with their own coefficients are produced annually and for each subpopulation, so that centers are compared with the contemporary performance of their peer centers for each patient group.

The mortality models are used to predict the number of deaths expected given a particular institution's case mix. This estimate of expected (E) number of deaths is compared with the observed (O) number of deaths in that institution, creating an O/E ratio, which is presented in a graphical format. If the O/E ratio exceeds 1 and the confidence interval around the O/E ratio excludes 1, then the center has statistically more deaths than expected. If the O/E ratio is less than 1 (and the confidence interval excludes 1), then the center has fewer deaths than expected. While the authors' approach to date has used caterpillar graphs to demonstrate the O/E ratios (Fig. 2), they are tending toward the use of funnel plots, which are more intuitive and are becoming the standard for comparing institutional performance (Fig. 3).²⁶ Funnel plots are simply scatter plots with the O/E plotted by hospital volume, with the confidence intervals placed directly on the graph. Although the caterpillar graphs give the appearance of centers being ranked, this is spurious, with centers in the middle all being average. This perception is obviated using funnel plots.

Length of stay (LOS) is modeled in a manner similar to mortality, with the inclusion of payer type as a covariate, given how this factor plays a large role in determining the ease of disposition. In presenting LOS, the length of stay for each patient is estimated and if the patient's LOS exceeds this by 25%, then they are considered to have an excess length of stay (ELOS). The proportion of patients who have ELOS at each center is then presented after adjustment for case mix. The development of risk-adjustment models for selected complications is under way and is likely to be presented in 2012 reports.

CURRENT STATE OF ACS TQIP

Now entering its third year, ACS TQIP has more than 120 participating centers. The components of ACS TQIP have evolved considerably through lessons learned in the pilot and the authors' early experiences (Fig. 4). The authors have standardized inclusion criteria to ensure that case ascertainment is similar across the centers to include all adults (age ≥ 16 years) with an ISS of 9 or more, exclusive of patients with advanced

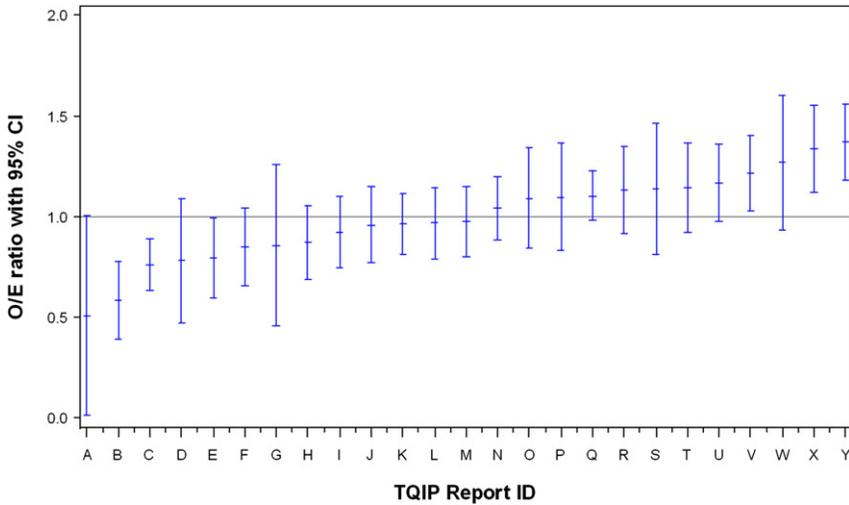


Fig. 2. A sample caterpillar graph demonstrating observed to expected (O/E) ratios for mortality. Expected number of deaths is estimated from the risk-adjustment models. Each center has a unique identifier as shown on the x-axis. In this example, centers B and C are high performers, with their O/E ratios and their confidence intervals all below 1. V, X, and Y are low performers, with their O/E ratios and their confidence intervals (CI) all below 1. It seems the remaining centers are ranked but statistically, each of the centers whose CIs touch unity have similar levels of performance.

directives to withhold life-sustaining interventions. Elderly patients with isolated hip fractures are captured (and reported on) separately, given the variability in the capture of this population across registries and the implications to risk adjustment.¹⁹ Aggregate outcomes by center are reported as well as outcomes in 2 distinct subsets of patients: multisystem blunt trauma and penetrating trauma. In addition to this all-patient report, the authors also provide quarterly reports that focus separately on patients with traumatic brain injury (TBI), shock, or the elderly population. Realizing that performance is not necessarily consistent across patient populations, these diverse reports allow centers to identify their strengths and the areas with opportunities for improvement.^{15,19,27} The need for focused reports on selected patient populations was evident, as each of these populations challenges expertise and resources differently. For example, the elderly require a different approach to care than the young. This phenomenon was highlighted by the poor correlation and concordance when assessing the performance within a center for the young compared with a center for the older patients.²⁷ In addition, reports to date have also provided information regarding the processes of care. For example, the authors have reported on the use of intracranial pressure monitors for patients with TBI (Fig. 5), and the use and timing of angiography for patients presenting in shock.

These reports will be expanded as additional data fields to capture processes of care are added. Over 2012 to 2013, the authors will be adding specific fields that will better identify patients with severe TBI and capture the use of intracranial monitoring in this patient population, which provides more granularity than is possible through the current fields in the NTDS. Data on the timing of fracture fixation, the use of pharmacologic venous thromboembolism prophylaxis, the time to hemorrhage control, and transfusion practices will also be captured. There has been tremendous interest in understanding the end-of-life practices, which reflect both quality and

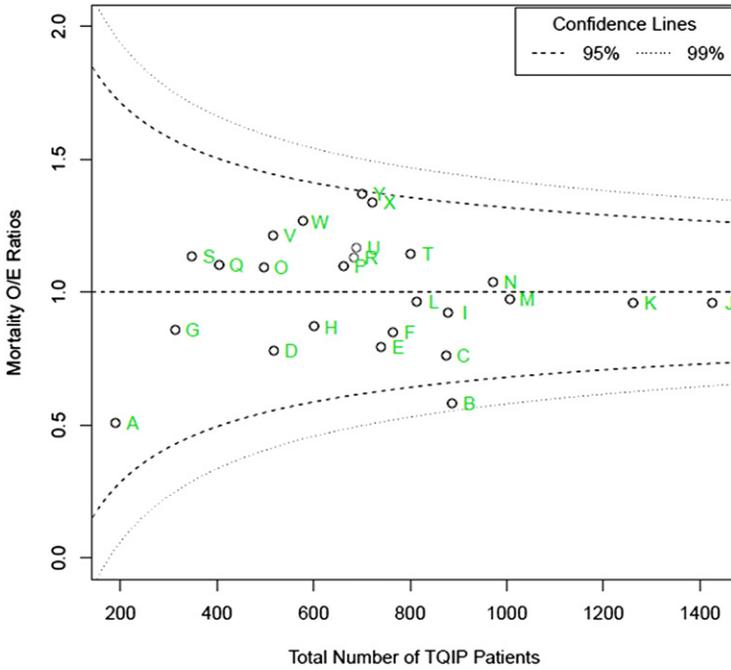


Fig. 3. A sample funnel plot. Each center's O/E ratio is plotted as a function of the center's volume. If a center is outside the 95% confidence interval, it is an outlier. A center below the lower line (eg, B) is a high performer, whereas center Y is just at the limit of average performance. Unlike the caterpillar graph, there is no perception of ranks.



Fig. 4. The key components of ACS TQIP.

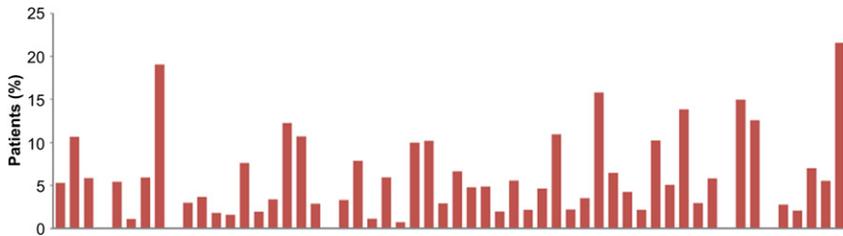


Fig. 5. The variability in use of cerebral monitoring across centers as an example of a process measure. Each vertical bar represents a center and the y-axis represents the proportion of intubated patients with isolated traumatic brain injury who have a cerebral monitor for either intracranial pressure or cerebral oximetry. These data were derived from ICD-9 procedure codes 01.10 (intracranial pressure monitoring), 01.16 (intracranial oxygen monitoring), 01.17 (brain temperature monitoring), and 02.20 (ventriculostomy). A new data field specific to intracranial monitoring along with education on its use will lead to a more consistent data capture and a likely increase in the use of cerebral monitoring for patients with severe traumatic brain injury.

perceptions of salvageability. To address this issue, data on withdrawal of life-sustaining therapy will be captured.

The intermittent nature of the reports provides an opportunity for the engagement of participants throughout the year. In addition, ACS TQIP has created an online tool that allows centers to obtain a probability of survival for each of their patients. This opportunity to drill down on selected patients allows centers to incorporate ACS TQIP into their performance improvement programs in real time, and provides objective assessments of whether an outcome could have been different.

FUTURE INITIATIVES IN ACS TQIP

The development and successful implementation of ACS TQIP has paved the way for several initiatives, including the identification and promulgation of best practices, and the creation of regional collaboratives.

Best Practices

External benchmarking of performance allows for the identification of centers that have particularly good outcomes or processes of care. The practices that result in these outcomes need to be identified for all participants to benefit. Some of these processes, as complex as they may be, might result from institutional culture and might not be easily translatable to other environments. To evaluate this possibility, the authors have explored the feasibility of semistructured interviews with institutional stakeholders to better understand the cultural elements of a high-performing center. Other factors that might lead to better outcomes include practices or structures that have been adopted for any variety of reasons. These factors will need to be identified through a process that requires a close relationship between ACS TQIP and participating centers. Stakeholders at consistently high-performing centers need to be interviewed to understand precisely how care is different at these centers. This challenge is probably one of the most significant of ACS TQIP and will be enabled, in part, through the development of smaller, regional collaboratives.

Regional Collaboratives

Collaboratives represent clusters of centers that share data and exchange information. In organizational theory, these are best referred to as communities of practice.

These communities are groups of people who “share a concern, set of problems, and who deepen their knowledge and expertise by interacting on an ongoing basis.²⁸” In theory, both TQIP and NSQIP are collaboratives, but there might be an additional benefit to smaller, regional collaboratives. Historical connections, better networking, and preexisting relationships might lead to a greater trust, and thus better information transfer across centers. In addition, smaller, more frequent in-person meetings focusing on local initiatives or challenges might offer a greater opportunity for an effective change. These regional collaboratives are effective in altering processes and outcomes of care in oncologic surgery, major general surgery, and cardiovascular surgery.²⁸ Limited evidence suggests that these regional collaboratives might even be more effective than larger, national initiatives such as NSQIP. For example, the Michigan Surgical Quality Collaborative is a group of 34 Michigan hospitals that use ACS NSQIP quality reporting infrastructure. In one study, this collaborative reported its performance relative to ACS NSQIP and demonstrated a significant improvement in the rates of postoperative complications that were not evident in the larger ACS NSQIP collaborative.²⁹

It is plausible that larger initiatives do not facilitate the exchange of details that might be very important for translation of knowledge into practice, and the wide array of institutions might provide a limited opportunity to evaluate relationships between processes and outcomes of care. Regional, customized processes that allow for sharing of best practices and implementation of effective strategies might very well be more successful. Several states are working with ACS TQIP to leverage the existing data and reporting infrastructure, analytic resources, and expertise to develop regional collaboratives. These states will be receiving reports that show their centers’ risk-adjusted outcomes in comparison with each other and with the entire TQIP participant base, and might extend to include system-level data as well (eg, interfacility transfer times).

The State of Michigan is farthest ahead, in large part because of the relationship between its trauma centers and Blue Cross Blue Shield of Michigan/Blue Care Network (BCBSM/BCN). The Michigan Trauma Quality Improvement Program (MTQIP) was formalized as a BCBSM/BCN statewide collaborative quality initiative (CQI) in 2011. Since 1997, BCBSM/BCN have partnered with Michigan hospitals and providers in creating statewide CQI, aimed at improving safety and quality of specific procedures and clinical practices across a diverse spectrum of specialties. There are now 12 CQI programs existing as components of a “Value Partnerships” effort, whereby BCBSM/BCN supports hospitals’ participation in both national and regional quality initiatives such as TQIP/MTQIP in a pay-for-participation approach, rather than pay-for-performance approach. A pay-for-performance approach might lead to competitiveness and limited willingness to share best practices (or poor performance) with others, whereas a pay-for-participation approach involves minimal risk. CQI programs, such as MTQIP, are focused on participation and engagement of hospitals at a regional level. MTQIP leverages the learning and the resource infrastructure offered by ACS TQIP.³⁰ In return, the Collaborative has offered its lessons learned in developing a collaborative and in piloting new ideas back to ACS TQIP for others to benefit.

Pediatric TQIP

There has been an extraordinary amount of interest in developing TQIP for the pediatric population and creating a pilot study involving a small number of pediatric trauma centers. This population is particularly difficult to study, as populations are relatively small in number and outcomes such as mortality are rare. There might very well be

a greater focus on the processes of care and morbidity, rather than mortality. At present, pediatric stakeholders are working on identifying pediatric indicators of quality that are evaluable across institutions.

SUMMARY

ACS TQIP provides participating centers with risk-adjusted benchmarking data. The information received through quarterly reports is focused and directed, and thus actionable. The collaborative nature of the program allows for the sharing of best practices and the identification of novel approaches to care for the injured. Smaller, regional collaboratives will further enable the sharing of implementation strategies that are practical and translatable to the local environment.

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