

ACS TQIP Collaborative Toolkit

A guide for getting started and maintaining momentum

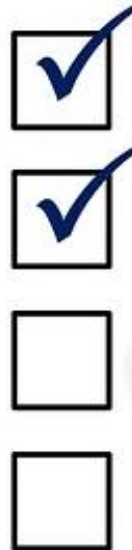


Table of Contents

Introduction	2
Getting Started.....	2
Maintaining Momentum.....	3
Quality Improvement.....	4
Collaborative Process and Structure.....	5
Funding Support.....	5
Collaborative Leadership	5
Learning	6
Data Collection†.....	7
Data Management†	7
Data Analysis/Reporting	8
Collaborative Meetings.....	8
Trust	9
Performance Improvement	9
Data Validation†	10
Trauma Center Expectations.....	10
Coordinating Center Expectations†	11
Vendors†	12
Misconduct	12
Appendix 1: Examples of Collaboratives.....	13
Appendix 1: Examples of Collaboratives (continued)	14
Appendix 2: ACS TQIP Collaborative List.....	15
Appendix 3: Collaborative Components	16
Appendix 4: ACS TQIP Collaborative Snapshots.....	17
Appendix 5: MTQIP performance index (Figure 2)	21
Appendix 6: Common Collaborative Documents.....	22
References	23
TQIP Collaborative Workgroup	24

† Indicates advanced collaborative activity, not necessary for getting started.

Introduction

Beginning a quality collaborative is a potentially intimidating task but one that can have tangible benefits at the individual patient, institutional, regional, and national level. When forming a quality collaborative, many questions can arise including: Why are we starting this collaborative? What can we accomplish? How does this approach differ from institutional level performance improvement? In considering answers to these questions, it is important to remember several points:

- Trauma centers share common problems
- Performance improvement is local with unique solutions tailored to the environment of each trauma center
- Regional collaborative quality initiatives are a form of efficient information exchange. These initiatives can provide access to data and flexible incorporation of data elements focused on problems of interest to the collaborative
- Collaboration allows for a diversity of ideas and rapid dissemination of new information and findings
- Regionally based quality improvement programs represent an opportunity to augment performance improvement efforts provided by nationally centered programs, with the potential advantages of grassroots participation, agile collaborative synergy, and accessible program management.¹

In total, the collaborative environment lets you determine how you are different and how you are similar to other institutions. You see your individual outcomes and can determine why you are different by examining your processes of care in comparison to other trauma centers. Overall, a collaborative environment can offer guidance on what potential actions can be taken to enable positive change in a trauma center to improve your outcomes.

To build a successful quality collaborative, there must be a few critical elements present. The first step is to identify the stakeholder group. Next, the group must create a shared vision for what is to be accomplished and in what time frame. Third, the leadership should delineate clear and attainable objectives that can provide focus to the collaborative in a systematic fashion. The importance of collaborative leadership cannot be overstated. The leader or leaders must be trustworthy, credible, transparent, and overtly committed to the avoidance of political gain. They must also prioritize the collaborative as their primary objective. Organization and conduct of the collaborative is a substantial undertaking similar to running an ongoing clinical program. Provision of collaborative leadership is a job with a high priority and cannot be viewed as a hobby.

Getting Started

If you are not familiar with the collaborative structure, a good initial starting point is to visit or discuss your plans with an existing collaborative. There are many different types of collaboratives in terms of areas of interest and geographic location (See Appendix 1). Typically, you will be building upon or synchronizing with a form of local or regional organization that is already in place (e.g. ACS COT state chapter, state trauma system, county trauma system, or hospital system). The first objective is to build and solidify good trustworthy relationships with the existing trauma system leadership. You should identify a senior leader from each of the disciplines that participates in trauma system leadership:

trauma program managers (TPM's), trauma medical directors (TMD's), and hospital administration. It is incredibly important to obtain buy in from healthcare professionals practicing at all trauma centers that will be involved in the collaborative. These champions, who will advocate for the collaborative as their principal objective, can help the collaborative leadership disseminate information and gain commitment from their colleagues. As the collaborative leadership begins to form, it is imperative to take a realistic inventory of the resources that are available. Key things to consider early in the development of the collaborative are the following:

- Is there a funding source?
- What infrastructure currently exists? What could easily be built or expanded upon?
- Do you have access to the data? Although not essential, access to the data can be helpful in certain circumstances. Is the data credible and reliable? Can you modify the data collection process to allow collection of custom created data elements? Is there a means of data analysis and reporting?
- How, when, and where should the collaborative meet?

Maintaining Momentum

Early and sustained participant engagement matters. The collaborative leadership should solicit feedback and opinions from the membership, especially from the trauma program managers, as these partners have the most familiarity with institutional data collection, data reporting, and performance improvement. Achieve commitment from front-line members such as trauma program managers, trauma program directors, and trauma registrars by listening to them and seeking their input. It is helpful if the collaborative makes meetings and conferences convenient and high yield so that participants derive demonstrable benefit from ongoing participation. One must realize that these are busy people who are not only giving up time that they could be using elsewhere but are also being asked to add work to their already busy lives. The collaborative leadership, therefore, must make sure that value is offered in return. Combining the collaborative meeting with an existing meeting (State COT or ACS chapter meeting) can facilitate efficiency. Offering educational opportunities during the meeting and arranging for CME credit is often appreciated.

One framework that may be useful in setting clear and achievable objectives is the SMART goal outline.² A SMART goal is:

- **Specific (and strategic):** Target a specific area for improvement. Link to goals/mission and strategic plan of the collaborative. Answers the question "What?"
- **Measurable:** The success toward meeting the goal can be measured. Answers the question "How?"
- **Assignable and Achievable:** Specify who will do it. Goals are realistic and can be achieved in a specific amount of time and are reasonable. Answers the question "Who?"
- **Relevant and Realistic:** States which results can be achieved given available resources. Align goals with current projects and focus in one defined area.
- **Time frame:** Goals have a clearly defined time-frame including a target or deadline date for when results can be achieved. Answers the question "When?"

Where available, financial incentives can provide a useful carrot and stick approach that heightens engagement and results in participants taking the program seriously. While some may feel that financial incentives are not the ideal approach, they are effective in acquiring people’s direct attention.

Quality Improvement

Patients enter the hospital acutely following traumatic injury with the intent of restoring their previously held state of health. From the patient’s perspective, the most desirable healing pathway is one which takes the shortest time, results in the least amount of discomfort, and produces the fewest complications. Traditional quality improvement measures have focused on rates of mortality and morbidity – cold, hard statistics. An alternative approach involves pivoting this focus towards processes of care received by the patient and the avoidance of life-altering problems. For example, if a patient can avoid developing a deep venous thrombosis (DVT), this lessens their risk of sudden death from a pulmonary embolus. Moreover, ongoing treatment with therapeutic anticoagulation is not required and the suffering associated with post-thrombotic syndrome is averted. DVT avoidance optimizes the patient’s health and decreases consumption of short-term resources which translates into reduced long-term costs to the patient and to the healthcare system.³

Value in healthcare is defined as outcomes relative to costs multiplied by appropriateness.^{4,5}

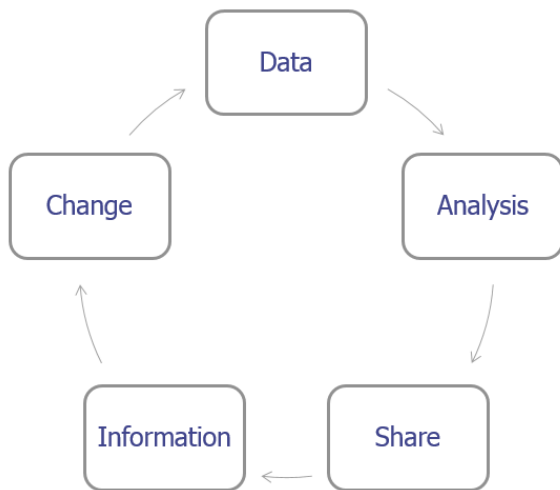
$$Value = \left(\frac{Outcomes}{Costs} \right) \times Appropriateness$$

Value is an essential measure of healthcare efficiency in relation to quality since cost reduction without concern for achieved outcomes leads to self-defeating cost savings at the expense of effective clinical care. No matter how positive the outcome or low the cost, if the procedure was not needed (appropriateness) then it is of zero value. Concern regarding the relationship between variation in quality and its impact on increasing health care expenditures has led to recent health care policy initiatives focused on achieving high-quality care with the efficient use of scarce health care resources.⁶ In layman’s terms, this equates to providing the right care, at the right time, to the right patient.

Collaborative Process and Structure

The collaborative process can be viewed as a continuous clinical learning program (Figure 1). Examples of existing ACS TQIP Collaboratives and their various structures are provided in Appendix 2. The collaborative process is present in areas of clinical interest beyond trauma. Often times, it is beneficial to reference various organizational structures, inside and outside of trauma, to identify components that may work within your environment (See Appendix 1). A summary of key collaborative components is provided in Appendix 3. The remaining sections of this toolkit are focused on explanation of these components of a collaborative and two examples of existing trauma collaboratives (See Appendix 4). Some of the described components are essential and represent basic necessities. **Other collaborative components are advanced and can be considered or added to your program as interest and resources allow. We have identified advanced collaborative components with the † symbol. Please keep in mind that these components are not essential for getting started.**

Figure 1- Clinical Learning Program



Funding Support

There are a variety of mechanisms by which a collaborative may be sponsored and/or supported monetarily. The most obvious avenue is as part of a State-wide trauma system (e.g. Georgia, Florida). Collaborative sponsorship can be provided by the State Department of Health or by a non-profit foundation set up as part of the trauma system (e.g. Pennsylvania). The Federal government may be capable of providing support to a collaborative associated with the military. Within the private sector, support can be provided for hospitals within a health system by a non-profit organization or a corporation responsible for administration of the system (e.g. HCA Healthcare). Lastly, third party payers (e.g. Blue Cross Blue Shield of Michigan) can support collaborative work as part of their business model to improve and optimize the quality of care delivered to their customers (e.g. Michigan).

Collaborative Leadership

Effective collaborative leadership is essential. The collaborative leader(s) is the driver of goals, serves as the cheerleader of projects, and provides overall direction to the collaborative. The leader organizes the

collaborative and facilitates the conduct of all administrative and performance improvement tasks. In setting goals, leaders should utilize the SMART framework or a similar method, be cognizant of the need for long timelines, and select tangible targets. Collaborative leadership must be capable of identifying and supporting core “doer” participants within the collaborative.

Trauma collaboratives include leadership from surgeons engaged in trauma care and from senior administrative healthcare professionals, most commonly trauma program managers. Many well-established collaboratives also have executive directors that control the business side of the collaborative, provide administrative oversight, and drive the logistical aspects of the organization.

When joining ACS TQIP as a collaborative, identifying both a clinical and administrative leader is required. Depending on available resources and the collaborative organizational structure, responsibilities may be divided differently between these two individuals. Generally speaking, leadership tasks can be separated into two broad categories: administrative and development and performance improvement.

- Administrative
 - Works with ACS TQIP to coordinate and track hospital participation
 - Coordinates logistics surrounding collaborative meetings or conference calls
- Development and Performance Improvement
 - Engages TMD’s and TPM’s and serves as “cheerleader”
 - Develops the agenda for meetings or conference calls
 - Leads and facilitates meetings
 - Drives strategic planning
 - Facilitates the process of selecting PI projects

Learning

All collaboratives are, at their core, educational vehicles. They serve as a means to place participants on the same page regarding data collection and usage. A learning healthcare system, as defined by the Institute of Medicine (IOM), is characterized by a number of essential attributes. In particular, there must be a consistent emphasis on a collaborative approach that shares data and insights across boundaries to drive better, more efficient medical practice and patient care.⁷

To align participants with regard to the data being collected, it is important to ensure that all participants are following the same data definitions as outlined in the most current version of the ACS National Trauma Data Standard (NTDS) Data Dictionary.⁸ A focus on data quality, particularly when getting started, is key, as the Collaborative Report should be a good reflection of trauma care within the system. ACS TQIP offers regular training on the Data Dictionary for abstractors and registrars in various modalities including an online course, tutorials, webinars, and in-person training at the ACS TQIP Annual Meeting.

Before initiating performance improvement projects, the target outcomes, data necessary, and potential patient care processes to evaluate must be made clear to participants. The education around this endeavor often involves considerable discussion either in-person or via conference calls. Members must be given an opportunity to provide input and have their concerns addressed. Once a consensus is

achieved, the final version of the performance improvement project needs to be distributed to participants along with education about expectations and reporting to be performed.

The in-person collaborative meetings are an invaluable source of information. Education takes place as collaborative leadership covers material essential to the program. Often peer-to-peer communication is the most useful part of the collaborative learning process as many participants experience similar problems and have a diversity of approaches towards solving them. It is easy for a participant to gauge the adoption of new methods based on other participant feedback and to determine if they are ahead, on, or behind the curve with regard to their peers.

Data Collection†

To the best of our knowledge, current trauma collaboratives utilize the existing trauma registry to collect their data. Having all of the participant trauma centers on a similar trauma registry software platform, and version has distinct advantages, but may not be possible. An early decision must be made about whether to pursue collection of additional data beyond what is outlined in the National Trauma Data Standard (NTDS). Performance improvement projects may require the collection of processes of care data to provide feedback on what is being done to treat the patient and determine how a specific treatment impacts patients. Examples of process measure types of data are outlined in Appendix 5. The collection of additional data beyond the NTDS and ACS TQIP infrastructure will require a mechanism to collect and collate collaborative specific data. Trauma registry software vendors can be helpful in the construction of this additional data collection infrastructure by providing customized data collection modules and data transfer/collation services.

Data Management†

If the collaborative is collecting no additional data beyond the NTDS and ACS TQIP data elements and does not desire direct access to the data, there will be no data management burden. However, if the collaborative desires to collect additional data, perform their own analytics, provide specialized reporting, and allow queries into the data by collaborative members, then the data management burden can be substantial. Setting up a customized data management infrastructure is a large task, but can provide almost unlimited flexibility and responsiveness regarding data use and performance improvement possibilities. Many existing collaboratives have started by using the data analytics setup available through their relationship with an existing national entity such as ACS NSQIP or ACS TQIP.

If your collaborative will be managing its own data, it is recommended that a comprehensive data management plan be formulated in consultation with information technology experts and legal support. The data management plan should include what types of agreements are needed between participants (Appendix 6). Proper safeguards should be put in place to protect data with password access, encryption, and server backup of files. Use of secure file transfer mechanisms and software is recommended. Typically, data will be transferred in, cleaned, collated, and stored in master files at the coordinating center. Collaborative participants may desire access to the data to conduct performance improvement projects. Policies and mechanisms should be devised to allow creation and transfer of a participant use file to satisfy this need. If a third-party is used for data analysis and reporting, a business agreement will need to be put in place to handle data transfer and responsibility.

Data Analysis/Reporting

ACS TQIP generates collaborative benchmark reports on a semiannual schedule consistent with that of individual trauma center reports. These reports resemble the content of individual adult trauma center reports with two important changes. First, all of the participant trauma centers in a collaborative are aggregated into a single collaborative-center, and this allows TQIP to benchmark the performance of the entire collaborative in a condensed manner. Second, while the individual trauma centers are not uniquely identified, the centers in the collaborative are identifiable compared to other trauma centers in ACS TQIP by use of yellow shading of point-estimates and confidence intervals on odds ratio graphs. This method allows comparison of collective collaborative performance with all other ACS TQIP participants and provides an opportunity to recognize system-wide issues/strengths, which may not be identifiable from the perspective of individual institutions. In order to further explore specific collaborative results, collaborative leaders will have to coordinate with participant trauma centers to complete analyses at the center-level using TQIP analytic tools, the results of which can be communicated back to the collaborative for collaborative-level interventions.

An important consideration involves how collaborative reports are distributed and stored. Based on the collaborative funding source, the entity providing support may or may not request access to data and reports. Provision of reports in aggregate form to the sponsor is a compromise that may avoid complete disclosure of individual results. It is imperative to think through the ramifications of this requirement when contracting with ACS TQIP and third party funding sources. For example, if the state or other governmental sources fund a collaborative, it is possible that collaborative reports could become discoverable.

† If a collaborative chooses to manage its own data, it can perform customized data analytics and reporting using a master set of data. Reports can be standardized for distribution at collaborative meetings. Analytics can be performed in-house, contracted out, or performed as a hybrid of the two. Vendors exist that can create web-based reporting platforms which allow access to the collaborative data. This type of reporting allows for trending, custom comparisons, and detailed data exploration, often at the patient level. It can also automate analytics and reporting that have been fully developed so that this repetitive task is less time-consuming.

Collaborative Meetings

Collaborative meetings are an ideal way to build trust, share information, and conduct collaborative business. In person meetings are recommended as they allow participants to be dedicated to collaborative business, interact with each other face-to-face, and focus on the conduct of the collaborative. They can also be used as opportunities for social interaction and networking. Other communication mechanisms such as conference calls and webinars can be used, but should be secondary to face-to-face meetings as these two modalities are prone to people becoming distracted, turning to other tasks, and tuning out without interacting. Two to four meetings per year are recommended to promote engagement and facilitate the collaborative progress. An awareness of the value of time and travel to participants is essential when planning the length, location, and date of collaborative meetings.

Data presented at collaborative meetings can be blinded or unblinded. Starting with blinded data and moving to unblinded data once trust is established is a rational approach to this delicate topic. Much

more can be accomplished when the data is presented in an unblinded fashion as it will intrinsically stimulate conversation and discussion. However, the stakes can be high for some participants and a safe environment must be created to allow for unblinded presentation of data. One way of safely managing unblinded data is to have meeting participants sign a confidentiality agreement prior to entry into each meeting that binds them to not share sensitive information presented at the meeting with people from outside the collaborative.

Many methods can be utilized to promote collaborative interaction at the meetings. Participants can be asked to present their own data followed by an opportunity for dialogue between participants. Surveys on topics of interest and controversy may be conducted prior to meetings using SurveyMonkey (www.surveymonkey.com) or an equivalent platform. These results can then be displayed at the meetings to facilitate discussion. Audience response clickers allow collaborative leaders to query for answers to questions relevant to the topic being presented at a meeting. Participants can be invited to present information on topics that they have experience with and are encouraged to share their progress involving individual performance improvement projects. Meeting evaluation scores have consistently ranked presentations of individual participant performance improvement projects as one of the most useful pieces of information within the Michigan Trauma Quality Improvement Program (MTQIP) collaborative. Panel discussions, round table group discussions, workgroups, and breakout sessions are additional mechanisms to promote member engagement.

Trust

A culture of trust and respect among collaborative members is paramount. The ability to be able to share ideas, promulgate successes, participate in discussions, and exchange data is enabled with a culture of respect and trust. While participating trauma centers may be competitors for business, this is not the case for improving quality and patient safety. Transparency within the collaborative creates a sharing culture where members willingly share best practices with each other without restraint. By creating a safe-harbor, a non-competitive trusting environment is present, and data is utilized in a responsible manner.

Building this type of culture begins with strong leaders and well-defined policies and procedures. Leaders who are experienced, passionate, and dedicated provide the vision and inspiration for establishing trust and respect. In parallel, clear policies and procedures should be in place and clear expectations set. Legal procedures and specifications for the sharing of data or business associate agreements for assistance of vendors is often a time-limiting but necessary step. Remain calm and circumspect in all that you do. Employ emotional intelligence to maintain a constant awareness of your interactions with others. Remember the three A's of medicine: ability, affability, and availability. Lastly, as Warren Buffet has stated "it takes 20 years to build a reputation and only 5 minutes to lose it." Keep this in mind as you work to build a culture of trust.

Performance Improvement

Trauma centers have experience with performance improvement as part of the "PIPS" process advocated by the ACS COT. Performance improvement within a collaborative is similar, but takes on a much different approach given the information sharing nature of the collaborative process. Sharing is evident in discussions of practice-based experiences, decisions on what new science or technologies to attempt to propagate within the collaborative, and review of data to determine success and failures. Shared knowledge prevents "reinvention of the wheel" and allows for rapid dissemination of key

problem-solving components that work. What works or does not work locally is often of great value to participants since many have common resource limitations that may not be present in other areas of the country.

Positive deviance is an approach to change that can be utilized to advantage within a collaborative. Positive deviance is based on the observation that in any community there are people whose uncommon but successful behaviors or strategies enable them to find better solutions to a problem than their peers.⁹ This difference is present despite facing similar challenges and having no extra resources or knowledge than their peers. Selection of performance improvement projects should take positive deviance into account and attempt to produce meaningful change while avoiding being onerous. Early, easy wins are key to building momentum. Performance improvement projects can be either collaborative wide or individual. Incentivizing and scoring of performance improvement should be carefully considered as a means to track progress and encourage robust engagement towards achieving collaborative goals.

Data Validation†

Construction of a robust data validation program is beneficial in assuring credibility and reliability of the data collected by the collaborative.¹⁰ The data validation program should assess the quality of data entered for trauma patients at each participant trauma center in the collaborative. The frequency of data validation audits is at the discretion of the collaborative program, but conducting data validation on an annual basis is recommended until proven stability is achieved. The data validation program should sample enough patient records and data elements to accurately gauge inter-rater reliability. Each participant must receive meaningful data validation feedback both in-person through debriefing procedures and via a written report. The data definitions manual to be followed must be published, updated annually, and aligned with the National Trauma Data Standard definitions when possible.^{8,11} Targeted selection criteria are used to query the submitted data for potentially “high yield” charts to be abstracted during the validation visit. A total of 7-10 charts are typically reviewed and scored during a site validation visit. The feedback letter to collaborative participant centers from a validation visit should include information of overall error rate, specific types of errors, and areas for data collection improvement.

Trauma Center Expectations

To participate in a quality collaborative, a facility must commit to meeting the expectations set out by the collaborative membership. The following are examples of *potential* requirements:

- Develop and maintain an organizational commitment to active participation in the quality collaborative for facility administration and trauma program staff
- Commit to scheduled submission of data
- Identify a clinical champion that is a trauma surgeon
 - The surgeon champion will lead the hospital in quality collaborative performance improvement efforts
 - The surgeon champion, or equivalent designee, will attend all quality collaborative meetings

- If the trauma medical director is not the surgeon champion, then the trauma medical director must be fully supportive of the program and the designated surgeon champion for collaborative performance improvement efforts
- Identify an administrative lead/site coordinator
 - The site coordinator will be the administrative lead for the quality collaborative at the facility (e.g. trauma program manager)
 - This person will also provide institutional support for full project participation
 - The site coordinator will attend all collaborative meetings
- Assign a dedicated trauma registrar to collect data:
 - This should consist of a 1.0 FTE person per 500-750 quality collaborative cases annually
 - The registrar should have access to an appropriate computer with high-speed internet connectivity
- Focus on Quality Improvement:
 - Enroll and maintain active program participation in ACS TQIP
 - Actively integrate quality collaborative and ACS TQIP information into the existing trauma center performance improvement patient safety (PIPS)/quality improvement (QI) program
- Commit to using quality collaborative and ACS TQIP data elements and data definitions:
 - These are updated annually
- Commit to all members using the same version of the Association for Advancement of Automotive Medicine (AAAM) Abbreviate Injury Scale for injury coding in the trauma registry
- Collaborate with leadership:
 - Participate in quality collaborative site visits, and external data validation audits of patient data entered into the collaborative database.†
 - Commit to developing and implementing a site-specific quality improvement agenda, linked to the collaborative quality improvement agenda, and also driven by opportunities specific to the facility based on its own experience
- Collaborate with other participating sites:
 - Participate in process improvement, including sharing of and learning from best practices
 - Be willing to share data
- Confidentiality and collegiality
 - Strive to promote a friendly and collegial atmosphere
 - Refrain from using quality collaborative or ACS TQIP data for competitive advantage or marketing

Coordinating Center Expectations†

The collaborative coordinating center staff should strongly consider conducting on-site customer service visits for participant trauma centers. These visits will allow the trauma center and coordinating center personnel to have dialogue exchange, address questions, and get to know one another in a less hurried environment than at face-to-face collaborative meetings. In addition, consultative services regarding the interpretation of collaborative and/or ACS TQIP reports and data may be requested by a participant trauma center. The coordinating center should be capable of facilitating pairing of trauma centers who seek similar information or solutions to problems so that they can communicate with each other in a non-threatening way.

Depending upon the funding source and charter of a collaborative, different oversight mechanisms may exist. These can be in the form of the following:

- Advisory Committee - Group of collaborative participants that serves to advise the collaborative leadership on direction, new projects, problems, and serves as a sounding board.
- Executive Committee - A more formal arrangement than the advisory committee and has a structure that typically votes on action items and determines collaborative leadership.
- Corporation - A collaborative that is part of a large hospital or healthcare corporation may have an oversight structure that reports to and through the corporate leadership infrastructure.
- Government - Trauma system oversight by state or county government can include collaborative management within their operative infrastructure.

Vendors†

A collaborative may contract with commercial third-party vendors for services essential to the program. Contracts may be held with software providers for provision of modules within their trauma registry software to collect custom data elements measuring outcomes and processes deemed essential to the collaborative. Vendors may also provide automated data transmission services to assist in uploading of trauma registry data from the participant hospitals to the coordinating center. The ability to revise and update the module on an annual basis to reflect changes in the data elements to be captured and their associated definitions should be considered. Hosting of an informational and organizational website may require assistance from a vendor. A website can contain all of the documentation pertaining to the collaborative including policies, administrative agreements, data definitions, data validation procedures, schedules, and contact information. Educational materials can be provided in a searchable slide library, YouTube video channel, and as page document files. Secure file transfer programs may be utilized to move information to and from the participant trauma centers and the coordinating center.

Misconduct

A collaborative should think about and have a plan for how it desires to handle breaches of confidentiality or inappropriate disclosure of data. Someone is bound to either knowingly or inadvertently challenge the system, and it is best to have policies in place to deal with these incidents prior to their occurrence. Use of collaborative information for marketing purposes is likely to create a trust problem and should be actively discouraged.

Appendix 1: Examples of Collaboratives

Collaborative Name		
National	Specialty	National Affiliation
ACS National Surgery Quality Improvement Program (ACS NSQIP)	Surgery	American College of Surgeons
ACS Trauma Quality Improvement Program (ACS TQIP)	Trauma	American College of Surgeons
Americas Hernia Society Quality Collaborative (AHSQC)	General Surgery	American Hernia Society
ASA/AQI National Anesthesia Clinical Outcomes Registry (NACOR)	Anesthesia	American Society of Anesthesiologists/Anesthesia Quality Institute
Collaborative Endocrine Surgery Quality Improvement Program (CESQIP)	Endocrine Surgery	American Association of Endocrine Surgeons
Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP)	Bariatric Surgery	American College of Surgeons/American Society for Metabolic and Bariatric Surgery
Multicenter Perioperative Outcomes Group (MPOG)	Anesthesia	Anesthesia Quality Institute
National Cancer Database (NCDB)	Clinical Oncology	American College of Surgeons/American Cancer Society
Pediatric Cardiac Critical Care Consortium (PC4)	Pediatric Cardiac Surgery	None
Society of Thoracic Surgery Database	Adult Cardiac Surgery, General Thoracic Surgery, Congenital Heart Surgery	Society of Thoracic Surgery

Appendix 1: Examples of Collaboratives (continued)

Collaborative Name		
Regional	Specialty	National Affiliation
Anesthesiology Performance Improvement and Reporting Exchange (ASPIRE)	Anesthesia	American Society of Anesthesiologists (ASA)
BCBSM Cardiovascular Consortium-Percutaneous Coronary Intervention (BMC2-PCI)	Interventional Cardiology	American College of Cardiology, National Cardiovascular Data Registry (ACC NCDR)
Integrated MI Patient-centered Alliance on Care Transitions (I-MPACT)	Physician Organizations	None
MI Anticoagulation Quality Improvement Initiative (MAQI2)	Cardiology/Anti-Coagulation	American College of Cardiology (ACC); Anticoagulation Forum
MI Arthroplasty Registry Collaborative for QI (MARCQI)	Orthopedic Surgery	Int'l Society of Arthroplasty Registries, American Joint Replacement Registry
MI Bariatric Surgery Collaborative (MBSC)	Bariatric Surgery	American Society of Metabolic and Bariatric Surgery (ASMBS)
MI Emergency Department Improvement Collaborative (MEDIC)	Emergency Medicine	None
MI Health and Hospital Association (MHA) Keystone Center	Hospital Administration	None
MI Hospital Medicine Safety Consortium (HMS)	Internal Medicine/ Hospitalist	None
MI Oncology Quality Consortium (MOQC)	Oncology	ASCO - QOPI (American Society of Clinical Oncology-Quality Oncology Practice Initiative)
MI Pharmacists Transforming Care and Quality (MPTCQ)	Physician Organizations (with Pharmacists)	None
MI Radiation Oncology Quality Consortium (MROQC)	Radiation Oncology	None
MI Society of Thoracic and Cardiovascular Surgeons Quality Collaborative (MSTCVS)	Cardiac Surgery	Society of Thoracic Surgeons (STS)

Appendix 2: ACS TQIP Collaborative List

Name	Type	Administration/Sponsor	Type	Trauma Centers*
Arkansas	State	Arkansas Department of Health	Third Party Admin	3
COT Region III (DE, PA, MD, DC, WV, VA)	Region	Participating hospitals	Hospital Admin	17
Florida	State	Florida Department of Health	Third Party Admin	29
Georgia	State	Georgia Trauma Care Network Commission/Georgia COT	Third Party Admin	15
HCA Healthcare	Hospital System	HCA Healthcare	Third Party Admin	38
Louisiana	State	Louisiana Emergency Response Network	Third Party Admin	5
Los Angeles County	Region	Los Angeles County Local EMS Agency	Third Party Admin	14
Michigan Trauma Quality Improvement Program (MTQIP)	State	Blue Cross Blue Shield of Michigan/Blue Care Network	Third Party Admin	29
New York	State	Participating hospitals	Hospital Admin	17
North Carolina	State	North Carolina COT Chapter	Third Party Admin	9
Northern Ohio	Region	Northern Ohio Trauma System	Third Party Admin	5
Pennsylvania	State	Pennsylvania Trauma Systems Foundation	Third Party Admin	28
Texas	State	Texas EMS Trauma & Acute Care Foundation	Third Party Admin	36

*The number of trauma centers in each collaborative is subject to change.

Appendix 3: Collaborative Components

- Specialty
- Mission, Vision, Values
- Affiliation/Sponsor
- Leadership
- Decision Making Structure
- Coordinating Center†
- Staffing/Volunteers
- Consistent use of Data Definitions
- Data Collection†
- Data Management†
- Data Analytics†
- Data Validation†
- Learning/Education
- Membership Process
- Participant Expectations
- Agreements
- Meetings
- Reporting
- Performance Improvement
- Site Visits†
- Policies
- Information Technology

†Indicates advanced collaborative components, not necessary for getting started.

Appendix 4: ACS TQIP Collaborative Snapshots

Michigan^{1,3,12}

Background

The Michigan Trauma Quality Improvement Program consists of 29 ACS-COT Level I and II verified hospitals delivering trauma care in the state of Michigan. Hallmarks of the collaborative are standardized data collection, annual data validation visits, face-to-face collaborative meetings, and dedication to performance improvement. MTQIP has demonstrated measurable improvement in patient outcomes, resource utilization, and compliance with processes of care.^{1,3,13,14}

Blue Cross Blue Shield of Michigan/Blue Care Network (BCBSM/BCN) sponsors MTQIP by providing support for the coordinating center and to each participant hospital. The program began in 2008 as a voluntary pilot and was formalized in July of 2010 with the provision of sustained support and expansion of enrollment. MTQIP provides comprehensive risk-adjusted benchmark reports to participants in paper form and online. Face-to-face collaborative meetings are held three times per year. Trauma centers participate in global performance improvement projects (e.g. venous thromboembolism prophylaxis, hemorrhage control and blood product utilization, brain injury management). Each center selects individual performance improvement projects based on their current data, and the center sets target values for quality improvement. All MTQIP trauma centers also enroll in ACS TQIP and receive the full benefits of national quality improvement program participation and benchmarking.

Performance Improvement

Each trauma center is scored on participation and quality improvement efforts annually. The MTQIP performance index (Figure 2) is developed by the coordinating center with guidance from an advisory committee and discussed with participating hospital surgeon champions before being finalized. Measures on the MTQIP performance index scorecard are reviewed annually, and updated if applicable, with increasing weight given to performance measures. When MTQIP initially began the BCBSM/BCN hospital performance index, scoring was based solely on participation (e.g. timely data submission, participant attendance, completion of data validation visits). As MTQIP became more established, BCBSM/BCN requested a transition in the scoring allocation of points from 100% for participation to a phased change over time to 30% for participation and 70% based on performance.

Advisory Committee

The MTQIP advisory committee is an essential group of colleagues within the collaborative. Committee membership consists of five trauma surgeon champions from participant trauma centers and the coordinating center staff. The advisory committee meets in person three times per year, prior to each MTQIP meeting, and on an as needed basis via conference calls. All essential MTQIP administrative matters such as policy decisions, performance index scoring, benchmark report development, and program direction are discussed, and input is sought from the advisory committee prior to rolling out to the entire collaborative membership.

Results

Trauma centers participating in MTQIP produced a 40% decline in their rate of serious complications from 2008 to 2013 (14.9% to 9.1%, $p < 0.001$).¹³ Mean risk-adjusted episode payments for pre-collaborative hospitals were \$38,752, and mean episode payments for post-collaborative hospitals were \$37,394, which resulted in an average savings of \$1,357 per episode ($p = 0.009$). There was a significant increase in payment relative to the risk-adjusted rate of serious complications within MTQIP trauma centers. We believe that these changes are attributable to key components of this regional quality improvement program. First, risk-adjusted reports of mortality and morbidity outcomes were continuously provided to trauma centers over a five-year period. Second, face-to-face meetings of the collaborative allowed for discussion of common issues and targeting of global PI initiatives. Third, annual trauma registry data validation audits assured credibility and ongoing reductions in variability of the data.

To accomplish the task of reducing complications, it was important for trauma centers to focus on picking up small victories in multiple areas. Examples of complications and methods used to reduce their rates include:

- Pneumonia: Hand washing, sub-glottic suctioning endotracheal tubes, timely and safe extubation.
- Urinary Tract Infection: Not placing a Foley catheter in every trauma patient, early nurse-driven discontinuation of Foley catheter.
- Return to ICU: Education, use of step down status beds.
- VTE: Timely initiation of prophylaxis, increasing the use of Low Molecular Weight Heparin as the preferred prophylaxis agent.¹⁵
- C. difficile colitis: Handwashing, antibiotic stewardship.

MTQIP has targeted specific processes in trauma care for focused collaborative improvement based upon best practices. These include increasing the proportion of patients who receive timely initiation of venous thromboembolism prophylaxis; increasing the proportion of patients who receive low molecular weight heparin as the preferred agent for venous thromboembolism prophylaxis; decreasing the utilization of prophylactic placement of inferior vena cava filters; and increasing the proportion of patients with bleeding that receive an appropriate ratio of blood to plasma during resuscitation.

Summary

MTQIP has improved the quality of care administered to trauma patients by focusing on delivery of more appropriate care in a timely manner. The results achieved by the MTQIP collaborative have decreased patient deaths from traumatic injury, cut down on costly and morbid complications, reduced consumption of costly hospital resources, and demonstrated significant cost savings. Support of a regional quality improvement collaborative for trauma represents an effective investment to achieve health care value.

Georgia

History and Background

The Georgia Quality Collaborative has its roots in the vision of the late M. Gage Oschner who spent years trying to create a forum for the leadership of the state’s trauma centers to meet and discuss their common challenges. In 2007, the state’s trauma system underwent an assessment by the American College of Surgeons who described the system as a series of “islands of excellence in a sea of chaos”. The ACS Review Team accurately described the lack of system integration, the prevalence of hospital diversion, and the lack of specialty coverage. They also noted limited budgetary support for emergency medical services or the trauma system. Probably the biggest strength noted in the state was the well organized and mature society of the state’s trauma program managers, the Georgia Committee for Trauma Excellence. This infrastructure had been in place since the mid-1980s and was led by a group of senior, experienced personnel. The ACS also highlighted the fact that all of the state’s trauma centers were on a standardized trauma registry. At approximately the same time, an assessment of the state of care of trauma patients in Georgia revealed that the mortality rate from trauma in the state as a whole was 20% worse than national average and especially high in rural areas. Moreover, it was noted that only 30% of traumatic injuries were cared for at designated trauma centers and these centers provided upwards of 250 million dollars in uncompensated care.

Amidst this bleak backdrop, the Georgia Trauma Care Network Commission, colloquially called the ‘Trauma Commission’, was established by State Bill 60. Its charge was to ‘establish, maintain, and administer a statewide trauma care network.’ The nine-member committee consisted of clinicians, politicians, and administrators and has been chaired by Dennis Ashley, MD, the longtime Trauma Medical Director of the Medical Center of Central Georgia. The establishment of this body, coupled with the limited infrastructure already in place, formed the beginnings of a foundation for the creation of a collaborative that would allow for true cooperation amongst the leadership of the state’s trauma centers.

The popularization of ACS-NSQIP and ACS TQIP led the Trauma Commission to invite Avery Nathens, the Chair of the ACS TQIP Committee, to speak at their retreat and by 2011, the Commission mandated participation in ACS TQIP for each of the state’s five Level I and nine Level II trauma centers. Moreover, the Commission allocated funding for each center to cover the cost of participation. By 2012, all centers had individually contracted with ACS TQIP and were participating in this national benchmarking project. Concurrent to this effort, the leadership of the Commission approached the Georgia chapter of the Committee on Trauma and asked the group to coordinate a joint effort amongst the trauma centers to analyze and use the ACS TQIP reports.

Over the ensuing few years, the Georgia COT led a series of conference calls with the leaders of the state’s trauma centers and this led to the formation of a subcommittee of the Georgia COT, which was titled the Georgia TQIP subcommittee. This group worked with ACS TQIP to devise state level reports, the first of which was received in October, 2012. As the group began to analyze this report, it was immediately evident that there was much variability in experience with these types of reports and there was much concern regarding homogeneity and quality of the data. Thus, the nascent collaborative spent much effort with education and put many resources into assuring homogenous and quality data. In early 2013, the ACS TQIP staff organized an in-person training session, which was hosted in Atlanta. This improved familiarity of the participants in understanding their reports and using the available tools. Several months later, the Georgia COT organized the first annual statewide “Day of Trauma”, which was

hosted in Macon, Georgia at Medical Center of Central Georgia. National experts, including both Drs. Mark R. Hemmila and Avery B. Nathens, were engaged to provide further education on report analysis.

Concurrent with these educational efforts, a strong effort was placed in understanding the data and a standardized series of audit filters was put in place to allow for ongoing assessment of error rates in the data sets. The end of this effort led to a publication in the Journal of the American College of Surgeons, which detailed the improvements in data homogeneity and accuracy in many of the participating centers.

Once data quality and inexperience with reports were improved, efforts to perform true state level PI began. In spring 2016, the first true unblinding of the data was performed in what has become the state's spring PI meeting. We identified several high performing centers within the collaborative in areas that were problematic on the state level reports. These centers were tasked with creating educational presentations for the subsequent summer meeting, which is what the original "Day of Trauma" had grown into. Indeed, the fourth annual Day of Trauma, held in conjunction with the Georgia ACS chapter meeting in August 2016, was the largest to date, with educational tracts for registrars, nurses and physicians.

The final step in infrastructure building occurred soon thereafter as the Trauma Commission allocated funding for an executive director of state PI and salary support for statistical analysis. The resultant entity, the Georgia Trauma and Surgical Quality Collaborative works with both the Georgia TQIP collaborative through the Georgia COT and also the state's burgeoning ACS-NSQIP collaborative to provide data collection and analysis and works to coordinate the ongoing conference calls and biannual meetings. The infrastructure for true state-level PI has now been laid, after a journey of more than six years.

Components

The Georgia Trauma and Surgical Quality Collaborative consists of an executive director, medical directors for both Georgia TQIP and Georgia NSQIP, and a part-time statistician. The Collaborative is supported with funds routed by the Trauma Commission through Emory University in Atlanta, which donated the physical space and some administrative oversight. Collaborative leadership is in the process of developing a board and exploring options for incorporation. It works with both the Georgia TQIP collaborative, which remains as a subcommittee of the Georgia COT and the more loosely organized Georgia NSQIP collaborative, which is a coalition of ACS-NSQIP participating hospitals in the state. The vision is to provide support for both groups' PI efforts at the state level and to find areas of overlap where combined projects may be possible. This type of collaborative structure is currently unique to the author's knowledge. Data collection will occur at the institutional level and then be forwarded and collated for analysis at the state office. PI projects will be designed at a more grassroots level, with proposals coming from participating centers to be vetted through discussion at biannual meetings and finalized by the executive committee/board of directors. There is a vision for three annual meetings, one in the spring in conjunction with the educational conference being held by the Georgia Trauma Foundation, one in the summer during the "Day of Trauma", which will continue to be held in conjunction with the Georgia chapter ACS meeting, and then a final one in the fall/winter. This final meeting, this year, will be held at the annual TQIP conference, but in future years will be held locally so as to include the NSQIP group. On the trauma side, early interest includes analyzing opportunities to improve rates of Acute Kidney Injury, Ventilator Associated Pneumonia, and potentially unplanned return to the operating room.

Appendix 5: MTQIP performance index (Figure 2)

Michigan Trauma Quality Improvement Program (MTQIP) 2017 Performance Index January 1, 2017 to December 31, 2017					
Measure	Weight	Measure Description			Points
#1	10	Data Submission (Partial/Incomplete Submissions No Points)			
		On time and complete 3 of 3 times			10
		On time and complete 2 of 3 times			5
#2	10	Meeting Participation All Disciplines *Surgeon represents 1 hospital only			
		Surgeon, and (TPM or MCR) Participate in 3 of 3 Collaborative meetings (9 pts)			0-10
		Surgeon, and (TPM or MCR) Participate in 2 of 3 Collaborative meetings (6 pts)			
Surgeon, and (TPM or MCR) Participate in 1 of 3 Collaborative meetings (3 pts)					
#3	10	Data Accuracy			
		1st Validation Visit-Error Rate			
		≥2 Validation Visits-Error Rate			
		5 Star Validation			10
		4 Star Validation			8
		3 Star Validation			5
2 Star Validation			3		
1 Star Validation			0		
#4	10	Venous Thromboembolism (VTE) Prophylaxis Initiated Within 48 Hours of Arrival in Trauma Service Admits with ≥ 2 Day Length of Stay (18 Mo's: 1/1/16-6/30/17)			
		≥ 50%			10
		≥ 40%			5
#5	10	Low Molecular Weight Heparin (LMWH) Venous Thromboembolism (VTE) Prophylaxis Use in Trauma Service Admits (18 Mo's: 1/1/16-6/30/17)			
		≥ 50%			10
		21-49%			7
		5-20%			5
#6	10	Red Blood Cell to Plasma Ratio (Weighted Mean Points) of Patients Transfused ≥5 Units in 1st 4 Hours (18 Mo's: 1/1/16-6/30/17)			
		10 pts: Tier 1: ≤ 1.5			0-10
		10 pts: Tier 2: 1.6-2.0			
		5 pts: Tier 3: 2.1-2.5			
0 pts: Tier 4: >2.5					
#7	10	Serious Complication Rate-Trauma Service Admits (3 years: 7/1/14-6/30/17)			
		Z-score: < -1 (major improvement)			10
		Z-score: -1 to 1 or serious complications low-outlier (average or better rate)			7
#8	10	Mortality Rate-Trauma Service Admits (3 years: 7/1/14-6/30/17)			
		Z-score: < -1 (major improvement)			10
		Z-score: -1 to 1 or mortality low-outlier (average or better rate)			7
#9	10	Inferior Vena Cava Filter Use (All Admits) (Collaborative Wide) (7/1/16-6/30/17)			
		≤ 1.2			10
		> 1.2			0
#10	10	Site Specific Quality Improvement Project (July 2016-December 2017)			
		Implemented, and met or exceeded target			10
		Implemented, showed improvement, but did not meet target			7
Implemented, but showed no improvement			0		
Total (Max Points) =				100	

Appendix 6: Common Collaborative Documents

Agreements and Forms	Description
Business Associate Agreement (BAA)	Used to establish a relationship between a HIPAA covered entity and business associate for sharing full protected health information and describing breach management
Confidentiality Agreement	Used to protect confidential discussions from disclosure
Data Sharing Agreement (DSA)	Used for sharing of non-public datasets containing full protected health information
Data Use Agreement (DUA)	Used for sharing of non-public datasets containing limited dataset protected health information
General Services Agreement (GSA)	Used to describe the goods or services to be exchanged by another party
Membership Application Form	Used to request collaborative membership
Memorandum of Understanding (MOU)	Used to formalize collaborations with internal or established parties
Remote Access Agreement (RAA)	Used to establish remote access validation
Statement of Work (SOW)	Used in project management to define project-specific activities, deliverables and timelines for an entity providing services to a client

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