USING VIDEO DEBRIEFING TO IMPROVE PERFORMANCE OF THE INTERPROFESSIONAL TRAUMA RESUSCITATION TEAM

A Doctor of Nursing Practice Project Report

by

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This Doctor of Nursing Practice Project Report meets the standards for scope and quality of Texas A&M University-Corpus Christi College of Nursing and Health Sciences and is hereby approved.

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August 2021

DEDICATION

This work is dedicated to my husband and son who have provided their endless encouragement and patience throughout my educational and professional endeavors. It is also dedicated to trauma professionals who provide unwavering service to trauma victims during the most critical moments of their lives.

ACKNOWLEDGEMENTS

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ABSTRACT

In trauma centers, failures in teamwork account for 87.9% of preventable errors. Errors made during the primary assessment cause up to 91% of preventable deaths. Video review of trauma resuscitations has been shown to improve teamwork, communication, confidence, leadership, and timeliness of care. This quality improvement project aimed to improve trauma team performance through video analysis and a Trauma Video Debriefing Conference (TVDC). Between February and May 2021, highest-tier trauma activations were recorded and variability in (1) primary assessment completion and (2) nontechnical skills were measured. Videos demonstrating learning opportunities were shared in a TVDC. Variabilities in (1) and (2) were measured utilizing the Advanced Trauma Life Support (ATLS) Primary Assessment Completion Tool (PACT) and the Trauma Nontechnical Skills (T-NOTECHS) instruments, respectively. To assess the impact of the TVDC interventions across time, we performed a simple linear regression, with the item of interest as our outcome variable. Pre- and post-TVDC teamwork perception was measured by the TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ). To assess the provider survey items across the pre- and post- TVDC intervention, the chi-square or Fisher's exact test was used where appropriate; the Wilcoxon Mann-Whitney U test was performed on the average module scores. During the initial project cycle, 66 trauma activations were measured, and 10 videos were reviewed across seven TVDCs, focused on team education and performance improvement. Progressive and statistically significant improvement in team performance was demonstrated, as evidenced by improved PACT (p = .0128) and T-NOTECHS (p = .0027) scores. Perception of teamwork, as measured by the T-TPQ, remained unchanged after project implementation. Implementation of a TVDC can contribute to improvement in both the technical and nontechnical performance of a TRT and is an effective tool for targeted

education and quality improvement. Perception of teamwork should be studied in dependent groups in upcoming project cycles.

Keywords: trauma resuscitation team, primary assessment, nontechnical skills, performance improvement, teamwork, communication

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Using Video Debriefing to Improve Performance of the Interprofessional Trauma Resuscitation Team

INTRODUCTION

Background

Trauma is the leading cause of mortality in the United States for individuals aged one to 44 years and the third leading cause of death for all ages (Centers for Disease Control and Prevention [CDC] & National Center for Injury Prevention and Control [NCIPC], 2019). Injuries are the leading cause of morbidity and years of potential lives lost, leaving millions of Americans chronically disabled every year (American College of Surgeons [ACS], 2014; CDC & NCIPC, 2018). Injury-related medical costs account for approximately 12 percent of national health care expenditures in the United States, approaching nearly half a trillion dollars annually (ACS, 2014). Trauma resuscitation teams (TRT) are interprofessional and their effective performance is essential to the systematic and timely delivery of care in the emergent, resuscitative time following the sustainment of injuries (Steinemann et al., 2016). Preventable errors occur even in mature trauma centers, with one-third of errors occurring during the initial resuscitation in the ED (Steinemann et al., 2011). Teamwork failures account for 87.9% of preventable medical errors and errors made during the primary assessment contribute to 91% of all preventable deaths (Bonjour et al., 2016; Pucher et al., 2013). The purpose of this quality improvement (QI) project was to improve TRT performance by hardwiring a systematic approach to resuscitative trauma care, reducing variability practice, communication failures, and role confusion, while optimizing interprofessional teamwork and leadership.

The TRT functions in a time-sensitive and high-pressure environment with little margin for error in performance, and a team approach to the evaluation and treatment of injured

patients is ideal in the initial phase of trauma care to support rapid identification of life-threatening injuries and performance of interventions (ACS, 2014; Groenestege-Kreb et al., 2014; Steinemann et al., 2016). There is a positive correlation between patient safety and TRT performance, with ineffective teamwork and failures in communication contributing to errors, delays in care, ineffective relationships, and negatively impacting morbidity and mortality (Groenestege-Kreb et al., 2014; Haske et al., 2018; Johnson, 2019; Rice et al., 2016; Steinemann et al., 2011; Weldon et al., 2019). The first hour following a traumatic injury is sometimes referred to as the "golden hour," with the underlying idea emphasizing the importance of time when addressing life-threatening injuries. Inefficiencies in the initial phase of trauma care can prolong the time to definitive interventions and increase the risk of morbidity and mortality (Long et al., 2019). Emergency department length of stay is an independent predictor of hospital mortality in trauma patients, emphasizing the importance of expedient evaluations and goal-directed resuscitations (Mowery et al., 2011). The effectiveness of an interprofessional healthcare team in providing safe and reliable care depends on its members' ability to collaborate and communicate to achieve a shared goal (Leonard & Frankel, 2011). The benefits of improvement in TRT performance include enhanced efficiency in decision-making and care delivery, as well as the secondary gain of fostering professional respect and growth across disciplines (Tomasik & Fleming, 2015). Additionally, eliminating errors and optimizing efficiencies have a positive impact on cost reduction (Bodenheimer & Grumbach, 2016).

Review of Literature

Trauma centers must commit to continuous improvement in the value of care delivered to injured patients by improving quality and reducing costs (American College of Surgeons [ACS], 2014). Prior to project implementation, the organization did not conduct interprofessional trauma

case reviews or team development activities. Consequently, variability in practice resulted in inconsistencies in TRT performance and trauma care. When video debriefing was used following live and/or simulated trauma resuscitations, several studies reported improvement in teamwork (Hughes et al., 2014; Murphy et al., 2019; Steinemann et al., 2011), confidence (Knobel et al., 2018), communication (Bergs et al., 2005; Capella et al., 2010; DeMoor et al., 2017; Härgestam et al., 2016), cohesion (Hamilton et al., 2012; Hughes et al., 2014), and leadership (Capella et al., 2010; Fernandez et al., 2020). Several studies also identified improvements in the timeliness of trauma care, when video debriefing was used following live and/or simulated trauma resuscitations (Dumas et al., 2018; El-Shafy et al., 2018; Fernandez et al., 2020; Hoang et al., 2020; Hoyt et al., 1988; Knobel et al., 2018; Long et al., 2019; Wutster et al., 2017). Current literature and evidence support the use of trauma video debriefing as an effective tool to educate trauma teams and to improve team performance and patient safety (Hamilton et al., 2012; Haske et al., 2018; McNicholas & Reilly, 2018; Sadideen et al., 2016).

In a seminal study, Hoyt et al. (1988) reported video debriefing was an effective intervention to educate and improve the quality of TRT performance. Video debriefing reduced the time to definitive care by 17%; reduced the frequency of wasted time from 37% to 15%; and improved prioritization of resuscitation from 56% to 88%. In the same study, 94% of residents and nurses found the video debriefing conference had a positive impact on delivery of care (Hoyt et al., 1988). Several other publications have endorsed Hoyt's study of trauma video review and debriefing as an effective tool for education and performance improvement (Bergs et al., 2005; Bonjour et al., 2016; DeMoor et al., 2017; Dumas et al., 2018; Dumas et al., 2020; Spanjersberg et al., 2009; Steinemann et al., 2012; Vella et al., 2019; Wutster et al., 2017).

Another foundational quasi-experimental study which supported video debriefing was Townsend et al. (1993) who used trauma video debriefing to address errors, delays, and system issues within trauma resuscitations. Their findings included improved efficiency, reduced technical errors, elimination of wasted time, and improved survival following the implementation of the video review process (Townsend et al., 1993). El-Shafy, et al. (2018) published a prospective observational study, whereby trauma video review was used to study the use of closed-loop communication and its impact on the timeliness and accuracy of task completion in trauma resuscitations. With the practice of closed-loop communication, the time to task completion was 1.53 min as compared to 4.68 min when closed-loop communication was not demonstrated. The changes in time to completion of other tasks were found to be statistically significant when comparing the difference between closed-loop and non-closed-loop communication. In a study by Hamilton et al. (2018), trauma team members participated in simulated trauma resuscitations followed by video debriefing. The mean team function score improved significantly after video debriefing (4.39 [+/-0.3] vs 5.45 [+/-0.4] pre-video vs post-video review, $p < .05$). Knobel et al. (2018) reported that in situ simulations with video debriefing significantly decreased the elapsed time from patient's arrival to the computer tomography (CT) in real trauma resuscitations (Spearman rank coefficient $r = -0.236$, $p = .001$). Trauma team members also reported a significant increase in self-confidence ($p < .05$). In a quasi-experimental study, Wutster et al. (2017) used trauma video review to identify TRT performance improvement opportunities. Identified opportunities for improvement (OFI) were shared with providers through a video debriefing procedure. Variability in practice was monitored, and the study found statistically significant improvements in compliance with trauma protocols and reduced variability over time ($p < .0001$). These findings concluded that video

debriefing was an effective strategy for promoting interprofessional team development and improved TRT performance, including timeliness, error reduction, teamwork, and communication (Hamilton et al., 2012; Rice et al., 2016).

While evidence supports the use of video debriefing as an effective tool to standardize and improve trauma team performance, many trauma centers still do not conduct video debriefing programs. Concerns surrounding patient privacy and consent for video recording are the most notable reasons trauma video review is not utilized (McNicholas & Reilly, 2018). Barriers to using trauma video include the lack of medical-legal support, the potential risk to patient confidentiality, and the lack of infrastructure and resources to support the live recording of trauma resuscitations and the review of recordings (McNicholas & Reilly, 2018).

Problem Description in the Setting

The project setting was an urban, academic, Level I trauma center in North Central Texas which admitted approximately 2600 injured patients each year and had approximately 3400 trauma team activations annually. The interprofessional trauma team consisted of nurses, patient care techs, respiratory therapists, radiology technologists, trauma surgeons (faculty and residents), and emergency medicine physicians (faculty and residents). The trauma program recognized variability in trauma team performance and suspected the fact that individual disciplines of the TRT tended to train in silos was a contributing factor. Despite having highly skilled team members, the very nature of interprofessional teams predisposed them to potential miscommunication opportunities, leading to medical errors or negative outcomes (Leonard & Frankel, 2011). Due to the negative implications of poor team performance, it was postulated

that an evidence-based quality intervention would cultivate more robust teams, improve patient safety, develop stronger providers, and improve the value of trauma care.

An organizational assessment of trauma team performance, and associated opportunities for improvement (OFI), was conducted at the regional Level I trauma center. Through the review of trauma performance improvement and patient safety (PIPS) data, variability in TRT performance, non-compliance with trauma standards, and communication failures were identified as the most common contributing factors to unanticipated and preventable morbidity and mortality events. High Reliability Organizations (HRO) function with standardized practice, thus the project targeted improved quality performance in trauma resuscitations to align with organizational quality goals (Agency for Healthcare Research and Quality [AHRQ], 2019). Organizational aims included the demonstration of high reliability, and the organization was supportive of initiatives that prioritized standardization of performance to maintain safe operations. Additionally, as a Level I trauma center, the organization was committed to continuous improvement in trauma, as an essential component of trauma verification and designation (ACS, 2014). Through participation in the American College of Surgeon's Trauma Quality Improvement Program (TQIP), benchmarking reports indicated the organization had an OFI in trauma morbidity and mortality. Of the unanticipated mortality events with identified OFI, from 2017 to 2020, communication failures and/or deviations from standards of trauma care were found to be a contributing factor in approximately 73% of the events. These organizational assessment findings substantiated the need for a QI initiative focused on improved trauma team communication, adherence to standards of care within the initial resuscitative phase of care, and standardization of trauma team performance.

Project Purpose and Aims

The project's purpose was to optimize trauma team performance by reducing variability in practice, eliminating communication failures, and hardwiring a standardized and systematic approach to each role in the TRT, despite variability in the people serving on the TRT. The QI project focused on the following question: In an interprofessional trauma team, will the addition of a video debriefing conference, compared to not using video debriefing, improve trauma team performance, specifically the timeliness and completeness of the primary survey and the use of closed-loop communication, as measured over a three-month period?

The first aim was to standardize trauma resuscitations, so the essential components of the primary survey were performed consistently and in a timely manner for every patient. Outcome objectives included adherence to the sequence and completeness of the trauma primary survey and the Advanced Trauma Life Support (ATLS) Primary Assessment Completion Tool (PACT) was used to measure achievement of this outcome (Wutster et al., 2017). A complete, sequential, and timely primary survey was measured from recorded trauma resuscitations, and feedback was provided to team members in a TVDC when there were deviations from the assessment standards.

The second aim was to improve interprofessional teamwork within the trauma resuscitations. Outcome objectives included demonstrating a score of better than or equal to the average performance of nontechnical teamwork skills during the trauma resuscitation. The Trauma Nontechnical Skill (T-NOTECHS) scale was used to measure outcome achievement (Steinemann et al., 2012). Nontechnical teamwork skills were measured from video recorded trauma resuscitations, and feedback was provided to team members in a TVDC when there was below-average performance.

The third aim was to improve the perception of interprofessional teamwork within trauma resuscitations. Outcome objectives included a demonstration of improved perception of teamwork following the implementation of a TVDC, and the TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ) was used to measure achievement of this outcome (Agency for Healthcare Research and Quality [AHRQ], 2010). The perception of teamwork was evaluated before and after TVDC implementation to demonstrate the project's practical significance.

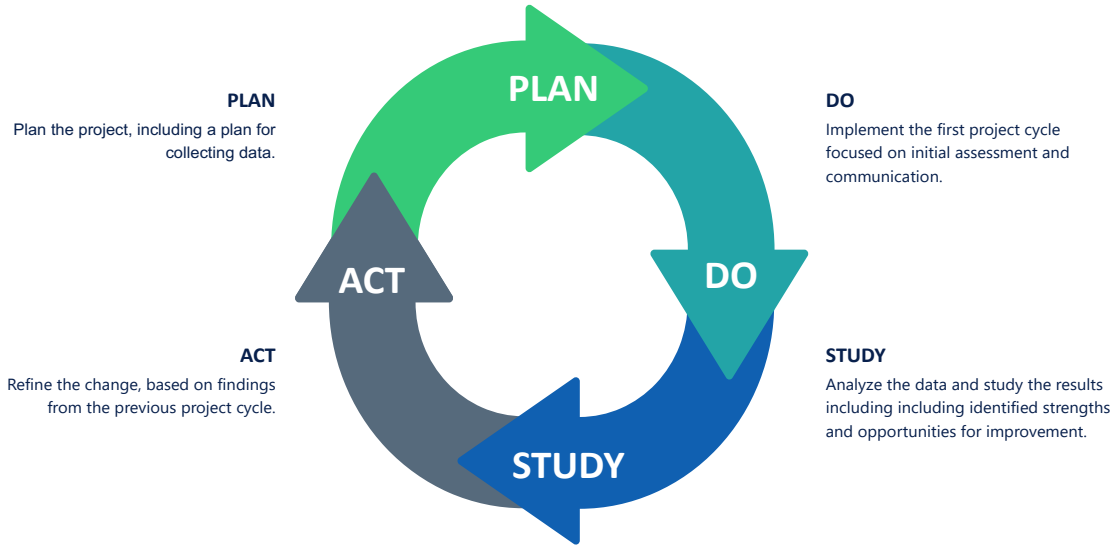
The project aligned with DNP Essential VI: Interprofessional Collaboration for Improving Patient and Population Outcomes. This essential was demonstrated throughout the project which focused on improving communication and collaborative practice within the interprofessional TRT, by implementing of a video debriefing program that promoted accountability to a standardized practice model (American Association of Colleges of Nursing [AACN], 2006). The project also aligned with the American Organization of Nurse Leaders (AONL), Nurse Executive Competencies for (1) Communication and Relationship Building, (2) Knowledge of the Health Care Environment, and (3) Leadership (American Organization of Nurse Leaders [AONL], 2015). To implement evidence-based clinical processes, the nurse leader had to demonstrate healthcare environment, leadership, and communication competencies (AONL, 2015). To effectively execute a change initiative and influence behaviors, the project director and nurse executive built good working relationships with the medical staff and project stakeholders and communicated justification and vision for the project with the trauma team members.

Guiding Frameworks

The QI project was guided by the Plan-Do-Study-Act (PDSA) framework. The PDSA cycle is a well-established and evidence-based framework, commonly used in quality initiatives

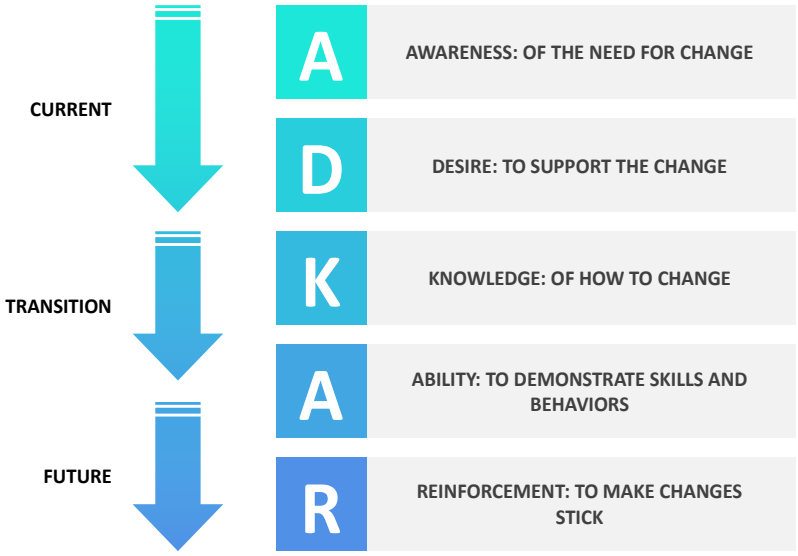
to improve healthcare processes (AHRQ Health Care Innovations Exchange, 2013). The PDSA model is a simple four-stage problem-solving model used for improvement cycles and is endorsed by the Institute for Healthcare Improvement (IHI) to accelerate change and QI (AHRQ Health Care Innovations Exchange, 2013; How to Improve: Model for Improvement, 2020). The PDSA cycle involved constant re-evaluation of outcomes to support the cycle of continuous improvement. Sustained change is achievable only by outlining and addressing multiple issues and regularly re-evaluating the need for further actions (Gillam & Siriwardena, 2013).

Figure 1: Plan-Do-Study-Act Framework



Prosci's ADKAR Conceptual Change Model was used to guide process change in the QI project. Prosci's ADKAR Model outlined five components of successful individual and organizational change (Hiatt, 2006). At its foundation, the change theory's concepts (awareness, desire, knowledge, ability, and reinforcement) focused on facilitating change in individuals, which was essential to achieve sustainable team-level and organizational change. This model was selected because the quality initiative sought to change individual and culturally ingrained practice patterns. Resistance to change and standardization of practice was anticipated and the ADKAR Model provided guidance for managing resistance (Creasey, 2016; Hiatt, 2006).

Figure 2: Prosci's ADKAR Change Model



METHODS

Ethical Considerations

The project plan was reviewed by the Texas A&M University — Corpus Christi (TAMU-CC) Research Compliance Office for project/study classification and received a determination of "Not Human Subjects Research" and permission to proceed as a Quality Improvement project. For the TAMU-CC Letter of Determination, see Appendix A. For the project's purposes, Personal Health Information (PHI) was collected with the approval of the organization's Office of Clinical Research division to conduct an academic QI project; see Appendix B. Finally, a letter of support was provided by the hospital's Chief Nurse Executive, agreeing to support the QI project and acknowledging the collection of PHI for project purposes; see Appendix C.

Project Design

The QI project was designed to use analysis and debriefings of recorded trauma resuscitations to improve trauma team performance. The project was conducted in an urban, academic, safety-net hospital and regional tertiary Level I trauma center. The hospital and

trauma center served a socio-economically disadvantaged area and a large trauma patient population, including approximately 3400 annual trauma team activations. In 2020, the leading mechanisms of injury resulting in trauma team activation at the project site were Motor Vehicle Collisions (*n* = 1127; 32.89%), Falls (*n* = 988; 28.83%), Gunshot Wounds (*n* = 292; 8.52%), Assaults (*n* = 158; 4.61%), Auto-Pedestrian Collisions (*n* = 145; 4.23%), Stab Wounds (*n* = 126; 3.68%), and other mechanisms of injury (*n* = 591; 17.25%). Trauma team activations (TTA) were categorized by severity level, with a level 1 activation being the highest level of acuity and a level 3 being the lowest level of acuity. In 2020, level 1 activations made up 20.8% of all activations and occurred if any of the following criteria were met:

1. Intubated trauma patients transferred from the scene or outside hospital
2. Patients with respiratory compromise; RR <10 or >30
3. Traumatic cardiac arrest
4. Hypotension: confirmed blood pressure at any time

Table 1: Hypotension parameters following trauma, by age

Age	Systolic Blood Pressure
< 1 y/o	< 60
1-10 y/o	< 70 + 2x age
11-69 y/o	< 90
≥ 70 y/o	<110

5. Transfer patients from the scene or an outside hospital, receiving blood to maintain vital signs
6. Glasgow Coma Scale score ≤ 8 with mechanism attributed to trauma
7. Gunshot wounds or other missile trauma to head, neck, torso (chest, abdomen, back, flank), or extremities proximal to elbow or knees.

The QI project targeted level 1 trauma activations because they represented the highest acuity and most severely injured patients. The level 1 trauma activations had the most critical need for complete and timely primary assessments and effective teamwork.

Table 2: SWOT Analysis

Strengths (internal, positive factors)	**Weaknesses** (internal, negative factors)
1. Organizational leadership, physician and nursing support and desire for trauma resuscitation team performance improvement. 2. Academic hospital with organization commitment to interprofessional team training. 3. Access to trauma pathology through consistent incoming trauma patients requiring activation of trauma team; average of 8-12 activations per day.	1. Resistance to change amongst senior faculty. Lack of engagement from Radiology and Respiratory providers. 2. Lack of experience with debriefing amongst senior faculty and leaders. All have taken basic TeamSTEPPS training but have limited debriefing practice. 3. Competitive and antagonistic relationships between Surgery and Emergency Medicine Residents.
Opportunities (external, positive factors)	**Threats** (external, negative factors)
1. Regulatory requirements for continuous improvement to maintain Level I trauma verification. 2. Supporting data reflecting opportunity for improvement in improving the mortality rate in penetrating trauma, as evidenced by improvements in the Trauma Quality Improvement Program (TQIP) national benchmarking reports. 3. Access to resources (equipment, financial, and human) for project support. In FY20 the organization supported the purchase of necessary equipment and currently, the organization has continued to support technology needs as well as dedicated time and human resources to support the project.	1. Risk of non-participation secondary to competing priorities and discomfort with being filmed and participating in debriefings. As COVID surges occur, quality and educational programs tend to be lower priority so participation could suffer. 2. Organizational rules currently limit in persons meetings, so debriefing will be virtual. A virtual format may negatively impact team member's engagement in meaningful team development. 3. Risk for technology failure impacting ability to review and debrief with recordings.

A SWOT analysis was performed during project planning which identified potential barriers that may have affected the success of this improvement project. The challenges addressed in project implementation included technical equipment failures, and COVID-19

related challenges. The challenges included the inability to hold in-person conferences and/or low participation and a lessened impact of web-conferences. Emphasis was also placed on managing resistance to change and a perceived fear of punitive actions amongst trauma resuscitation team members. These factors were mitigated to prevent disruption of the project, as reflected in a Risk Assessment Matrix and Mitigation Strategies.

Table 3: Risk Assessment Matrix and Mitigation Plan

Risk Description	Business Impact	Probability of Occurrence	Priority	Mitigation Strategies
Technical equipment failure	Without recorded trauma resuscitations, the project will be stalled.	2	1	Install recording equipment in two resuscitation rooms. Have availability of handheld recording equipment as back up.
COVID-19 related barriers to holding a Video Debriefing Conference	In person meeting disruption may require use of web-based conferencing which may limit team development.	4	2	Meetings held virtually via secure Zoom for Healthcare platform. Incentivized participation through offering CME, CNE, and professional development credits.
Resistance to change in practice	Resistant team members will negatively impact change of team performance	5	3	Messaging of the change initiative was presented by leaders and included rationale. Identified and obtained input from resistance groups.
Fear of punitive action	Fear of punitive action will create avoidance behaviors	4	4	Training provided to project committee and project stakeholders on Just Culture.

Performance of a complete, sequential, and timely primary survey was measured from video recorded trauma resuscitations and feedback was provided to team members in a TVDC when there were deviations from the assessment standards. The Associate Trauma Medical Director and Emergency Medicine Trauma Liaison were responsible for performing the objective review and collecting performance data on the designated data collection tools. Data collected from recorded videos was maintained by the project director on secure, password-protected drives and videos were maintained on a secure hospital server with limited access only by defined project team members. To support privacy and data security, an organizational policy

was developed and approved by the organization. The policy defined the procedures for obtaining consent to use recordings in the QI project, the access to recordings, and the review process; see the organizational policy in Appendix D.

The first project goal was trauma team members would perform a complete and sequential primary survey in 99% of level 1 trauma activations within 5 min of activation by the end of the 3-month project period. The second goal was that team members would perform better than or equal to the average in 80% of level 1 trauma activations by the end of the 3-month project period. The third goal was that trauma team members would experience an improved perception of teamwork by the end of the 3-month project, as evidenced by T-TPQ survey results.

Participants and Recruitment

A convenience sample was collected based on availability of recorded TTAs meeting inclusion criteria. Trauma resuscitations were included if they were: (1) level 1 TTAs; (2) received into either of the rooms with recording equipment; and (3) recordings were complete from the start of the TTA to the disposition from the resuscitation room. An overhead recording system was installed in the trauma resuscitation rooms to capture video and audio during trauma resuscitations. It was anticipated in a 3-month period, up to 100 level 1 TTAs may be included in the sample, based on historical volumes.

TRT members were included in the TVDC if they were from one of the disciplines involved with level 1 TTAs, including (1) Emergency Medicine (EM) Attendings; (2) EM Residents; (3) Trauma Surgical Attendings; (4) Trauma Surgical Residents; (5) Respiratory Therapists; (6) Radiology Technologists; (7) Trauma Resuscitation RNs; (8) Emergency Services Techs; (9) Trauma Nurse Clinicians, (10) Pre-hospital or Emergency Medical Services (EMS)

team members. In trauma resuscitations, physicians conducted assessments, diagnosed injuries, and performed interventions, as needed. The senior surgical or EM providers served in the role of team leader and were responsible for leading the team in patient care and developing the post-resuscitation plan. The team leaders made decisions regarding diagnostic procedures, admission level of care, and the need for surgical intervention. There was a component of shared responsibility within the team, as each team member represented their specific area of expertise and had the responsibility to question the plan of care when it deviated from standard trauma resuscitation protocols.

The clinical outcomes for patients were impacted by the team's adherence to trauma protocols and delivery of life-saving care, as well as the senior provider and team leader's ability to make decisions, delegate tasks, communicate with the team members and the patient, and adapt to the needs of the patient and team (Sadideen et al., 2016). Nurses and emergency patient care techs provided direct patient care by obtaining vital signs, initiating peripheral venous access, collecting laboratory specimens, assisting with assessments and procedures, and securing belongings and/or evidence. Additionally, nurses administered medications, infused prescribed crystalloid or blood products, and documented aspects of the trauma resuscitation. Respiratory Therapists collected arterial blood samples and assisted with procedures related to supporting airway patency and effective ventilation. Radiology Technologists were responsible for obtaining and presenting radiographs as ordered by the team leader. The trauma resuscitation team was dynamic and adaptable, adding or excusing participants in response to the patient's needs and situations.

Intervention

The PDSA model and ADKAR change management framework were used to guide the planning and implementation of the quality improvement project. A project team was established to assist in the planning, implementation, review, and/or reinforcement phases of the project. The project team included: (1) a Project Director (PD) who was responsible for overall project management, and also served as Executive Director for the trauma program; (2) physician champions, including the Chief of Surgery, Chief of Emergency Medicine, Trauma Medical Director, Associate Trauma Medical Director, and Emergency Medicine-Trauma Liaison, (3) the Trauma Services and Emergency Services Nurse Managers and representatives from Emergency and Trauma Nursing, (4) the Respiratory Therapy Manager and a lead Respiratory Therapist, and (6) the Radiology Supervisor. Chief Residents from Emergency Medicine and Surgery were also invited to participate on the project team but did not attend project team meetings. The PD facilitated project team meetings, including the review of planning documents and action plans, which resulted from input received during the planning phase of the project. The PD developed training modules for the project team and the individual disciplines that comprised the TRT.

In the pre-implementation phase of the project, the PD formalized procedures and policy to support peer protections and privacy as well as delivered training to the project team and the individual stakeholder groups and disciplines. The TRT was heterogeneous, involving representatives from several disciplines and with varying degrees of experience; thus, the training modules were based on social learning theory (SLT) (Braungart et al., 2019). The training module delivered to the project team included content focused on video review procedures, teamwork complexities, debriefing conference structure, and the TeamSTEPPS methodology, which was used to promote enhanced team performance. Training on TeamSTEPPS principles was essential for the project team, as these principles would be

promoted during the debriefing conferences to drive improved team performance. The TeamSTEPPS curriculum and system focused on promoting the principles of team structure, communication, leadership, situational monitoring, and mutual support (Department of Defense Patient Safety Program [DOD] & Agency for Healthcare Research and Quality [AHRQ], 2013). The TeamSTEPPS methodology was selected as the foundation for team performance improvement because it was an evidence-based framework with over 20 years of research supporting its effectiveness in improving healthcare team performance and patient safety (Agency for Healthcare Research and Quality [AHRQ], 2019a).

Following the project team training, the PD presented the project purpose and goals to individual stakeholder groups, including Trauma and Emergency Nurses, Radiology Technologists, Surgical Residents and Faculty, and Emergency Medicine Residents and Faculty. Attempts were made to present content to the Respiratory Therapy team; however, due to scheduling conflicts and inclement weather, the Respiratory team did not have training delivered by the PD prior to project implementation. Respiratory Therapists were provided the training slides to review in their own time.

Once stakeholder training was complete, level 1 TTAs recording began and a mock-TTA session was also recorded with the plan to share at the first TVDC as an example of an ideal trauma resuscitation. In the mock-TTA session, the team demonstrated a timely and sequential primary assessment and as well as optimal leadership and closed-loop communication.

After the collection of two weeks of baseline recordings and the closing of the pre-intervention survey, the TVDC was implemented in a biweekly format. The TVDC was held virtually via the secure Zoom for Healthcare application. Members of the TRT were invited to the TVDC via a Zoom link, which required registration, so participants were identifiable. TVDC

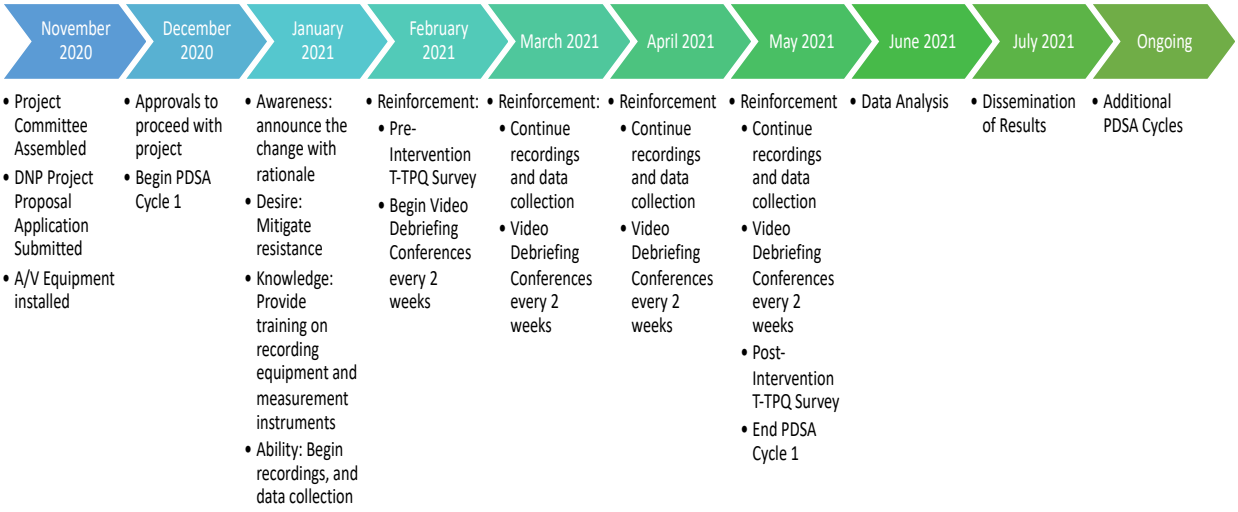
participants were required to submit an attestation of confidentiality, as acceptance and adherence to the confidentiality expectations for the activity. A strategy implemented to ensure cultural competence and effectiveness within the TVDC was the creation of *Ground Rules*. The *Ground Rules* were presented at the beginning of each TVDC and were meant to establish a safe environment whereby interprofessional team members were encouraged to express themselves in a collegial and emotionally intelligent manner while valuing diversity and demonstrating cultural humility (Bastable & Sopczyk, 2019). Similarly, to support psychological safety within the team, priority was made to promote and protect a *Just Culture* within the TVDC, where mistakes were not punished, trust was developed amongst team members, and participants each had an equal voice (Arul et al., 2017). The project team assisted with disseminating awareness of the project amongst individual disciplines and facilitated the video debriefing conferences, including providing feedback on team performance and promoting the TeamSTEPPS principles.

Data Collection

Team performance data were collected throughout a 12-week project timeframe using designated data collection forms; see Appendix E. The PD facilitated weekly video review and scoring sessions with the reviewing providers. Baseline data were collected from the pre-intervention videos. The PD transcribed data collection from video scoring into the central data collection spreadsheet; see Appendix F. Following the initial review and scoring of performance, referrals were made to the TVDC for below- and above-average performance and identified learning opportunities. The PD notated the debriefing discussions, identifying opportunities for improvement themes. Both corrective and positive reinforcement were provided during the video debriefing conferences.

Team perception was measured pre- and post-implementation of the TVDC. The pre-intervention survey, TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ), was administered electronically via a Qualtrics survey link. Following 12 weeks of data collection and 7 TVDC occurrences, a post-intervention survey was administered amongst trauma resuscitation team members through an electronic Qualtrics survey link. See Figure 3 for a timeline of each project component conducted, beginning with organizational assessment through the dissemination of results.

Figure 3: Quality Improvement Project Timeline



Measurement Tools

As described above, data were collected from a review of each recorded trauma resuscitation using two measurement instruments: The T-NOTECHS scale and the ATLS PACT. Performance scores were tracked for improvement over time, throughout the 12-week timeframe. The first aim was to standardize trauma resuscitations, so the essential components of the primary survey were performed consistently and promptly for every patient. The ATLS algorithm has been proven to improve outcomes through the standardized and systematic process of identifying life-threatening injuries and definitive management (Wutster et al., 2017). The

PACT, a validated and reliable tool, was used to objectively measure primary assessment performance; see Appendix G (Wutster et al., 2017). Outcome objectives included adherence to the sequence and completeness of the trauma primary survey and the PACT measured achievement of this outcome (Wutster et al., 2017).

The second aim of the project was to improve interprofessional teamwork within the trauma resuscitations. A modified version of the T-NOTECHS scale was used to assess the teamwork skills of the interprofessional trauma team; see Appendix H. The T-NOTECHS is a trauma-specific instrument designed for the evaluation of trauma resuscitations in the emergency department. The T-NOTECHS is the most commonly used tool for evaluating trauma team performance, and it is reliable and has been validated by several studies (DeMoor et al., 2017). The T-NOTECHS instrument aligns with TeamSTEPPS principles and measures five domains of teamwork, including (1) leadership, (2) cooperation and resource management, (3) communication and interaction, (4) assessment and decision-making, and (5) situational awareness and coping with stress (Steinemann et al., 2012). The T-NOTECHS reduces subjectivity by using a modified 3-point scale (1 = best, 2 = average, 3 = worst) with associated and clarified scoring definitions (Dumas et al., 2020). Outcome measures were the evaluation of performance in each domain of teamwork and objectives included a demonstration of a score of better than or equal to the average performance of nontechnical teamwork skills during the trauma resuscitation, and the T-NOTECHS scale was used to measure achievement of this outcome (Steinemann et al., 2012). Performance of nontechnical teamwork skills was measured from video recorded trauma resuscitations and feedback was provided to team members in a TVDC when there was below-average performance.

The third aim of the project was to improve the perception of interprofessional teamwork within trauma resuscitations. Pre- and post-measurements of perception of teamwork data were collected amongst trauma team members before the first TVDC and again following the implementation of bi-weekly (every other week; $n = 7$) TVDCs. The instrument used for measuring perception of teamwork was the T-TPQ, a validated instrument that measures the domains of team structure, team leadership, situation monitoring, mutual support, and communication; see Appendix I (AHRQ, 2010). Outcome objectives included a demonstration of improved perception of teamwork following the implementation of a TVDC. The perception of teamwork was evaluated before and after implementing the TVDCs, to demonstrate the practical significance of the project.

Data Analysis and Evaluation

Outcomes of the project included the sequential, timely, and completeness of trauma primary assessment performance, as measured by the PACT tool; the use of clear, closed-loop communication, as measured by the T-NOTECHS tool; and the perception of individual team members on group-level team skills and behavior, as measured by the T-TPQ tool. Statistical analysis was computed using SAS software, version 9.4. Descriptive statistics of project team members' demographics were analyzed and presented using frequency tables. For the technical and nontechnical performance outcomes, measured with the T-NOTECHs and PACT tools, the scores were analyzed for improvements over time using analysis of variance to test the difference in scores across time (Polit, 2010). To assess the statistical impact of the TVDC interventions across time, a simple linear regression was performed, with the item of interest being the outcome variable of PACT and T-NOTECHS scores. Additionally, scores were trended using run charts. Pareto charts were used to describe OFI themes that were identified in the TVDCs.

For measuring changes in the perception of teamwork with the T-TPQ tool, the chi-square or Fisher's exact test was used where appropriate; the Wilcoxon Mann-Whitney U test was performed on the average module scores to detect statistically significant differences between the pre- and post-intervention groups.

RESULTS

Implementation

The project began with the implementation of the Trauma Video Debriefing Conference (TVDC). As planned and described in the Methods section, prior to implementing the TVDC intervention, the project committee was trained on TeamSTEPPs principles, and stakeholder groups were oriented to the project purpose. An unanticipated inclement weather event occurred in mid-February, resulting in the cancellation of the project presentation with the Respiratory Therapy team, so they were provided training materials to review in their own time.

The pre-intervention T-TPQ survey was sent via Qualtrics on February 1, 2021 and was closed on February 19, 2021. During this time, 84 surveys were returned by members of the trauma resuscitation team. The TVDC project team recorded a mock-TTA to demonstrate an ideal trauma resuscitation to the TRT, with a deliberate focus on demonstration of timely and sequential assessment and interventions as well as clearly identified leadership with command and control of the resuscitation team. The mock-TTA recording included a team pre-debriefing with an assignment of roles, a calm and orderly evaluation, a lack of idle or unassigned team members, closed-loop communication, and critical information routing through the team leader with a lack of simultaneous conversations. The mock resuscitation was created, to share at the first TVDC, as an example of how future resuscitations should be conducted.

During the initial project implementation phase, COVID-19 admissions dropped to the lowest volumes since the late summer 2020 and there was demobilization of many of the operational changes made in response to the COVID-19 pandemic, including the closure of the COVID ICU. Despite demobilization of COVID-19 response efforts, the organization continued to promote physical distancing and virtual meetings while discouraging in-person gatherings of greater than 20 people. As a result, the first TVDC was held on February 19, 2021, via the Zoom for Healthcare platform.

At the initial TVDC, a baseline resuscitation video was shared of a patient who had been injured after being hit by a train. The resuscitation was particularly disorganized and highlighted several opportunities for improvement, representing the current state of trauma resuscitations. Following the initial case debriefing, the mock-TTA video was presented, representing the project goal of standardized and sequential trauma resuscitations. During the TVDC, attendance was captured, as were comments collected in the Zoom chat and through discussions. The first TVDC had over 36 attendees representing members from all disciplines. Following each TVDC, the project team would debrief on opportunities for ongoing optimization of the conference. Initially, the TVDC was planned for twice a month. In the second TVDC on March 5, participants expressed interest in more frequent TVDCs, so the conference frequency was increased to three times for the months of March and April. In May, the TVDC returned to biweekly occurrence due to the availability of project and conference facilitators. Following the third TVDC, the project team identified value in having EMS participate in the TVDC, specifically to optimize the transition of care from the EMS to the hospital team, as this was identified as a common OFI.

Opportunities and threats identified during the SWOT analysis included antagonistic relationships between the Surgery and Emergency Medicine Resident programs as well as the risk of non-participation secondary to discomfort with being filmed and participating in debriefings. In response to these factors and to promote collegiality and psychological safety of team members, each TVDC began with a review of the conference *Ground Rules.* The *Ground Rules* focused on confidentiality of the activity, promoting effective teamwork and a Just Culture, valuing diversity and individual perspectives, and celebrating successes. Another potential project threat identified was technical failure. As part of the mitigation strategy, recording equipment was installed in two trauma resuscitation rooms. Technical challenges were a consistent theme throughout the first 12-week PDSA cycle. The recording equipment vendor had to restart the recording system, specifically the application that streamed vital signs from the monitor into the video recordings several times throughout the project cycle. There was also a three-day period when the recording equipment went offline in the second trauma room and was unable to have service restored without a site visit from the vendor. Other technical challenges encountered included streaming videos and coordinating secure case discussion through the virtual platform.

Outcomes

The pre-intervention perception of teamwork survey participant sample was made up of 84 members of the trauma resuscitation team and the sample consisted of females (n = 46, 54.8%), males (n = 37, 44.1%), and unknown or non-binary gender (n = 1, 1.2%). The majority of participants reported being White, not Hispanic (n = 60, 71.4%), with others identifying as Hispanic or Latino (n = 13, 15.5%), Black or African American (n = 5, 6.0%), or Other (n = 6, 7.1%) race/ethnicity. Participants were predominately Technical Specialists (n = 41, 48.8%)

including Radiology Technologists, Respiratory Therapists or Emergency Services Techs. Other participants included Emergency Medicine and Surgery Residents (n = 18, 21.4%), Emergency and Trauma Nurses (n = 15, 17.9%), and Emergency Medicine and Surgery Faculty (n = 10, 11.9%). Table 4 presents a comparison of the descriptive statistics for the pre- and post-intervention survey participant groups. Of note, there was a significant difference (p = .0012) in the roles represented in the pre- and post- survey participant groups.

Table 4: Demographic Distribution of Survey Participants of the Video Debriefing Program Study Participants, by Study Interval

	Pre-TVDC Intervention N = 84	Post-TVDC Intervention N = 67	P-Value
Gender (%)[1]			
Female	46 (54.8%)	41 (61.2%)	0.0647
Male	37 (44.1%)	21 (31.3%)	
Unknown	1 (1.2%)	5 (7.5%)	
Age (%)[1]			
18-24	2 (2.4%)	1 (1.5%)	0.8682
25-34	35 (41.7%)	25 (37.3%)	
35-44	25 (29.8%)	25 (37.3%)	
45-54	9 (10.7%)	9 (13.4%)	
55-64	11 (13.1%)	6 (9.0%)	
Over 65	2 (2.4%)	1 (1.5%)	
Race/Ethnicity (%)[1]			
Black or African American	5 (6.0%)	2 (3.0%)	0.3267
Hispanic or Latino	13 (15.5%)	5 (7.5%)	
Other	6 (7.1%)	7 (10.5%)	
White	60 (71.4%)	53 (79.1%)	
Role (%)[2]			
Faculty	10 (11.9%)	16 (23.9%)	0.0012
Nurses	15 (17.9%)	25 (37.3%)	
Residents	18 (21.4%)	11 (16.4%)	
Technical Specialists	41 (48.8%)	15 (22.4%)	
Years of Experience (%)[1]			
1 to 3	26 (31.0%)	14 (20.9%)	0.1901
4 to 6	13 (15.5%)	13 (19.4%)	
7 to 9	10 (11.9%)	5 (7.5%)	
10 to 12	7 (8.3%)	11 (16.4%)	
13 to 15	5 (6.0%)	10 (14.9%)	
16 to 19	8 (9.5%)	3 (4.5%)	
20+	15 (17.9%)	11 (16.4%)	

1. Fisher's Exact Test was performed
2. χ^2 was performed

Between February 1 and May 9, 2021, 148 level 1 Trauma Activations were received in the trauma center. Of those, 88 patients met inclusion criteria and 66 were scored for the intervention sample. The intervention sample was representative of the overall level 1 trauma activations, with the majority of patients having sustained gunshot wounds our motor vehicle collisions. See Table 5 for detailed summary of the trauma activation sample included in the project cycle.

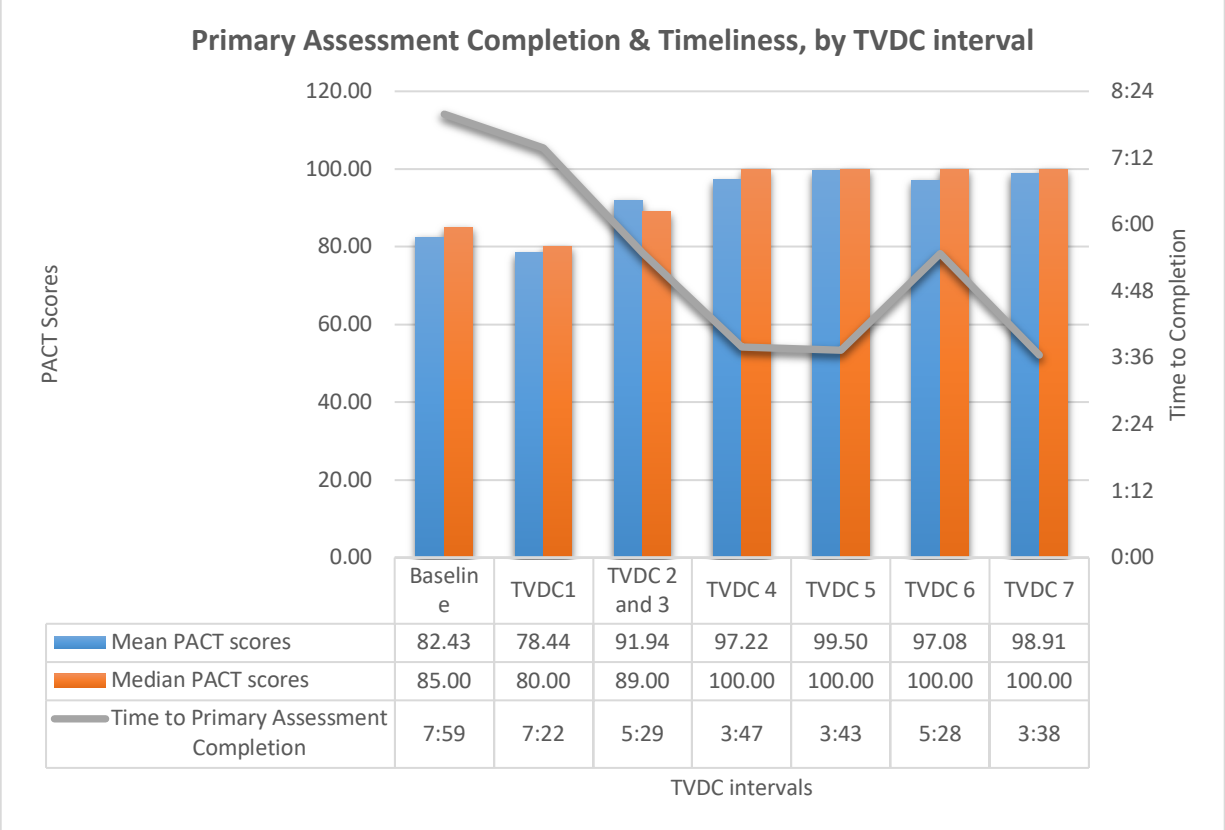
Table 5: Trauma Activations in Project Sample

Mechanism of Injury (MOI)	***Level 1 TTAs***	***Inclusion Criteria Met***	***Scored***
MVC/MCC/ATV	41	27	20
Fall	12	6	5
Assault or Other blunt injury	9	4	3
GSW	57	36	26
SW or Other penetrating	9	5	5
Burn	5	1	1
AutoPed	8	6	5
Other MOI	7	2	1
Grand Total	148	88	66

The first project aim was to standardize trauma resuscitations, so the essential components of the primary survey were performed in a consistent and timely manner for every patient. The specific goal of this aim was that trauma team members would perform a complete and sequential primary survey in 99% of level 1 trauma activations within 5 min of activation by the end of the 3-month project period, as evidenced by the PACT scores collected from recorded trauma resuscitations. Evaluation of performance using the PACT instrument results in a score between zero and 100, with higher scores indicating better performance of primary assessment completion. The data set was non-normal so non-parametric tests were used to analyze the changes over time. The overall median PACT score was 100.0 with an interquartile range (*IQR* = 90.0 to 100.0) representing the difference between the third and first quartiles. The overall median time to completion of the primary survey was 3:42 minutes (*IQR* = 3:00 to 6:20). While

progressive improvement in the completeness of the primary assessment was demonstrated in PACT scores, progressive reduction in time to complete the primary assessment was also found following the TVDC interventions. There was a demonstrated increase in PACT scores as well as a decrease in elapsed time to completion of the primary survey. Using the Kruskal Wallis one-way analysis of variance, a statistically significant effect of the TVDC on PACT scores was found (p = .0004). Furthermore, upon performing the dwass steel critchlow-fligner method for multiple comparisons, we found a significant difference between the TVDC 1 and TVDC 5 groups (p = .0217), as well as between the TVDC 1 and TVDC 7 groups (p = .0429).

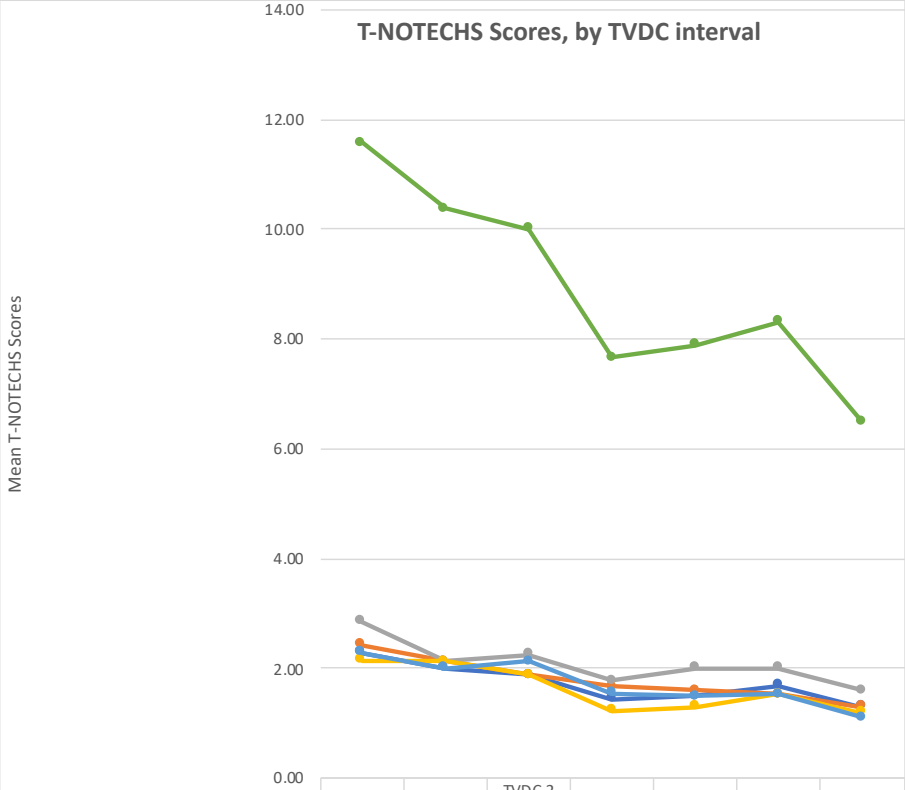
Figure 4: Primary Assessment Completion and Timeliness Trends



The second aim of the project was to improve interprofessional teamwork within the trauma resuscitations. The specific goal of this aim was that trauma team members would perform a better than or equal to average in 80% of level 1 trauma activations by the end of the

3-month project period, as evidenced by the T-NOTECHS scores collected from trauma resuscitation recordings. Evaluation of performance using the T-NOTECHS instrument results in a score between five and 15, with lower scores indicating better nontechnical performance. The overall mean T-NOTECHS score was (M = 8.63, SD = 2.62). Progressive improvement was noted overall and in each component of the T-NOTECHS evaluation from baseline. Figure 5 demonstrates progressive improvements in mean T-NOTECHS scores, beginning with pre-intervention baseline scores and following each of the TVDC occurrences.

Figure 5: Trauma Nontechnical Skills Run Chart



	Baseline	TVDC1	TVDC 2 and 3	TVDC 4	TVDC 5	TVDC 6	TVDC 7
Mean Scores by TVDC Leadership	2.29	2.00	1.88	1.44	1.50	1.69	1.30
Mean Scores by TVDC Cooperation and Resource Management	2.43	2.13	1.88	1.67	1.60	1.54	1.30
Mean Scores by TVDC Communication	2.86	2.13	2.25	1.78	2.00	2.00	1.60
Mean Scores by TVDC Assessment and Decision Making	2.14	2.13	1.88	1.22	1.30	1.54	1.20
Mean Scores by TVDC Situational Awareness	2.29	2.00	2.13	1.56	1.50	1.54	1.10
Mean Scores by TVDC Total T-NOTECHS	11.57	10.38	10.00	7.67	7.90	8.31	6.50

The greatest improvements were demonstrated in the domains of Cooperation and Resource Management (b = -.1732; p = .0002) and Situational Awareness (b = -.1829; p = .0017), while the domains of Communication (b = -.1532; p = .023) and Leadership (b = -.1418; p = .0096) showed the least improvement over time. Using analysis of variance there was a statistically significant effect of the TVDC on T-NOTECHS scores, $F(28.79, 4.62) = 6.23$, $p = < .0001$. To assess the impact of the TVDC interventions across time, on PACT and T-NOTECHS scores, a simple linear regression was performed, with the item of interest as our outcome variable.

Table 6: Simple Linear Regressions Assessing Provider Survey Modules, PACT Scores, and T-NOTECHS Scores, Over Time

	β_1 trend over time	95% Confidence Interval	*P*-Value
Mean Scores by TVDC			
Leadership	-0.14	(-0.231, -0.052)	0.0096
Cooperation and Resource Management	-0.17	(-0.220, -0.126)	0.0002
Communication	-0.15	(-0.275, -0.031)	0.0232
Assessment and Decision Making	-0.08	(-0.158, 0.006)	0.0638
Situational Awareness	-0.18	(-0.260, -0.106)	0.0017
Total T-NOTECHS	-0.77	(-1.124, -0.408)	0.0027
Median Scores by TVDC			
Total PACT	3.43	(1.103, 5.754)	0.0128

The third aim of the project was to improve the perception of interprofessional teamwork within the trauma resuscitations. The specific goal of this aim was that trauma team members would experience improved perception of teamwork by the end of the 3-month project, as evidenced by T-TPQ survey results. To assess the participant perception survey results items across the pre- and post-TVDC intervention, the chi-square or Fisher's exact test was used where appropriate; the Wilcoxon Mann-Whitney U test was performed on the average module scores. The data analysis found that survey participants did not have a statistically significant

improvement in the perception of teamwork (p = .5767) at the end of the 12-week intervention cycle. Demonstration of pre- and post-intervention T-TPQ results reported by the individual domains of TeamSTEPPS, including the median average scores, can be found in Table 7 through Table 11.

Table 7: Distribution of T-TPQ Team Function Answers Provided by Survey Participants, by Study Interval

	Post-TVDC Survey *N* = 67	Pre-TVDC Survey *N* = 84	*P*-Value
The skills of staff overlap sufficiently so that work can be shared when necessary (%)[1]			
Strongly Disagree, Disagree	4 (6.3%)	10 (12.5%)	0.2268
Neutral	8 (12.5%)	5 (6.3%)	
Agree, Strongly Agree	52 (81.3%)	65 (81.3%)	
Staff are held accountable for their actions (%)[1]			
Strongly Disagree, Disagree	8 (12.5%)	14 (17.5%)	0.6898
Neutral	12 (18.8%)	13 (16.3%)	
Agree, Strongly Agree	44 (68.8%)	53 (66.3%)	
Staff within my unit share information that enables timely decision making by the direct patient care team (%)[2]			
Strongly Disagree, Disagree	2 (3.2%)	5 (6.3%)	0.2363
Neutral	9 (14.3%)	5 (6.3%)	
Agree, Strongly Agree	52 (82.5%)	70 (87.5%)	
My unit makes efficient use of resources--e.g., staff supplies, equipment, information (%)[1]			
Strongly Disagree, Disagree	10 (15.6%)	9 (11.3%)	0.125
Neutral	14 (21.9%)	9 (11.3%)	
Agree, Strongly Agree	40 (62.5%)	62 (77.5%)	
Staff understand their roles and responsibilities (%)[2]			
Strongly Disagree, Disagree	3 (4.7%)	7 (8.8%)	0.4255

	Neutral	11 (17.2%)	9 (11.3%)	
	Agree, Strongly Agree	50 (78.1%)	64 (80.0%)	
My unit has clearly articulated goals (%)[2]				
	Strongly Disagree, Disagree	3 (4.7%)	5 (6.3%)	
	Neutral	8 (12.5%)	10 (12.5%)	0.9465
	Agree, Strongly Agree	53 (82.8%)	65 (81.3%)	
My unit operates at a high level of efficiency (%)[1]				
	Strongly Disagree, Disagree	5 (7.8%)	8 (10.0%)	
	Neutral	11 (17.2%)	12 (15.0%)	0.8629
	Agree, Strongly Agree	48 (75.0%)	60 (75.0%)	
Median Average Team Function Score (*IQR*)[3]		4.0 (3.6 to 4.6)	4.0 (3.6 to 4.6)	0.5767
	1. χ2 was performed *2. Fisher's Exact Test was performed* *3. Wilcoxon Mann-Whitney U Test was performed*			

Table 8: Distribution of T-TPQ Leadership Answers Provided by Survey Participants, by Study Interval

	Post-TVDC Survey *N* = 67	**Pre-TVDC Survey *N* = 84**	***P*-Value**
My supervisor/manager considers staff input when making decisions about patient care (%)[1]			
Strongly Disagree, Disagree	8 (13.1%)	6 (7.8%)	0.3889
Neutral	9 (14.8%)	8 (10.4%)	
Agree, Strongly Agree	44 (72.1%)	63 (81.8%)	
My supervisor/manager provides opportunities to discuss the unit's performance after an event (%)[1]			
Strongly Disagree, Disagree	9 (14.8%)	11 (14.3%)	0.8568
Neutral	9 (14.8%)	9 (11.7%)	
Agree, Strongly Agree	43 (70.5%)	57 (74.0%)	
My supervisor/manager takes time to meet with staff to develop a plan for patient care (%)[1]			
Strongly Disagree, Disagree	5 (8.2%)	8 (10.4%)	0.3987
Neutral	16 (26.2%)	13 (16.9%)	
Agree, Strongly Agree	40 (65.6%)	56 (72.7%)	
My supervisor/manager ensures that adequate resources (e.g., staff, supplies, equipment, information) are available (%)[1]			

	Strongly Disagree, Disagree	5 (8.2%)	7 (9.1%)	0.8008
	Neutral	13 (21.3%)	13 (16.9%)	
	Agree, Strongly Agree	43 (70.5%)	57 (74.0%)	
My supervisor/manager resolves conflicts successfully (%)[2]				
	Strongly Disagree, Disagree	4 (6.6%)	7 (9.1%)	0.5354
	Neutral	13 (21.3%)	11 (14.3%)	
	Agree, Strongly Agree	44 (72.1%)	59 (76.6%)	
My supervisor/manager models appropriate team behavior (%)				
	Strongly Disagree, Disagree	5 (8.2%)	6 (7.8%)	0.9923
	Neutral	9 (14.8%)	11 (14.3%)	
	Agree, Strongly Agree	47 (77.1%)	60 (77.9%)	
My supervisor/manager ensures that staff are aware of any situations or changes that may affect patient care (%)[2]				
	Strongly Disagree, Disagree	3 (4.9%)	4 (5.2%)	0.7922
	Neutral	10 (16.4%)	9 (11.7%)	
	Agree, Strongly Agree	48 (78.7%)	64 (83.1%)	
Median Average Leadership Score (*IQR*)[3]		4.0 (3.1 to 5.0)	4.0 (3.7 to 4.7)	0.9584

1. χ2 was performed
2. Fisher's Exact Test was performed
3. Wilcoxon Mann-Whitney U Test was performed

Table 9: Distribution of T-TPQ Situational Awareness Answers Provided by Survey Participants, by Study Interval

		Post-TVDC Survey *N* = 67	**Pre-TVDC Survey *N* = 84**	***P*-Value**
Staff effectively anticipate each other's needs (%)[1]				
	Strongly Disagree, Disagree	1 (1.7%)	7 (9.5%)	0.0675
	Neutral	12 (20.7%)	8 (10.8%)	
	Agree, Strongly Agree	45 (77.6%)	59 (79.7%)	
Staff monitor each other's performance (%)[1]				
	Strongly Disagree, Disagree	2 (3.5%)	8 (10.8%)	0.1778
	Neutral	12 (20.7%)	10 (13.5%)	
	Agree, Strongly Agree	44 (75.9%)	56 (75.7%)	
Staff exchange relevant information as it becomes available (%)[1]				
	Strongly Disagree, Disagree	0 (0.0%)	3 (4.1%)	0.3442

	Neutral	6 (10.3%)	6 (8.1%)	
	Agree, Strongly Agree	52 (89.7%)	65 (87.8%)	
Staff continuously scan the environment for important information (%)[1]				
	Strongly Disagree, Disagree	2 (3.5%)	4 (5.4%)	0.8072
	Neutral	7 (12.1%)	7 (9.5%)	
	Agree, Strongly Agree	49 (84.5%)	63 (85.1%)	
Staff share information regarding potential complications (e.g., patient changes, bed availability (%)[1]				
	Strongly Disagree, Disagree	3 (5.2%)	4 (5.4%)	0.9259
	Neutral	4 (6.9%)	7 (9.5%)	
	Agree, Strongly Agree	51 (87.9%)	63 (85.1%)	
Staff meets to reevaluate patient care goals when aspects of the situation have changed (%)[1]				
	Strongly Disagree, Disagree	4 (6.9%)	4 (5.4%)	0.2516
	Neutral	9 (15.5%)	5 (6.8%)	
	Agree, Strongly Agree	45 (77.6%)	65 (87.8%)	
Staff correct each other's mistakes to ensure that procedures are followed properly (%)[1]				
	Strongly Disagree, Disagree	5 (8.6%)	4 (5.4%)	0.717
	Neutral	8 (13.8%)	9 (12.2%)	
	Agree, Strongly Agree	45 (77.6%)	61 (82.4%)	
Median Average Situation Score (*IQR*)[2]		4.0 (3.6 to 4.4)	4.0 (3.7 to 4.6)	0.5118

1. Fisher's Exact Test was performed
2. Wilcoxon Mann-Whitney U Test was performed

Table 10: Distribution of T-TPQ Mutual Support Answers Provided by Survey Participants, by Study Interval

	Post-TVDC Survey *N* = 67	**Pre-TVDC Survey *N* = 84**	***P*-Value**

Staff assist fellow staff during high workload (%)[1]				
	Strongly Disagree, Disagree	4 (7.3%)	1 (1.4%)	0.177
	Neutral	6 (10.9%)	5 (6.9%)	
	Agree, Strongly Agree	45 (81.8%)	66 (91.7%)	
Staff request assistance from fellow staff when they feel overwhelmed (%)[1]				
	Strongly Disagree, Disagree	3 (5.5%)	5 (6.9%)	0.2833
	Neutral	11 (20.0%)	7 (9.7%)	
	Agree, Strongly Agree	41 (74.6%)	60 (83.3%)	
Staff caution each other about potentially dangerous situations (%)[1]				
	Strongly Disagree, Disagree	2 (3.6%)	3 (4.2%)	0.9218
	Neutral	7 (12.7%)	7 (9.7%)	
	Agree, Strongly Agree	46 (83.6%)	62 (86.1%)	
Feedback between staff is delivered in a way that promotes positive interactions and future change (%)[2]				
	Strongly Disagree, Disagree	5 (9.1%)	6 (8.3%)	0.9763
	Neutral	10 (18.2%)	14 (19.4%)	
	Agree, Strongly Agree	40 (72.7%)	52 (72.2%)	
Staff advocate for patients even when their opinion conflicts with that of a senior member of the unit (%)[1]				
	Strongly Disagree, Disagree	2 (3.6%)	4 (5.6%)	0.2376
	Neutral	9 (16.4%)	5 (6.9%)	
	Agree, Strongly Agree	44 (80.0%)	63 (87.5%)	
When staff have a concern about patient safety, they challenge others until they are sure the concern has been heard (%)[1]				
	Strongly Disagree, Disagree	3 (5.5%)	3 (4.2%)	0.8777
	Neutral	8 (14.6%)	9 (12.5%)	
	Agree, Strongly Agree	44 (80.0%)	60 (83.3%)	
Staff resolve their conflicts, even when the conflicts have become personal (%)[1]				
	Strongly Disagree, Disagree	7 (12.7%)	7 (9.7%)	0.9202
	Neutral	10 (18.2%)	14 (19.4%)	

	Agree, Strongly Agree	38 (69.1%)	51 (70.8%)	
Median Average Mutual Score (*IQR*)[3]		4.0 (3.6 to 4.7)	4.0 (3.7 to 4.6)	0.4983

1. Fisher's Exact Test was performed
2. $\chi 2$ was performed
3. Wilcoxon Mann-Whitney U Test was performed

Table 11: Distribution of T-TPQ Communication Answers Provided by Survey Participants, by Study Interval

	Post-TVDC Survey *N* = 84	**Pre-TVDC Survey *N* = 67**	***P*-Value**
Information regarding patient care is explained to patients and their families in lay terms (%)[1]			
Strongly Disagree, Disagree	6 (11.5%)	3 (4.2%)	0.1264
Neutral	6 (11.5%)	4 (5.6%)	
Agree, Strongly Agree	40 (76.9%)	64 (90.1%)	
Staff relay relevant information in a timely manner (%)[2]			
Strongly Disagree, Disagree	6 (11.5%)	6 (8.5%)	0.3871
Neutral	7 (13.5%)	5 (7.0%)	
Agree, Strongly Agree	39 (75.0%)	60 (84.5%)	
When communicating with patients, staff allow enough time for questions (%)[2]			
Strongly Disagree, Disagree	5 (9.6%)	5 (7.0%)	0.6946
Neutral	7 (13.5%)	7 (9.9%)	
Agree, Strongly Agree	40 (76.9%)	59 (83.1%)	
Staff use common terminology when communicating with each other (%)[1]			
Strongly Disagree, Disagree	2 (3.9%)	1 (1.4%)	0.0238
Neutral	6 (11.5%)	1 (1.4%)	
Agree, Strongly Agree	44 (84.6%)	69 (97.2%)	
Staff verbally verify information that they receive from one another (%)[1]			
Strongly Disagree, Disagree	1 (1.9%)	6 (8.5%)	0.095

	Neutral	9 (17.3%)	5 (7.0%)	
	Agree, Strongly Agree	42 (80.8%)	60 (84.5%)	
Staff follow a standardized method of sharing information when handing off patients (%)[1]				
	Strongly Disagree, Disagree	3 (5.8%)	2 (2.8%)	
	Neutral	11 (21.2%)	6 (8.5%)	0.0802
	Agree, Strongly Agree	38 (73.1%)	63 (88.7%)	
Staff seek information from all available sources (%)[1]				
	Strongly Disagree, Disagree	2 (3.9%)	4 (5.6%)	
	Neutral	9 (17.3%)	7 (9.9%)	0.5337
	Agree, Strongly Agree	41 (78.9%)	60 (84.5%)	
Median Average Communication Score (*IQR*)[3]		4.0 (3.5 to 4.4)	4.0 (4.0 to 4.7)	0.0886
1. Fisher's Exact Test was performed *2. $\chi 2$ was performed* *3. Wilcoxon Mann-Whitney U Test was performed*				

DISCUSSION

Approximately 75% of errors in healthcare are related to poor team performance, highlighting the significance of technical and nontechnical skills of individual team members as well as team processes and relationships (Courtenay et al., 2013). The purpose of the project was to implement TVDCs to improve trauma team performance, as evidenced by improvements in PACT and T-NOTECHS scores, as well as improved perception of teamwork amongst team members. PACT and T-NOTECHS scores and the elapsed time to primary assessment completion were improved significantly following the implementation of the TVDC interventions. The perception of teamwork remained unchanged following the first project cycle.

The Trauma Video Debriefing Conference provided a constructive venue for the interprofessional trauma team to engage in performance improvement and knowledge

development. The conference became a popular educational forum with consistent attendance and engagement from Trauma Surgical and EM providers as well as Emergency and Trauma Nurses. In contrast, Respiratory Therapy and Radiology representative attendance was less consistent.

Table 12: TVDC Attendance Trends, by Role and Intervention Interval

TVDC Date	*Total Attendees*	*Surgical Faculty*	*Surgical Resident*	*Emergency Medicine Faculty*	*Emergency Medicine Resident*	*Emergency RN*	*Trauma RN*	*Emergency Tech/EMT*	*Respiratory Therapist*	*Radiology Technologist*	*EMS*
2/19/21	36	10	5	7	5	0	8	0	1	0	0
3/5/21	50	8	7	6	11	3	14	0	2	0	0
3/12/21	53	10	6	9	6	6	12	0	2	2	0
3/19/21	48	7	6	6	7	11	10	1	0	0	0
4/2/21	34	3	8	3	0	6	11	0	2	0	1
4/16/21	36	4	0	8	4	5	12	0	2	0	1
4/30/21	54	8	10	3	7	7	14	1	2	0	2
5/14/21	43	6	7	9	5	4	9	0	2	0	1

Other successes included EMS engagement in the conference as well as positive feedback and anectodical evidence of perceived improvements made to the structure and leadership of trauma resuscitations. A secondary gain to the TVDC was that the venue created an opportunity for providers and nurses to earn trauma-related continuing education credits required for maintenance of certifications and licensure. As a result of the TVDC, team members demonstrated increased familiarity with TeamSTEPPS principles, which may be applied in the care of non-trauma related patients, as well.

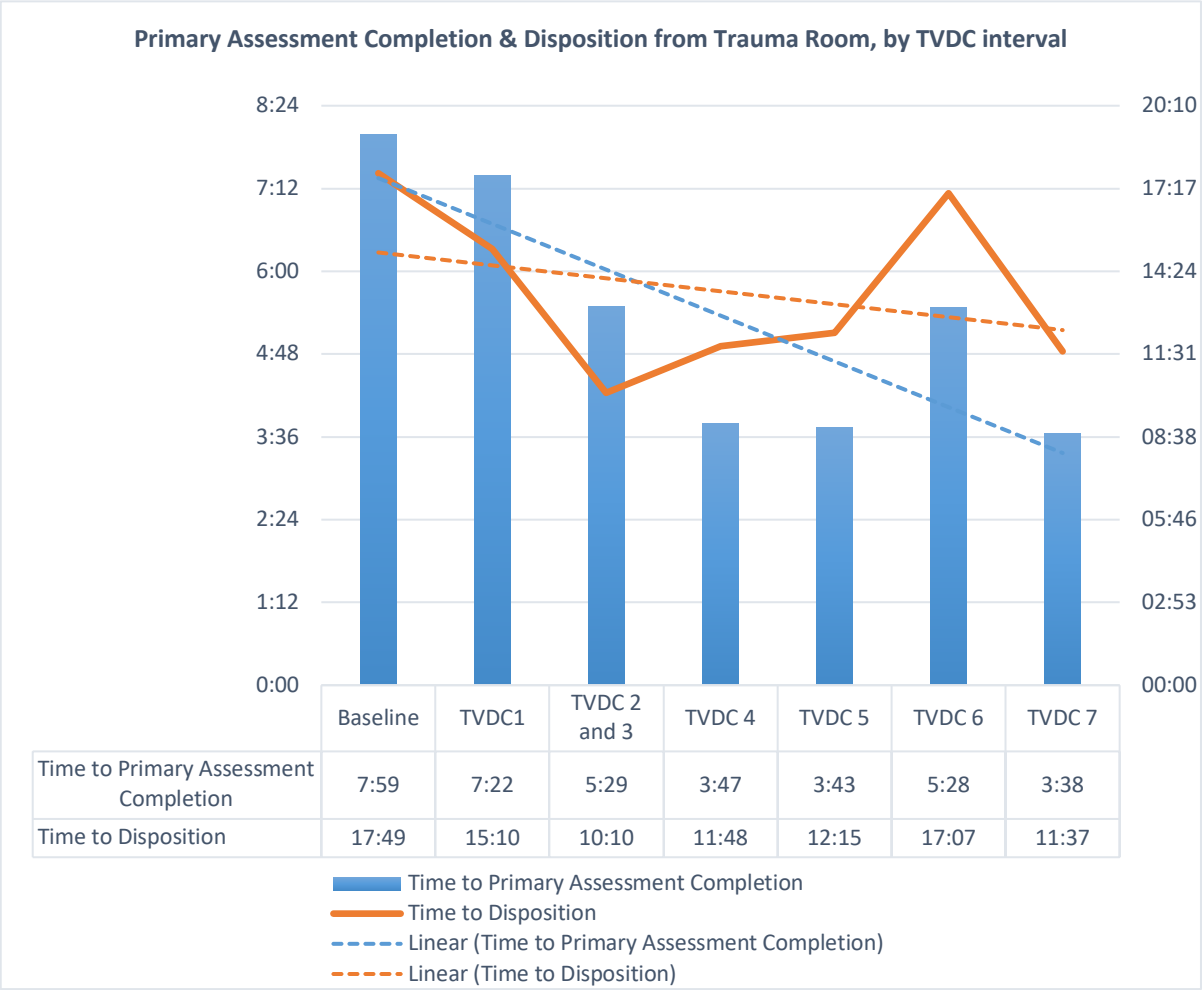
Challenges in implementing the TVDCs included instances of technical difficulties in streaming recordings through Zoom. A function to optimize audio and video sharing was used to project the videos clearly to conference participants. Another lesson learned was that if participants did not mute their microphones, the bandwidth of Zoom streaming was slowed and

created a blurred screen for end-users, so the project team muted participants upon entry and monitored status throughout the conference. An additional challenge encountered was the failure to begin the recordings. Of 148 level 1 trauma activations received during the project time frame, only 88, or 59.45%, were recorded. Several of these patients arrived by private vehicle, leaving the teams without much lead time to prepare and start the recordings, while other patients were received into rooms without recording equipment. Upon evaluation, it was identified the teams forgot to begin recording on several occasions. This seemed to occur more frequently when the department census and/or acuity were higher. For example, in the fourth week of the project, a maternal trauma patient was received into the trauma rooms following a major motor vehicle collision. The mother was hemodynamically unstable, and the fetal heart tones were profoundly bradycardic. An emergency cesarean was performed in the trauma resuscitation rooms and the mother survived, while infant did not sustain a return of circulation. This type of trauma case is very complex and not commonly encountered, so there would have been a great learning opportunity from debriefing the case with supplemental video. Unfortunately, in this case the recording was forgotten.

In addition to observed improvements in both the technical and nontechnical aspects of the trauma resuscitations, improvements were identified in relationships with Emergency Medical Services partners and collegiality between the Trauma Surgery and Emergency Medicine teams. As a result of improvements made to the performance of the trauma resuscitation team, the time to clinical decision-making was reduced as evidence by reduction in elapsed time to completing primary assessment and disposition from the trauma resuscitation rooms. Figure 6 demonstrates the trends in reduction of time to completion of the primary assessment as well as the overall time to disposition from the trauma resuscitation room. The

clinical significance of timely trauma resuscitations transmits to earlier identification and definitive treatment of life-threatening injuries.

Figure 6: Elapsed Time to Primary Assessment and Disposition from Trauma Room



	Baseline	TVDC1	TVDC 2 and 3	TVDC 4	TVDC 5	TVDC 6	TVDC 7
Time to Primary Assessment Completion	7:59	7:22	5:29	3:47	3:43	5:28	3:38
Time to Disposition	17:49	15:10	10:10	11:48	12:15	17:07	11:37

Team performance was expected to improve following the implementation of a trauma video debriefing conference (TVDC), whereby constructive feedback was provided to the interprofessional team by peers and leaders in bi-weekly conferences. Measurement focused on improvements made over the three months following the initiation of video debriefing sessions (Haske et al., 2018). Comparable to Armstrong et al. (2021), the domains of teamwork and leadership were improved as evidenced by T-NOTECHS scores following team development activities. Perception of teamwork remained the stable following the intervention

period, dissimilar to the improvements found by Gardner et al (2019). While the difference in perception of teamwork between the pre- and post-TVDC surveys was not found to be statistically significantly, there have been anecdotal reports from team members and EMS providers indicating a perception of improvement. The lack of overall statistical significance in the difference of perception may be related to variation between survey participant groups and the limited number of repeat survey participants. Further analysis of the T-TPQ data may be valuable to determine if any participant sub-groups reported improvements in perception. Additionally, repeating the T-TPQ survey after a longer project interval may be beneficial to capture repeat survey participants and exposure to a greater number of trauma resuscitations.

Limitations

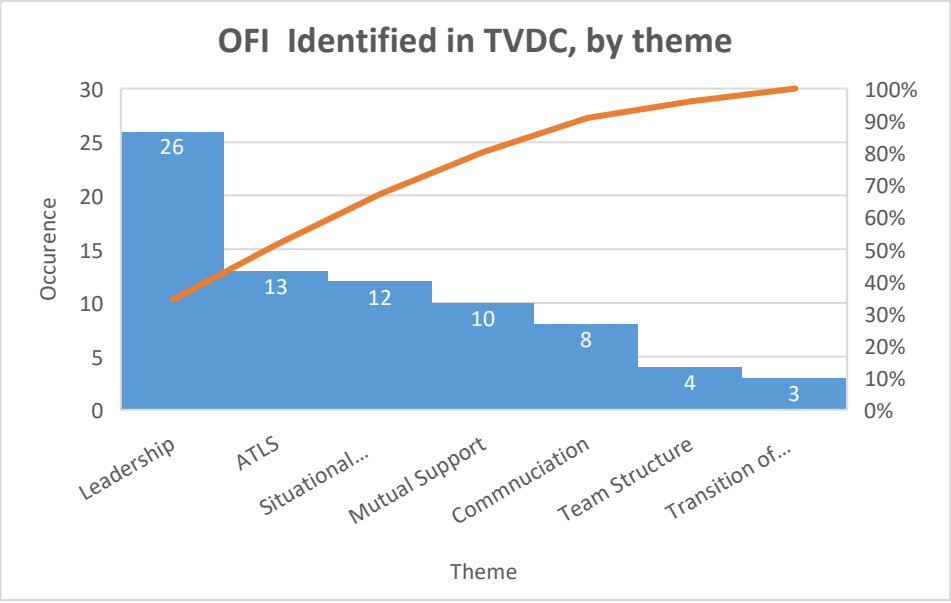
A limitation of the study results was the potential for skewed results due to missed recordings. Several high acuity trauma resuscitations were not recorded, limiting the cases included in the study sample. Opportunities to automate the recordings will be evaluated in future PDSA cycles. Another limitation of the project was maintaining the engagement of the providers for pre-review scoring sessions where videos were selected for referral to the TVDC. The pre-review and scoring of videos were time-consuming, taking between 25 to 30 minutes per video, so reviewing and scoring all videos took approximately three to five hours per week. Having adequate protected time to score videos was a challenge given the competing priorities and demands of the physicians who were appointed to score videos. The project plan did not initially call for two physician reviewers for each video. However, the project team felt there should be representation and scoring from both Trauma Surgery and Emergency Medicine. This portion of the project plan was not fully executed due to time constraints. For sustainability of

the project, the pre-review and referral process will be updated to include pre-review by Trauma PI Specialists whose time is dedicated to the Trauma PI program.

Interpretation

Through the implementation of the first PDSA cycle, the focus was placed on the completion of a timely and sequential primary assessment, as well as nontechnical skills including closed-loop communication. Lessons have been learned that will guide continued improvements in subsequent PDSA cycles. Opportunities for improvement emphasized at the TVDCs were clustered by theme and categorized in a Pareto chart; See Figure 7. Team leadership has proven to be the area with the greatest opportunity for continued improvement and additional interventions such as leadership development activities, should be considered. Additionally, there is opportunity to integrate mock or simulated trauma resuscitations into the project, specifically those uncommon scenarios. An example of a simulated trauma with educational benefit would be the maternal trauma patient who requires an emergency cesarean delivery in the trauma rooms.

Figure 7: Opportunities for Improvement Pareto



The outcomes and aims were achieved, as the timely completion of the primary assessment was evident through improvement in PACT scores and reduced time measurements. There were progressive improvements made in the demonstration of nontechnical skills with each episode of the Trauma Video Debriefing Conference. Trauma Video Debriefing Conferences will continue as part of the trauma quality and educational programs. When possible, debriefing conferences will be held in person to enhance team relationship development and learning.

Conclusions

Upon conclusion of this initial project cycle, we concluded that video debriefing improved the performance of this Level I trauma center's trauma team. We learned there were opportunities for improvement beyond the initial focus of a complete primary assessment and closed-loop communication. Future PDSA cycles should focus on the most commonly identified opportunities for improvement including team leadership and communication as well as infrastructure and workflow items. Leadership has significant influence on the quality of the resuscitation and should be a focus for ongoing improvements. Additional research or quality projects are needed to further develop leadership skills for residents. Simulation or mock resuscitations are needed to practice the infrequently encountered scenarios. Infrastructure issues identified in the trauma resuscitation rooms should also be addressed, including the re-positioning of obstructive sinks that impede access to patients. This project may be replicated in other trauma centers to support improvement of the trauma resuscitation team. Video debriefing and TeamSTEPPS principles may also be implemented for the development of other healthcare teams.

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LIST OF APPENDICES

APPENDIX PAGE

APPENDIX A: Letter of Determination from TAMU-CC Compliance Office

From: "irb@tamucc.edu" <donotreply@redcap.tamucc.edu>
Subject: Not Human Subjects Determination: Not Research
Date: January 13, 2021 at 11:05:08 AM CST
To: clyell@islander.tamucc.edu
Cc: irb@tamucc.edu
Reply-To: irb@tamucc.edu

Dear Cassie Lyell,

Activities meeting the DHHS definition of research or the FDA definition of clinical investigation and involves human subjects are subject to IRB review and approval.

On 01-13-2021, the Office of Research Compliance reviewed the project below and determined that the proposed activity does not meet the FDA definition of a clinical investigation or DHHS definition of research:

Type of Review:	Not Human Subjects Determination
IRB ID:	TAMU-CC-IRB-2021-01-01
Project Lead:	Cassie Lyell
Title:	Using Video Debriefing to Improve Performance of the Interprofessional Trauma Resuscitation Team
Rationale:	The project will not develop or contribute generalizable knowledge

Therefore, this project does not require IRB review. You may proceed with this project.

Limits to this determination:

1. This determination applies only to the activities described in the documents reviewed. Any planned changes require submission to the IRB to ensure that the research continues to meet criteria for a non-human subject research determination.
2. This project may NOT be referenced as "IRB approved".

The following statement can be included in the manuscript: "This Project was reviewed and determined to not meet the criteria for human subject's research by the Texas A&M University-Corpus Christi Institutional Review Board."

Please do not hesitate to contact the Office of Research Compliance with any questions.
Respectfully,
Germaine Hughes-Waters
Office of Research Compliance

APPENDIX B: Facility Approval of Academic QI project

Centered in Care
Powered by Pride

1500 South Main Street
Fort Worth, Texas 76104

phone 817-702-3431

JPShealthnet.org

TO: Cassie Lyell, MSN, RN, TCRN, DNP Student
Trauma & Acute Care Surgery
JPS Health Network

FROM: Melissa W. Acosta, PhD
Director, Office of Clinical Research

DATE: September 24, 2020

RE: OCR Acknowledgement Letter- Quality Improvement, JPS Trauma & Acute Care Surgery

TITLE: **Improving Performance of the Inter-professional Trauma Resuscitation Team Through the Implementation of Video Debriefing Program**

The Director, Office of Clinical Research (OCR) has reviewed the quality improvement proposal which you submitted to OCR on September 21st, 2020.

The purpose of your project is to cultivate stronger teams, improve patient safety, develop stronger providers, and improve the value of trauma care via these specific goals:

A. The trauma resuscitation team (TRT) will demonstrate statistically significant improvement from baseline in the performance of complete and sequential primary assessments, within 5 minutes of Level 1 trauma team activations (TTA), as measured by mean PACT scores, over the course of a 3-month project cycle.

B. The TRT will demonstrate statistically significant improvement from baseline in the performance of closed-loop communication throughout the primary assessment of Level 1 trauma activations, as measured by mean T-NOTECHS scores, by the end of the 3-month project cycle.

C. The TRT will demonstrate statistically significant improvement from baseline in perception of teamwork, as measured by T-TPQ survey results, by the end of the 3-month project cycle.

It has been determined that your project activities which include: 1) using recorded trauma resuscitations; and 2) give performance feedback and educate TRT members on the roles, timeliness of trauma assessments, and use of closed-loop communication are not subject to human subject research regulations.

> **The project summary, aim and activities does not fit into the criteria to be considered for the application of the regulations governing human subject research from the Office of Human Research Protection (OHRP) in its definition of research, research subject and human subject found in 45CFR 46.102 (d)(e)(f) as shown below:**
>
> ***(d) Research means a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge. Activities which meet this definition constitute research for purposes of this policy, whether or not they are conducted or supported under a program which is considered research for other purposes. For example, some demonstration and service programs may include research activities.***
>
> ***(e) Research subject to regulation, and similar terms are intended to encompass those research activities for which a federal department or agency has specific responsibility for regulating as a research activity, (for example,***

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Investigational New Drug requirements administered by the Food and Drug Administration). It does not include research activities which are incidentally regulated by a federal department or agency solely as part of the department's or agency's broader responsibility to regulate certain types of activities whether research or non-research in nature (for example, Wage and Hour requirements administered by the Department of Labor).

(f) Human subject means a living individual about whom an investigator (whether professional or student) conducting research obtains: (1) Data through intervention or interaction with the individual, or (2) Identifiable private information.

The JPS Office of Clinical Research appreciates your continued commitment to quality improvement. Should you have questions or require further assistance, please contact this office at (817) 702-3655.

APPENDIX C: Facility Letter of Support

Centered in Care
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1500 South Main Street
Fort Worth, Texas 76104

phone 817-702-3431

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September 11, 2020

Dr. Sara Baldwin
Associate Dean for Academic Programs
College of Nursing and Health Sciences
Texas A&M University – Corpus Christi
6300 Ocean Drive
Corpus Christi, TX 78412

Dear Dr. Baldwin,

The purpose of this letter is to provide *Cassie Lyell*, a Doctor of Nursing Practice student at Texas A&M University College of Nursing and Health Sciences, support in conducting a quality improvement project at *JPS Health Network.* The project, *Improving Performance of the Interprofessional Trauma Resuscitation Team through the Implementation of a Video Debriefing Program*, entails using recorded trauma resuscitations for interprofessional education and quality improvement.

The purpose of this quality improvement initiative is to optimize trauma resuscitation team performance by focusing on improved communication, adherence standards of care within the resuscitation phase of care, and standardization of trauma team performance to eliminate communication failures and hardwire roles. JPS Health Network was selected for this project because the Trauma Performance Improvement and Patient Safety (PIPS) program has identified variability in trauma resuscitation team performance, non-compliance with trauma standards, and communication failures, as a contributing factors to unanticipated and preventable morbidity and mortality events. Cassie Lyell is employed at this institution and, given her role with the Trauma Program, she has a vested interest in improving trauma care at this facility.

I, *Wanda Peebles*, Executive Vice President and Chief Nursing Executive at JPS Health Network, do hereby support *Cassie Lyell* in the conduction the quality improvement project, *Improving Performance of the Interprofessional Trauma Resuscitation Team through the Implantation of a Video Debriefing Program* at JPS Health Network.

I also approve *Cassie Lyell* to access protected health information (PHI) for purposes of conducting the quality improvement project. As part of her employment, she is responsible for maintaining the security and confidentiality of privileged peer review and quality improvement activities, as well as maintaining compliance with HIPAA. These expectations will be upheld through the duration of the quality improvement project and no PHI will be shared outside of protected and confidential trauma quality improvement activities.

Trauma & Acute Care Surgery 817.702.8102 817.702.6097

Sincerely,

Wanda Peebles, RN, MSN, MBA/HCA
Executive Vice President and Chief Nursing Executive
JPS Health Network
1500 S. Main Street
Fort Worth, Texas 76104
817-702-1647
wpeebles@jpshealth.org

APPENDIX D: Organizational Policy for Trauma Video Recordings

Centered in Care Powered by Pride	Procedure #: TRA 161 Recording Trauma Activations Originating Department: Trauma Services Effective Date: 03/05/2021 Page **1** of **4**

TITLE: TRA 161 Recording Trauma Activations

PURPOSE:

To establish a program and procedure for the use of video recording in trauma patient resuscitations for quality improvement purposes, to allow for precise understanding of the team environment and thus provide invaluable insight for how to best improve outcomes, and to create an opportunity for accurate assessment of both the inter-professional team and individual performance, in terms of resuscitation and procedural competence and safety.

DEFINITIONS:

Stakeholders: Department of Emergency Medicine Medical Director, Department of Emergency Medicine Chair, Department of Emergency Medicine-Trauma Liaison, Trauma Medical Director, Associate Trauma Medical Director, Department of Surgery Chair, designated Trauma and Emergency Medicine senior residents, Emergency Services Executive Director and/or Manager, Trauma Services and Acute Care Surgery Executive Director and/or Manager, Lead Trauma PI Specialist

PROCEDURE:

I. Patient Consent

Informed consent to utilize the digital video recordings must be obtained before access and review for any purpose. Tarrant County Hospital District d/b/a JPS Health Network (JPS) will retain control of the recording until consent is obtained.

A. The current (2019) JPS General Consent for Treatment and Acknowledgements, includes an understanding that “photos or videos may be taken in connection with Patient’s treatment”
   a. The consent will be signed by the patient and/or surrogate decision maker
      i. If conscious, the patient should be able to provide or deny consent to be recorded in advance.
      ii. If the patient is unable to provide or deny consent, the staff may request consent from the surrogate decision maker.
      iii. If no surrogate decision maker is available, the hospital may record patient activities.
   b. If the General Consent for Treatment and Acknowledgements is not signed, the staff may request consent from the patient and/or surrogate decision maker.
B. There may be times when it will be desirable to record, but it will not be feasible to obtain consent.
   a. An exception to obtaining the JPS General Consent for Treatment and Acknowledgements from the patient or surrogate decision maker will include

situations whereby implied consent for emergency medical treatment is applicable.

C. If consent is not given, then the patient is either removed from the recording or the recording will be destroyed.
D. Staff will verify that a signed consent is on file prior to access or review of the patient's digital video recording.
E. If a need arises for an exception, the program leadership team will consult with Legal and Patient Safety & Quality.
F. All recordings will be auto-destroyed 30 days after being obtained.

II. Recording
A. Scope
a. May record any/all Level 1 trauma team activations in the resuscitation rooms with equipment.
B. Patient Notice
a. A sign will be posted in the Emergency Department informing the community and patients that video recording will be occurring when emergency services are provided within the trauma resuscitation rooms.

III. Access and Confidentiality
Recordings will be accessed and used for quality improvement and peer review purposes only. The recording will not, under any circumstances, become a part of the patient's medical record.
A. Access will be limited to the permissions of defined stakeholders.
B. Recordings will remain in the physical possession of JPS and will not be released to anyone else or used for any other purpose
C. Anyone who is not an employee of the JPS Health Network who performs recording cannot have the organization's recording or copy of the recording.

IV. Review Process
All review of the material must be done within 30 days, after which the video recordings will be automatically erased.
A. Access to the video recordings will be limited to the defined stakeholders.
B. Each recording reviewed will require documentation of access and review.
C. The availability of a video recording does not mandate its review; not all recordings will be reviewed.
D. Reviews will be done based on the following categories: system issues, quality and performance improvement, and education.
E. Select resuscitation video recordings will be presented to a joint Trauma Resuscitation Conference in order to promote quality improvement, inter-professional trauma team development and communications, procedure competency, and system enhancement.

a. This conference will be closed and attendance will be limited to hospital affiliated physicians, nurses, trauma techs, and other members of the trauma resuscitation team who are closely involved with the care of the injured patient by virtue of their roles on the trauma team.
b. Participants in the review of recordings will be required to sign a confidentiality commitment.
c. The review and the findings of the video resuscitation shall fall under Peer Review Protection.

REFERENCES:

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NOTES AND ATTACHMENTS:

General Consent for Treatment and Acknowledgement (Attachment)

▪ MRN	
▪ Consent verified	
▪ Date of Service	
▪ Arrival Time	
▪ Time on the monitor	
▪ Time to first BP	
▪ Time of disposition	
▪ Disposition destination	
▪ Mechanism of injury	
▪ Survival (Y/N)	
▪ Pre-brief with team (Y/N)	
▪ Substandard PPE (Y/N)	
▪ Crowd control – extra people (Y/N)	
▪ Reviewer	

ATLS Primary Assessment Completion Tool (PACT)

	Point Value	Points Earned
Airway was maintained with cervical spine protection		
Airway patent	10	
C-collar placed	10	
Breathing and ventilation		
Auscultate Right Lung	5	
Auscultate Left Lung	5	
Provide Oxygenation and Ventilation	10	
Circulation and hemorrhage control		
Central Pulses	5	
Identification and control of external bleeding	5	
Heart rate	2.5	
Blood pressure	2.5	
Skin color	2.5	
Capillary refill	2.5	
Disability, neurologic status		
Glasgow Coma Scale	10	
Pupils	10	
Exposure and environmental control		
Completely Expose	20	
Total points earned (max 100)		
Negative points if indicated and not completed		
	Point value	**Points deducted**
Needle decompression/chest tube	-5	
Intravenous access and warmed fluids	-5	
Warm blankets/measure to prevent hypothermia	-5	
Temperature control of room	-5	
Primary survey handoff to surgeon, upon arrival	-5	

Components completed but not in ATLS format	-15	
Total points (earned - deducted):		

T-NOTECHS (Trauma Nontechnical Skills) Scale

Leadership		
1	**2**	**3**
Team leader clearly recognizable at all times, "bird's eye" view with delegation, transitions of leadership clear, assignment of roles, excellent time management	Team leader defined but does not fulfill all functions or does procedures meant for others or transitions unclear	Team leader not clear
Comments:		
Cooperation and Resource Management		
1	**2**	**3**
All team members clearly identified, speak up if help needed, no team members are idle	Role identity of all members not clear, some team members idle some of the time	Role identity of most members not clear, most team members idle most of the time
Comments:		
Communication		
1	**2**	**3**
Team leader is at the foot of the bed, critical communication through the team leader, all orders to team leader, closed loop communication, orders directed to specific people	Communication not always through team leader, orders not always acknowledged	Communication frequently inaudible or incoherent with many simultaneous conversations
Comments:		
Assessment and Decision Making		
1	**2**	**3**
Primary and secondary survey done in order and without omissions, findings summarized, goals and plan communicated to the team	Assessment somewhat out of order, some elements of secondary survey incomplete	Elements of the primary survey incomplete, multiple team members unclear about the next step
Comments:		
Situational Awareness		
1	**2**	**3**
Unforeseen findings, distractions, or change in patient condition did not disrupt orderly evaluation. Team is calm, team plans ahead, awareness of team members emotional condition	Unforeseen findings caused minor delay but did not preclude task completion	Unforeseen events disrupt patient assessment and treatment. Team members stressed, lack of anticipation of next steps
Comments:		

Total T-NOTECHS Score (min 5, max 15):	

Successes to Recognize
Opportunities for improvement to highlight
Other Comments
Referral to TVDC? **Reason:** • **PACT scores ≤ 80 points or ≥ 98** • **T-NOTECHS score < 7 or > 11** • **Delays to OR** • **Adverse events** • **Other learning opportunity:**

Completed by Trauma PI Team

	Team member notified	Team member present at TVDC
Surgeon Attending		
Surgeon Residents		
EM Attending		
EM Residents		
TNC		
ED RNs		
ED Techs		
Respiratory Therapist		
Radiology Tech		

APPENDIX F: Data Set Spreadsheet

Demographics						
						EMS Report
TTA#	Trauma Registry Number	Reviewer	Date Reviewed	Mechanism of Injury	Survival	Silent during brief report (Y = 1; N= 2)
1						
2						
3						

ATLS Primary Assessment Completion Tool																					
Airway		Breathing and Ventilation			Circulation						Disability		Exposure & Environmental Control	Negative points if indicated and not completed						Total score/ 100 possible points	Time to Completion of Primary Survey
Airway patency 10 pts	C-Collar in place, if applicable 10 pts	Auscultate R Lung 5 pts	Auscultate L Lung 5 pts	Provide Oxygentation and Ventilation 10 pts	Central pulses 5 pts	ID & control of external bleeding 5 pts	Heart Rate 2.5 pts	Blood Pressure 2.5 pts	Skin color 2.5 pts	Capillary Refill 2.5 pts	Glasgow Coma Scale 10 pts	Pupils 10pts	Completely Exposed 20 pts	Needle decompression/ Chest tube - 5pts	Intravenous access and warmed fluids - 5pts	Warming measures to prevent hypothermia -5 pts	Temperature collection -5 pts	Primary survey handoff to Attending surgeon 5 pts	Components completed out of ATLS -format/ sequence 15 pts	PACT Score >/= 85 considered passing	Measured minutes from pateint TTA start to completion of primary assessment
																				0	

Trauma NOTECHS					
Leadership	Cooperation and Resource Management	Communication	Assessment and Decision Making	Siuation Awareness	Total Score/15 possible points
1 = best; 2 = average; 3 = worst	1 = best; 2 = average; 3 = worst	1 = best; 2 = average; 3 = worst	1 = best; 2 = average; 3 = worst	1 = best; 2 = average; 3 = worst	5 = best; 10 = average; 15 = worst
					0

APPENDIX G: ATLS Primary Assessment Completion Tool (PACT) (Wutster et al., 2017)

	Possible Points	Points Earned
Airway maintenance with cervical spine protection (20 points)		
• Airway patent	10	
• C-collar in place(d)	10	
Breathing and ventilation (20 points)		
• Auscultate right lung	5	
• Auscultate left lung	5	
• Provide oxygenation and ventilation	10	
Circulation and hemorrhage control (20 points)		
• Central pulses	5	
• Identification and control of external bleeding	5	
• Heart rate	2.5	
• Blood pressure	2.5	
• Skin color	2.5	
• Capillary refill	2.5	
Disability; neurologic status (20 points)		
• Glasgow Coma Scale	10	
• Pupils	10	
Exposure/environmental control		
• Completely expose	20	
Negative points if indicated and not completed		
• Needle decompression/CT	−5	
• Intravenous access and warmed fluid administration	−5	
• Warm blankets/measures to prevent hypothermia	−5	
• Temperature control of room	−5	
• Primary survey handoff to pediatric surgeon	−5	
Components completed but not in ATLS format	−15	

APPENDIX H: Trauma-NOTECHS (Dumas et al., 2020)

Trauma-NOTECHS			
	1	2	3
Leadership	Team leader clearly recognizable at all times, "birds' eye" view with delegation, transitions of leadership clear, assignment of roles, excellent time management	Team leader defined but does not fulfill all functions or does procedures meant for others or transitions unclear	Team leader not clear
	1	2	3
Cooperation and resource management	All team members clearly identified, speak up if help needed, no team members are idle	Role identity of all members not clear, some team members idle some of the time	Role identity of most members not clear, most team members idle most of the time
	1	2	3
Communication	Team leader is at the head of the bed, critical communication through the team leader, all orders to team leader, closed loop communication, orders directed to specific people	Communication not always through team leader, orders not always acknowledged	Communication frequently inaudible or incoherent with many simultaneous conversations
	1	2	3
Assessment and decision making	Primary and secondary survey done in order and without omissions, findings summarized, goals and plan communicated to the team	Assessment somewhat out of order, some elements of secondary survey incomplete	Elements of the primary survey incomplete, multiple team members unclear about the next step
	1	2	3
Situation awareness	Unforeseen findings, distractions, or change in patient condition did not disrupt orderly evaluation. Team is calm, team plans ahead, awareness of team members emotional condition	Unforeseen findings caused minor delay but did not preclude task completion	Unforeseen events disrupt patient assessment and treatment. Team members stressed, lack of anticipation of next steps

APPENDIX I: TeamSTEPPS Teamwork Perceptions Questionnaire (AHRQ, 2010)

Team Function	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. The skills of staff overlap sufficiently so that work can be shared when necessary.					
2. Staff are held accountable for their actions.					
3. Staff within my unit share information that enables timely decision making by the direct patient care team.					
4. My unit makes efficient use of resources (e.g., staff supplies, equipment, information).					
5. Staff understand their roles and responsibilities.					
6. My unit has clearly articulated goals.					
7. My unit operates at a high level of efficiency.					
Leadership	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
8. My supervisor/manager considers staff input when making decisions about patient care.					
9. My supervisor/manager provides opportunities to discuss the unit's performance after an event.					
10. My supervisor/manager takes time to meet with staff to develop a plan for patient care.					
11. My supervisor/manager ensures that adequate resources (e.g., staff, supplies, equipment, information) are available.					

12. My supervisor/manager resolves conflicts successfully.					
13. My supervisor/manager models appropriate team behavior.					
14. My supervisor/manager ensures that staff are aware of any situations or changes that may affect patient care.					
Situation Monitoring	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
15. Staff effectively anticipate each other's needs.					
16. Staff monitor each other's performance.					
17. Staff exchange relevant information as it becomes available.					
18. Staff continuously scan the environment for important information.					
19. Staff share information regarding potential complications (e.g., patient changes, bed availability).					
20. Staff meets to reevaluate patient care goals when aspects of the situation have changed.					
21. Staff correct each other's mistakes to ensure that procedures are followed properly.					
Mutual Support	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
22. Staff assist fellow staff during high workload.					

23. Staff request assistance from fellow staff when they feel overwhelmed.					
24. Staff caution each other about potentially dangerous situations.					
25. Feedback between staff is delivered in a way that promotes positive interactions and future change.					
26. Staff advocate for patients even when their opinion conflicts with that of a senior member of the unit.					
27. When staff have a concern about patient safety, they challenge others until they are sure the concern has been heard.					
28. Staff resolve their conflicts, even when the conflicts have become personal.					
Communication	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
29. Information regarding patient care is explained to patients and their families in lay terms.					
30. Staff relay relevant information in a timely manner.					
31. When communicating with patients, staff allow enough time for questions.					
32. Staff use common terminology when communicating with each other.					
33. Staff verbally verify information that they receive from one another.					
34. Staff follow a standardized method of sharing information when handing off patients.					

35. Staff seek information from all available sources.					