

# SouthEast Texas Regional Advisory Council (SETRAC) Focus on Trauma Registry Data in Preparation for Multi-Institutional Trauma Registry Collaborative Benchmarking Initiatives

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**SETRAC Trauma Registry Collaborative Hospitals:** Level I Trauma Centers: Ben Taub General Hospital, Memorial Hermann Texas Medical Center, Memorial Hermann Children's, & Texas Children's; Level II Trauma Centers: Clear Lake Regional Medical Center & Conroe Regional Medical Center; Level III Trauma Centers: Memorial Hermann Southwest, Lyndon B. Johnson General Hospital, Bayshore Medical Center, Memorial Hermann The Woodlands, Memorial Hermann Southeast, Houston Northwest Medical Center, Memorial Hermann Greater Heights Hospital, St. Joseph Medical Center Houston, Cypress Fairbanks Medical Center, Oakbend Medical Center, North Cypress Medical Center, Memorial Hermann Katy, Matagorda Regional Hospital, Huntsville Memorial Hospital, Memorial Hermann Sugarland Hospital, El Campo Memorial Hospital, Columbus Community Hospital, & St. Joseph's The Heights; Level IV Trauma Centers: Bellville St. Joseph Hospital, Doctors Hospital Tidwell, & East Houston Regional Medical Center; In Active Pursuit of Designation: Tomball Regional Medical Center & Bay Area Regional Medical Center

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## Background:

The American College of Surgeons Trauma Quality Improvement Program (ACS TQIP) circle of continuous quality improvement starts with valid, reliable, standardized trauma registry data.<sup>1,2</sup> Using data uniformity, the ACS TQIP generates risk-adjusted performance measurement reports for trauma centers and trauma collaborative initiatives.<sup>1,2</sup> The ACS TQIP risk-adjusted performance measurement reports provide valuable trauma quality improvement feedback to trauma centers and regional trauma collaborative programs.<sup>2</sup> The collaborative feedback allows for consistent trauma registry data to drive trauma performance improvement measurements while promoting a structure for identification of high performers thus leading to the identification of best clinical practices among participating trauma centers.<sup>1,2</sup>

Trauma centers with effective Performance Improvement (PI) programs rely on the accuracy of concurrent trauma data abstraction and timely review for PI resolution and loop closure.<sup>3</sup> "In the same way that reliable data abstraction is required for effective institutional-level PI, data homogeneity is required for quality cross-institutional benchmarking."<sup>4</sup> A regional focus on trauma registry data consistency is the first step in preparation for regional multi-institutional trauma center collaborative benchmarking initiatives.

The Trauma Data Registry Subcommittee of the SETRAC over the past two years has focused on trauma registry data validity, reliability, standardization, and consistency. The focus was placed on trauma data completeness to ensure accurate outcomes of trauma registry collaborative benchmarking initiatives. With the support of 29 SETRAC trauma registry collaborative hospitals and SETRAC Trauma Systems Committee, the Trauma Registry Data Subcommittee set out on a mission to improve the validity, consistency, and accuracy of the regional trauma registry data submissions to the SETRAC trauma registry. In preparations for implementing regional risk-adjusted trauma performance improvement measurement reports.

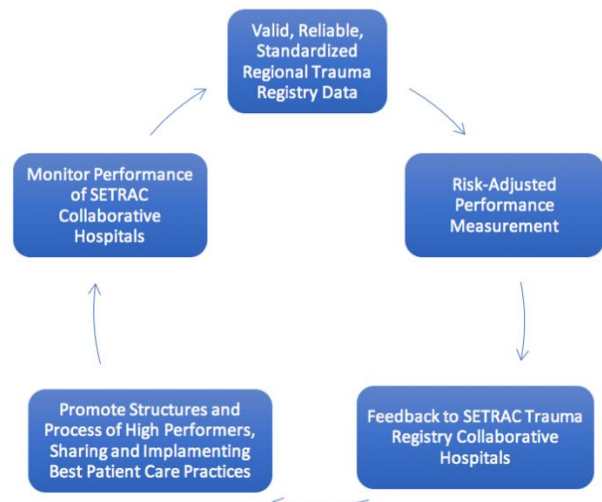


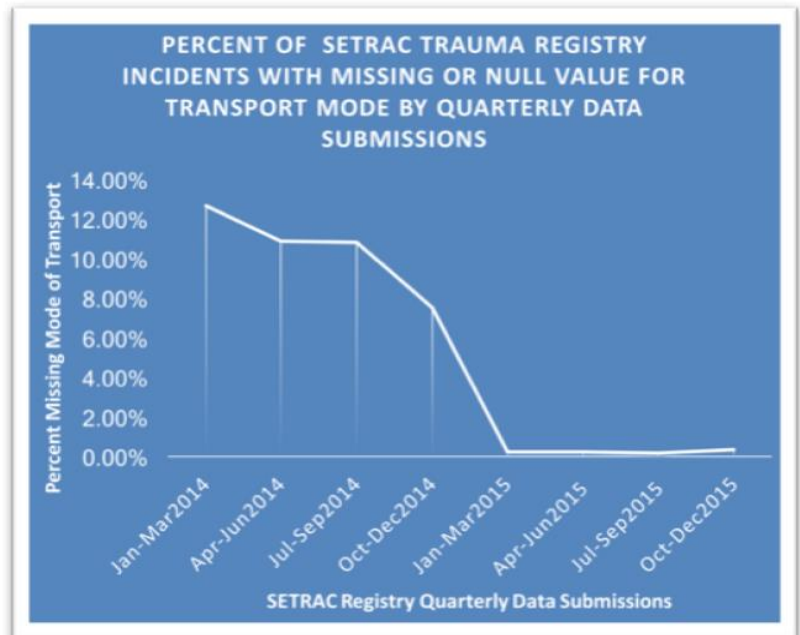
Figure 1. SETRAC Framework for continuous quality improvement. Framework adapted and modified from framework published in the 2012 Surgical Clinics of North America Journal by Avery Nathens, H. Gill Cryer, and John Fildes, "The American College of Surgeons Trauma Quality Improvement Program."

## Challenge:

“The trauma registry should function to drive an efficient and effective performance improvement program for the care of the injured patient.”<sup>5</sup> The trauma system committee of SETRAC identified a need to maintain concurrent, valid, reliable, and standardized data for multi-institutional benchmarking.<sup>2,4</sup> Obtaining concurrent standardized trauma data which is valid and reliable from the State of Texas EMS Trauma Registry has proven to be less than optimal for the SETRAC regional trauma system. The State of Texas EMS Trauma Registry currently operates on a 3 to 4-year delay of trauma system data.<sup>6</sup> The most current regional data available from the State of Texas is 2013 and 2014 trauma registry data which does not include the full integration of National Trauma Data Standard (NTDS) thus causing issues with data homogeneity and inability to benchmark data with the National Trauma Data Bank annual reports.<sup>4,6</sup> The SETRAC Trauma Committee unanimously agreed the delay in obtaining data from the State of Texas and the heterogeneity of the data sets is less than ideal for effective cross-institutional benchmarking and regional PI driven by trauma registry data.

Understanding the need for concurrent trauma registry data SETRAC implemented a regional trauma registry. Upon implementation of the regional registry the challenge was twofold for SETRAC: issues identified with multiple intuitions submitting heterogeneous trauma data and the identification of absent or inaccurate use of data fields being reported to the regional trauma registry. To implement the framework for regional trauma PI driven by risk-adjusted performance measures the Trauma Data Registry Subcommittee begin focusing on registry data consistency.<sup>2</sup>

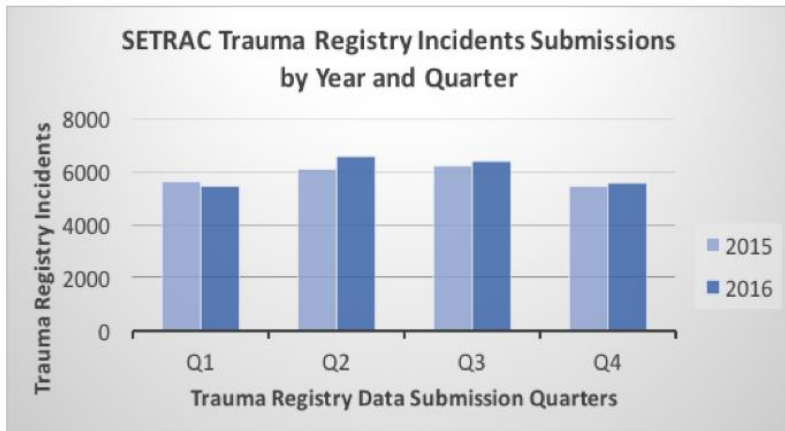
One example of registry data consistency involved data being reported to the regional trauma registry identifying the trauma patient’s mode of arrival to the treating facility. The January to March 2014 quarterly data submission period identified 13% of incidents submitted had a missing or null value reported for patient’s transport mode as seen in Figure 2. The SETRAC Trauma Registry committee began focusing on key National Trauma Data Standards (NTDS) and drilling down into regional trauma data identify opportunities for improvement.



**Figure 2.** Percent of SETRAC Trauma Registry Incidents with missing or null value for Transport Mode by Quarterly data submission to regional trauma registry. Line graph demonstrates one example of SETRAC Trauma Registry Data Subcommittees focus improvements to ensure trauma registry data is valid, reliable, and standardized.

**Intervention:**

SETRAC Trauma Systems committee developed the Trauma Data Registry Subcommittee in 2014 to provide the region with the capabilities to maintain a concurrent, valid, reliable, and standardized trauma registry. All hospitals within the SETRAC region signed Business Associate Agreements (BAA) and have joined the regional registry collaborative. Hospitals submit quarterly trauma data submissions to the regional registry following the National Trauma Data Standards (NTDS).



**Figure 3.** SETRAC Trauma Registry Incidents submitted quarterly to regional trauma registry.

To ensure the data validity and reliability the regional advisory council began hosting monthly collaborative trauma registry data reviews. During the monthly collaborative reviews data is critically reviewed to identify trauma data PI opportunities. Using ad-hoc and standard

registry reports during the collaborative meeting regional trauma data is analyzed for gaps and opportunities for improvement. Figure 4 is a sample of a report used during monthly collaborative trauma registry data reviews

Transport Mode	Total	Percent	Jan-Mar2014	Apr-Jun2014	Jul-Sep2014	Oct-Dec2014	Jan-Mar2015	Apr-Jun2015	Jul-Sep2015	Oct-Dec2015
	22224	47.5	2424	3071	2755	2650	2634	2934	3015	2741
Fixed Wing Ambulance	4	0	0	0	2	0	0	0	2	0
Ground Ambulance	16405	73.8	1818	2220	2004	1933	2022	2165	2192	2051
Helicopter Ambulance	2882	13	263	390	408	372	261	402	433	353
Missing	1	0	0	0	1	0	0	0	0	0
Not Applicable	5	0	0	0	0	1	3	0	0	1
Not Documented	7	0	0	0	0	0	0	0	0	7
Other	76	0.3	9	20	8	12	9	9	6	3
Police	147	0.7	20	17	17	12	21	15	27	18
Private or Public Vehicle, Walk-in	2692	12.1	314	423	315	320	318	343	354	305
Unknown	5	0	0	1	0	0	0	0	1	3

**Figure 4.** SETRAC Standard Registry Data Submission Frequency Report for Transport Mode. This report identifies the frequency of missing and null values used by quarter for the NTDS Transport Mode.

Figure 2 highlights the opportunity for improvement associated with data submission of Transport Mode of Arrival to the regional trauma registry. During the first quarterly submission in 2014, 13% of incidents submitted to the regional trauma registry had a missing or null value reported for trauma patients transport mode of arrival. Over the next 4 quarterly submission the incidents of records submitted to the regional trauma registry with a missing or null value report had dropped from 13% to 0%. This was a significant improvement and was monitored for 4 consecutive quarters for effective loop closure of this registry PI opportunity. This was just one example of an NTDS data element that was monitored for accuracy. The subcommittee reviews the submission frequency for NTDS data fields with each quarterly submission, which allows for areas of concern to be addressed concurrently at each trauma center.


The successful implementation of collaborative trauma registry data reviews is a direct result of having a multidisciplinary team made up of the Trauma Systems Committee Members, Trauma Registry Data Subcommittee Members, SETRAC Staff, and Trauma Registrars. The collaborative team members help to ensure data accuracy and completeness, provide concurrent monthly feedback on registry data quality issues, and missing data elements. Through the process of regional data validation potential opportunities for improvement are communicated to participating trauma centers for verification, which allows trauma registry collaborative centers to drill down to the incident level for review of data accuracy. This level of data review allows for near real time correction of data validity issues thus increasing the reliability of trauma registry data, allowing for effective regional trauma benchmarking reports.

With valid, reliable, and standard data the subcommittee is now able to generate crude trauma complication benchmarking reports. Using the regional crude trauma complication rates in comparison with the National Trauma Data Bank (NTDB) Annual Report is shown in figure 5. Regional complication rates are generated using the crude rate calculation formula published at the 2014 ACS TQIP Annual Scientific Meeting and Training by Hall et al.<sup>8</sup>

**Calculation Formula for Targeted Complication Rates<sup>8</sup>**

ACS NTDS Annual Report Complication Frequency X Regional N value of all registry incidents

100

	Favorable Directionality	SETRAC Jan to Sept 2016 Crude Complication Totals	SETRAC 2016 Crude Complication Target	ACS NTDB 2016 Annual Report Frequency Percentage	SETRAC Complication Frequency Percent of Patients reported with a Complication	SETRAC 2016 Crude Percentage
 <p><b>SETRAC Trauma Complication Dashboard</b>  <b>Complication Frequency Percent: Jan. 1, 2016 - Sep. 30, 2016</b>            American College of Surgeons (ACS)            Trauma Quality Improvement Program (TQIP)            National Trauma Data Bank (NTDB) Complication Events  <i>As of 05/15/2017 N=15975</i>  <i>Percentage Based off 2016 Trauma Registry Admissions submitted to the SETRAC Regional Trauma Registry for Hospital Admissions between Jan. 1, 2016 to Sep. 30, 2016: Target Formula = ACS National Frequency Percentage multiplied by N and divided by 100</i>            Report Created by: Garrett Hall, BSN, RN, CSTR for SETRAC Trauma Data Registry Subcommittee</p>						
Acute Kidney Injury/ Acute Renal Failure	🟡	81	<85	0.53	2.20	0.51
ARDS: Adult (Acute) Respiratory Distress Syndrome	🟢	21	<61	0.38	0.60	0.13
Cardiac Arrest with CPR	🟢	65	<112	0.70	1.70	0.41
Decubitus Ulcers	🟢	21	<54	0.34	0.60	0.13
Deep Surgical Site Infection	🟡	13	<18	0.11	0.30	0.08
Drug or Alcohol Withdrawal Syndrome	🟢	31	<110	0.69	1.70	0.19
Deep Vein Thrombosis (DVT)	🟢	63	<96	0.60	1.70	0.39
Extremity Compartment Syndrome	🟡	15	<21	0.13	0.40	0.09
Myocardial Infarction	🟢	9	<29	0.18	0.20	0.06
Organ Space Surgical Site Infection	🔴	24	<14	0.09	0.60	0.15
Pneumonia	🟢	60	<257	1.61	0.10	0.38
Pulmonary Embolism	🔴	60	<43	0.27	1.60	0.38
Stroke / CVA	🟡	27	<32	0.20	0.70	0.17
Superficial Surgical Site Infection	🔴	53	<24	0.15	1.40	0.33
Unplanned Intubation	🟢	55	<120	0.75	1.50	0.34
Catheter-Associated Urinary Tract Infection	🟢	30	<192	1.20	0.80	0.19
Catheter-Related Blood Stream Infection	🟢	3	<10	0.06	0.01	0.02
Osteomyelitis	🔴	4	<3	0.02	0.01	0.03
Unplanned Return to the OR	🔴	65	<53	0.33	1.70	0.41
Unplanned Return to the ICU	🟢	58	<150	0.94	1.60	0.36
Severe Sepsis	🟢	45	<56	0.35	1.2	0.28

**Figure 5.** 2016 SETRAC Trauma Complication Dashboard for tracking crude complications in comparison with the National Trauma Data Bank 2016 Annual Report. The dashboard was adapted and modified from the original framework published in 2014 at the American College of Surgeons Trauma Quality Improvement Program Annual Scientific Meeting and Training by Hall et al., “Using a Balanced Scorecard (BSC) Approach to Monitor Frequency and Data Validity of Trauma Complications Events with Quarterly National Trauma Data Bank (NTDB) / Trauma Quality Improvement Program (TQIP) Submission Frequency Reports.”

Additionally, in 2016 the Trauma Registrars Education Workgroup was created to oversee biannual regional trauma registry education workshops. The biannual trauma registry education workshops focus on registry data management approaches to maintain data homogeneity. Along with highlighting regional opportunities for data quality improvement. The biannual workshops are intended to help provide ongoing education to support the endless cycle of trauma registry data quality improvement.

Intervention Focus:

- Quarterly Submission of Trauma Registry Data to Regional Registry
- Monthly Collaborative Trauma Registry Data Reviews
- Concurrent feedback on trauma registry data quality issues and missing data elements
- Regional Crude Trauma Complication Rates compared with NTDB Annual Report Crude Trauma Complication Rates
- Biannual Regional Trauma Registry Education Workshops

### **Sustainment**

- Continue the production of regional multi-institutional crude trauma benchmarking reports which focus on measures of mortality and complications with the goal of moving to risk-adjusted trauma benchmarking reports for the region
- Trauma registrars to meet monthly for collaborative trauma registry data reviews
- Implementation of SETRAC Trauma Surgeon Champions for Regional Trauma Quality Improvement Collaborative
- Propose the development of a SETRAC Multi-Institutional Trauma Quality Improvement Collaborative Committee

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## Reference:

1. American College of Surgeons. Trauma Quality Improvement Program. Available at: <https://www.facs.org/quality-programs/trauma/tqip>. Accessed May 9, 2017.
2. Nathens A. B., Cryer H. G., & Fildes J. (2012). The American College of Surgeons Trauma Quality Improvement Program. *Surg Clin N Am* 2012;92:441e454.
3. Rotondo, M. F., Cribari, C., & Smith, S. R. (2014). Resources for the Optimal Care of the Trauma Patient 2014. Chicago, IL: Committee on Trauma, American College of Surgeons; 2014.
4. Dente C. J., Ashley D. W., Dunne J. R., Henderson V., Ferdinand C., Renz B., ... GRIT Study Group. (2016). Heterogeneity in trauma registry data quality: Implications for regional and national performance improvement in trauma. *Journal of the American College of Surgeons*, 222(3), 288–295. doi:10.1016/j.jamcollsurg.2015.11.035
5. Michigan Trauma Quality Improvement Program. Trauma Registry. Available at: <http://mtqip.org/node/8/#registry> Accessed May 9, 2017.
6. State of Texas Public Use Data Files. Texas Health and Human Services, Department of State Health Services, Injury Epidemiology and Surveillance Branch. Available at <https://www.dshs.texas.gov/injury/data/Data-Requests.doc>. Accessed May 9, 2017.
7. The National Trauma Data Standard. Available at: <http://www.ntdsdictionary.org>. Accessed May 9, 2017
8. Hall, G. D., Klein, J., Eastman, A. L., Jeter, S., Johnson, D., & Depner, K. (2014). Using a Balanced Scorecard (BSC) Approach to Monitor Frequency and Data Validity of Trauma Complications Events with Quarterly National Trauma Data Bank (NTDB) / Trauma Quality Improvement Program (TQIP) Submission Frequency Reports. American College of Surgeons. Chicago, IL.