November 2, 2016

PERFORMACE IMPROVEMENT UPDATE

PIPS, Outcomes and the PA-TQIP Collaborative—working together

The following communication highlights what's happening with Performance Improvement & the PA Collaborative. If you have questions, please contact Theresa "Terry" Snavely, RN, BSN—Performance Improvement Specialist at tsnavely@ptsf.org

PA-TQIP IN ORLANDO

If you are scheduled to attend the TQIP conference in Orlando, Florida this weekend—we hope that you've scheduled to attend the Pennsylvania Collaborative Luncheon on Sunday (November 6, 2016). The agenda is attached.

PENNSYLVANIA CONFIDENTIALITY STATEMENT

Please review the attached "draft" document. This document is intended to validate the confidentiality of information discussed at Pennsylvania Trauma Quality Improvement Program (PA-TQIP) meetings. The purpose of PA-TQIP is to improve the overall quality of care for trauma patients in trauma centers across the State of Pennsylvania. This document will be discussed at a future meeting.

2016 FALL TQIP COLLABORATIVE REPORT

The "TQIP Collaborative - Fall 2016" ACS TQIP Benchmark Report is attached. Please take time to review this valuable data.

MEETINGS & NETWORKING OPPORTUNITIES

PA-TQIP Meeting—*first in-state meeting!*

Thursday, December 1, 2016 from 1p.m. until 2:30 p.m., **Meeting details, RSVP—to be posted**

Sheraton Harrisburg-Hershey Hotel. This will be an opportunity to review the Collaborative Report in detail, identify and discuss opportunities, and establish State goals

PA Collaborative Luncheon Agenda

Sunday, November 6, 2016 from Noon until 1 p.m.

1. Introductions

2. Confidentiality agreement

3. 2016 Fall PA Collaborative Report
   Trauma Centers are welcome to bring own reports & findings to share

4. Future meetings: First in-state TQIP Collaborative meeting
   Thursday, December 1, 2016 from 1p.m. until 2:30 p.m.,
   Meeting details, RSVP—to be posted by PTSF
   Sheraton Harrisburg-Hershey Hotel.

Confidentiality Statement

This document is intended to validate the confidentiality of information discussed at Pennsylvania Trauma Quality Improvement Program (PA-TQIP) meetings.

The purpose of PA-TQIP is to improve the overall quality of care for trauma patients in trauma centers across the State of Pennsylvania. Regularly scheduled meetings will occur and involve the review of site specific as well as aggregate data regarding processes and outcomes of care. The review will include identification of statewide benchmarks and open discussions related to improving systems and methods of treatment. A culture of openness and trust are critical to the development of such a collaborative effort to improve quality, and a commitment to confidentiality is required for this.

The following examples are to be considered privileged and confidential information and should be discussed only within the confines of the PA-TQIP collaborative meetings.

- Any and all patient information.
- Any specific PA-TQIP site case information.
- Any information discussed regarding a specific PA-TQIP site outcome.
- ·Any reference to a specific PA-TQIP site result or analysis.

Members agree to protect the confidentiality of all information discussed at this meeting and take steps to safeguard against any disclosure of privileged information that may have been discussed.

Signature: _____

Facility or health system representative: _____

ACS TQIP BENCHMARK REPORT:

TQIP Collaborative - Fall 2016

ACS tqip TRAUMA QUALITY IMPROVEMENT PROGRAM

AMERICAN COLLEGE OF SURGEONS

Inspiring Quality:
Highest Standards, Better Outcomes

COMMITTEE ON TRAUMA

Released October 2016

Introduction

This report is based on admissions from 2015 and the first quarter of 2016, including a total of 292,426 admissions that meet TQIP inclusion/exclusion criteria (see References document), from 392 TQIP centers.

Patient cohorts

The ACS TQIP reports on all incidents that meet inclusion criteria and on several subsets of patients selected for focused analysis based upon specific patient or injury characteristics (see References document for detailed cohort criteria). This report provides feedback on the following groups:

- TQIP population (All Patients)
- Blunt multisystem injuries
- Penetrating injuries
- Shock patients
- Severe Traumatic Brain Injury (sTBI) patients
- Elderly patients
- Elderly patients with blunt multisystem injuries
- Elderly patients with isolated hip fracture (IHF)
- Fractures (mid-shaft femur and open tibia/fibula shaft)
- Hemorrhagic shock patients
- Splenic injuries

These subsets were selected to reflect the wide spectrum of trauma patients and their varied challenges. This approach also provides an opportunity for centers with significant over-representation of a particular type of patient to better understand their performance relative to their peers in that particular area.

What's new in this report?

- **Unplanned Admission to the ICU Model**
  We have introduced a new specific complication model – Unplanned Admission to the ICU. This new specific complication is modeled in the 'All Patients' cohort. As is the case with the introduction of any new model, we strongly encourage participants to diligently explore data quality, regardless of performance, to make sure we are providing reliable feedback.

- **Complication Definition Transitions**
  The definitions of three complications have changed from 2015 to 2016 – Pneumonia became Ventilator-Associated Pneumonia (VAP), Urinary Tract Infection became Catheter-Associated Urinary Tract Infection (CAUTI), and Catheter-Related Blood Stream Infection became Central Line-Associated Bloodstream Infection (CLABSI).To account for these transitions, we applied weights in our risk-adjusted models to make event rates under the changed definitions comparable. We also show complication rates by year for all changed definitions in the complications table.

- **Readability and the References Document**
  We have made a number of edits to the text and tables associated with your risk-adjusted results to make the feedback more readable and, understandable including the removal of the Predicted Observed column as it was not informative for readers. Additionally, we have moved the Appendices previously appearing at the end of this report into an external References document. Moving those appendices allows us more flexibility with presentation and content, but the information in the References document remains integral to understanding your report.

Please take the time to review the Aggregate and Benchmark reports and let us know your questions or comments. Many thanks for your hard work and commitment to improved patient care.

Inter-Hospital Comparisons

Patient characteristics and injury severity differ across trauma centers. These differences may affect the risk profile of patients at one center compared to another. Therefore, comparing crude mortality and complications rates across centers is not a valid method for making inter-hospital comparisons. To account for these differences, statistical models were developed to estimate the outcomes for each hospital while adjusting for patient characteristics (see References document for variables used in the risk-adjustment models).

Missing data can have significant implications for inter-facility comparisons. Of the 292,426 admissions that met TQIP inclusion criteria in this report cycle, 11.1% had missing data in at least one field that might affect our ability to risk-adjust. The distribution of missing values for the individual covariates ranged from 0% to 5.3%. In most cases, records with missing data are not excluded from analyses. Rather, we use multiple imputation to provide the best estimates of what the true values might be.

Injury Severity

For most of the data covered in this report, AIS was not required by TQIP. As a result, not all centers contribute the full AIS score to TQIP. Moreover, those that do provide AIS use a variety of versions and coding methods. To overcome these variations, we convert all submitted AIS to AIS 98 as follows:

- AIS 05 is crosswalked to AIS 98 based on AAAM AIS 05 Manual
- AIS 90 or 95 is crosswalked to AIS 98
- ICD-90 Map is used if no AIS is submitted (to convert ICD-9 codes to AIS)

To address this issue and provide a more accurate picture of injury severity, TQIP has begun to require AIS 05/08 on all admissions as of January 1st, 2016 and will look to use AIS 05/08 once all records are on that consistent standard. Please prepare your registry staff for this change.

Other limitations of inter-facility comparisons

The ACS TQIP report allows centers to compare their outcomes with other hospitals. However, it is possible that factors other than quality of care may influence the risk-adjusted rates. The following limitations must be kept in mind when interpreting your data:

- Data quality: It is possible that differences in data quality, such as capture of complications or coding of injury diagnosis, might contribute to differences in odds ratios. For example, if all injuries are not documented and coded, they cannot be accounted for in the models.
- Performance over time: A trauma center's performance may vary over time. Most of the contents of this report present a single snapshot in time.
- Chance: Statistical models produce estimates of event rates. It is possible that chance alone led to the position of your center's performance relative to peers. To reflect the role of chance, each estimate of a hospital's relative performance is reported with a corresponding 95% confidence interval. Based on the data, we are 95% confident that a hospital's true performance is somewhere in the range delineated by the confidence interval.
- In-hospital outcomes: Odds ratios are based upon in-hospital events. Differences in discharge disposition or access to alternate levels of care might influence in-hospital mortality rates.

Risk-Adjusted Results

Hierarchical linear models

This report uses hierarchical linear modeling statistical methodology (HLM), also known as generalized linear mixed models, to create risk-adjusted estimates of outcomes. HLM was created for data with multiple structural levels--in our case, patients nested within hospitals--and appropriately models the fact that patients are not randomly assigned to TQIP sites. Lack of random assignment means that observations within hospitals are not independent from each other. Event rates may differ among hospitals just like individual patients may differ from each other with respect to an outcome of interest. By modeling this between-patient and between-hospital variability separately, HLM estimates of event rates for hospitals with low reliability are adjusted

using information from the overall TQIP population. 'Shrinkage' describes this property of HLM where hospital estimates are shifted toward the overall sample event rate. The smaller the sample the greater the shrinkage, while estimates based on large numbers of patients are hardly affected at all.

The HLM methodology produces odds ratios as the metric for hospital performance. The odds ratio assigned to your hospital indicates the odds of a particular outcome in your hospital compared to the average hospital in the analysis. Odds ratios above 1 indicate that the odds of event in your hospital are higher than average. Logistic regression with stepwise selection (alpha=.05) was used to identify statistically significant predictors for modeling. Clinical importance was also used to add statistically non-significant predictors into the model. The list of all predictors considered for adjustment can be found in the References document.

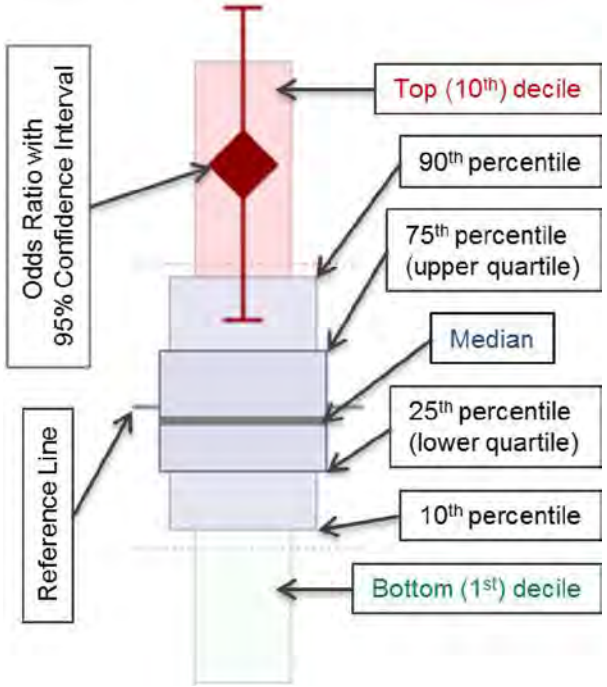
Interpretation of charts

This report contains a chart for each outcome and each chart shows your results for all modeled cohorts. The odds ratio and 95% confidence interval for your hospital are shown on a modified box plot for each cohort. In addition to median and quartiles, the modified box plot shows minimum and maximum odds ratios for the entire TQIP sample as well as 10th and 90th percentiles of the data. To obtain the deciles, the odds ratios for for all hospitals are ordered from lowest to highest, and then divided into ten groups, each containing ten percent of the hospitals. The lower the decile, the better your outcomes are compared to other hospitals.

If the odds ratio for your hospital is in the first decile, the odds of outcome at your hospital are lower than 90% of the other TQIP hospitals. If your odds ratio is in the 10th decile, your odds are higher than 90% of the other TQIP hospitals. If the confidence interval for the odds ratio is completely above or below the reference line (OR=1.00) then we are 95% certain that your results differ from a typical TQIP hospital and you are designated as either a Low or High outlier.

Please see the modified box plot legend below to help interpret your results.

Figure 1: Box Decile Legend



I. Patient Inclusion by Month

This report is based on admissions from 2015 and the first quarter of 2016. For each hospital, we report on the most recent 12 months of submitted data if 12 months of data are available. The table below shows the number of your patient admissions that are included in this report by month and year. Cells shaded green indicate months of admissions that were appropriately excluded from this report if your data submissions were up-to-date. Cells shaded red are months of admissions expected to be included in this report if hospital data submissions were up-to-date. Gray shaded cells are outside of the date range for this report and are not included for any hospital. Please review to confirm that your data submissions are on track and we are using the most current data submitted by your facility.

Table 1: Patient Inclusion by Month

Month	2015	2016
January		550
February		550
March		558
April	647	
May	698	
June	700	
July	682	
August	788	
September	744	
October	730	
November	635	
December	615	

II. Risk-Adjusted Mortality

Mortality is defined by death in the ED, death in the hospital, or discharge/transfer to hospice care.

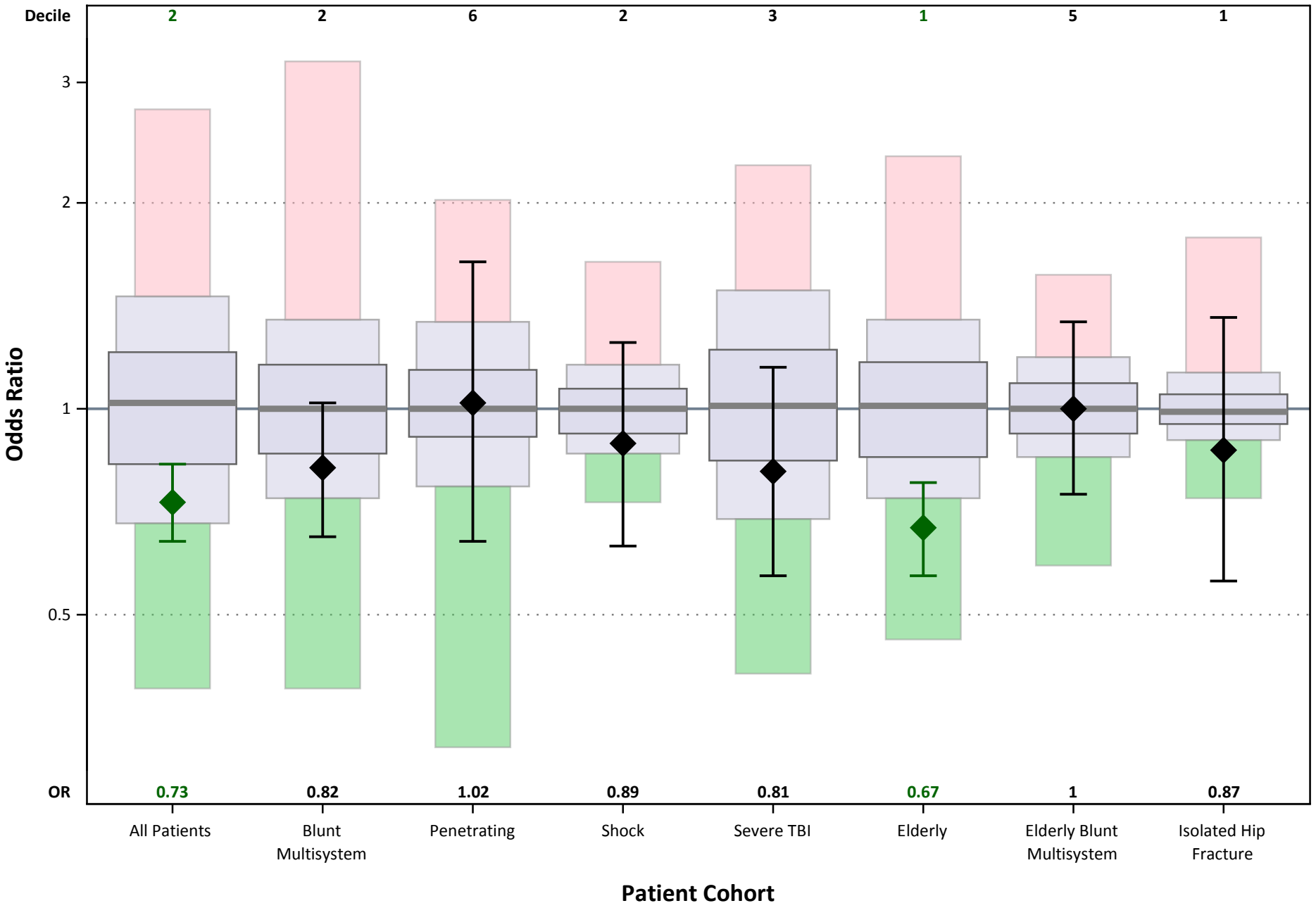
Expected rates are estimated based on statistical models and take into account the risk profile of patients cared for in your center.

Observed rates and expected rates shown below can only be used to approximate the odds ratio due to model factors which account for risk-factor effects, sample size, data transformations, and outcome variability.

Table 2: Risk-Adjusted Mortality by Cohort

		Mortality			Odds Ratio and 95% Confidence Interval				
Cohort	N	Observed Events	Observed (%)	Expected (%)	Odds Ratio	Lower	Upper	Outlier	Decile
All Patients	7,639	482	6.3	7.5	0.73	0.64	0.83	Low	2
Blunt Multisystem	1,275	159	12.5	13.9	0.82	0.65	1.02	Average	2
Penetrating	338	39	11.5	11.4	1.02	0.64	1.64	Average	6
Shock	239	65	27.2	28.9	0.89	0.63	1.25	Average	2
Severe TBI	224	116	51.8	54.9	0.81	0.57	1.15	Average	3
Elderly	3,020	249	8.2	10.7	0.67	0.57	0.78	Low	1
Elderly Blunt Multisystem	364	67	18.4	18.4	1.00	0.75	1.34	Average	5
Isolated Hip Fracture	258	6	2.3	3.4	0.87	0.56	1.36	Average	1

Figure 2: Risk-Adjusted Mortality by Cohort



III. Risk-Adjusted Major Complications

The Major Complications outcome includes the following NTDS complications: Acute Kidney Injury, Acute Respiratory Distress Syndrome (ARDS), Cardiac Arrest with Resuscitative Efforts by Health Care Provider, Cather-Related Blood Stream Infection (2016: Central Line-Associated Bloodstream Infection), Decubitus Ulcer, Deep Surgical Site Infection, Myocardial Infarction, Organ/Space Surgical Site Infection, Pneumonia (2016: Ventilator-Associated Pneumonia), Pulmonary Embolism, Severe Sepsis, Stroke/CVA, Unplanned Return to the OR, and Unplanned Admission to the ICU.

Patients were excluded from complications models if they died within two days, if their time to death was unknown, or if their complications were unknown. Additionally, centers were excluded if they had unknown complication information for greater than 10% of their patients who met TQIP inclusion criteria for this report.

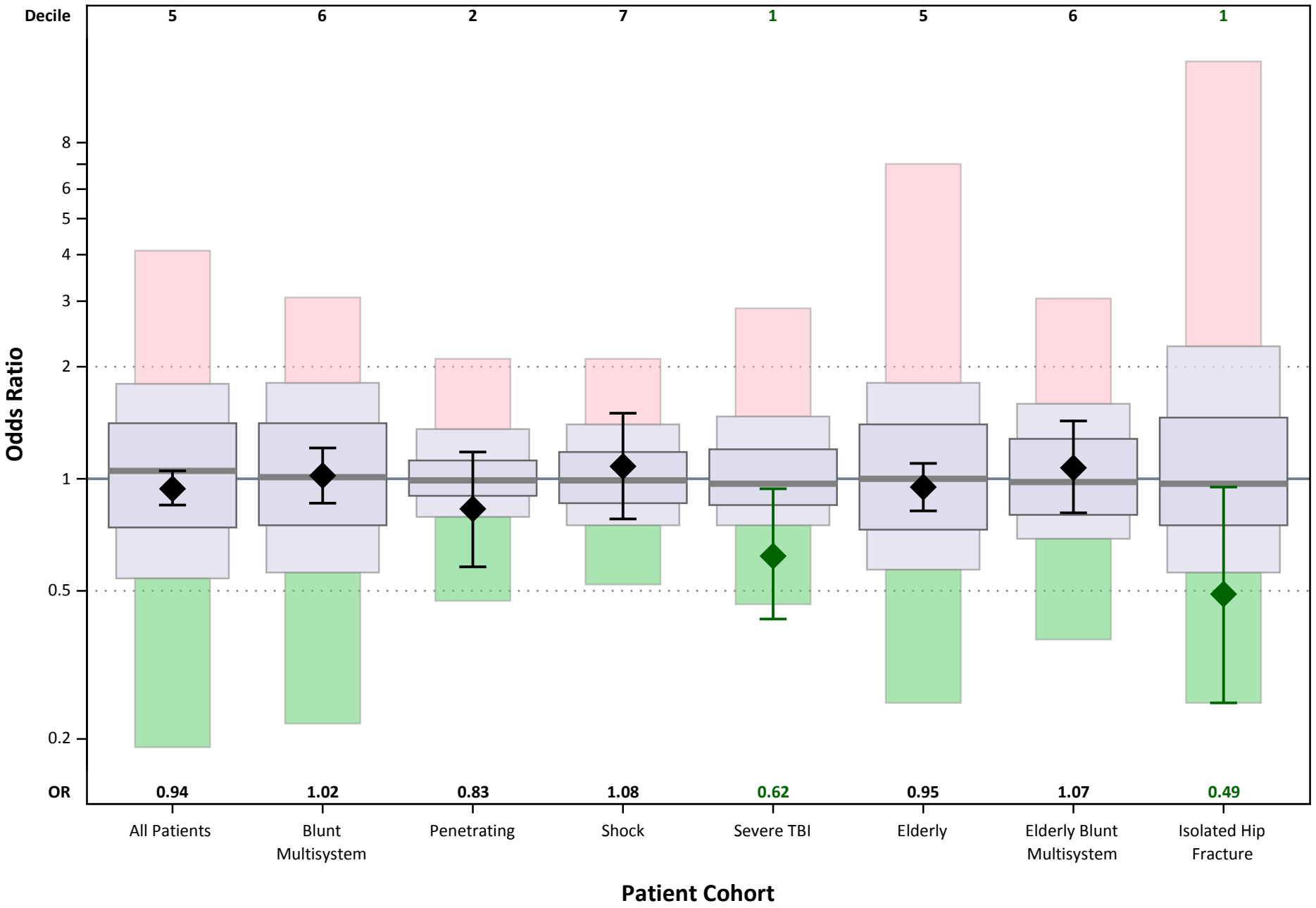
Expected rates are estimated based on statistical models and take into account the risk profile of patients cared for in your center.

Observed rates and expected rates shown below can only be used to approximate the odds ratio due to model factors which account for risk-factor effects, sample size, data transformations, and outcome variability.

Table 3: Risk-Adjusted Major Complications by Cohort

		Major Complications			Odds Ratio and 95% Confidence Interval				
Cohort	N	Observed Events	Observed (%)	Expected (%)	Odds Ratio	Lower	Upper	Outlier	Decile
All Patients	7,418	558	7.5	7.8	0.94	0.85	1.05	Average	5
Blunt Multisystem	1,199	205	17.1	16.7	1.02	0.86	1.21	Average	6
Penetrating	303	37	12.2	13.7	0.83	0.58	1.18	Average	2
Shock	196	51	26.0	24.7	1.08	0.78	1.50	Average	7
Severe TBI	162	22	13.6	20.4	0.62	0.42	0.94	Low	1
Elderly	2,938	236	8.0	8.3	0.95	0.82	1.10	Average	5
Elderly Blunt Multisystem	341	64	18.8	17.7	1.07	0.81	1.43	Average	6
Isolated Hip Fracture	258	6	2.3	5.4	0.49	0.25	0.95	Low	1

Figure 3: Risk-Adjusted Major Complications by Cohort



IV. Risk-Adjusted Major Complications Including Death by Cohort

The Major Complications including Death outcome includes all major complications as well as mortality. By including death with complications for this outcome, we can account for patients who die too early to develop a complication.

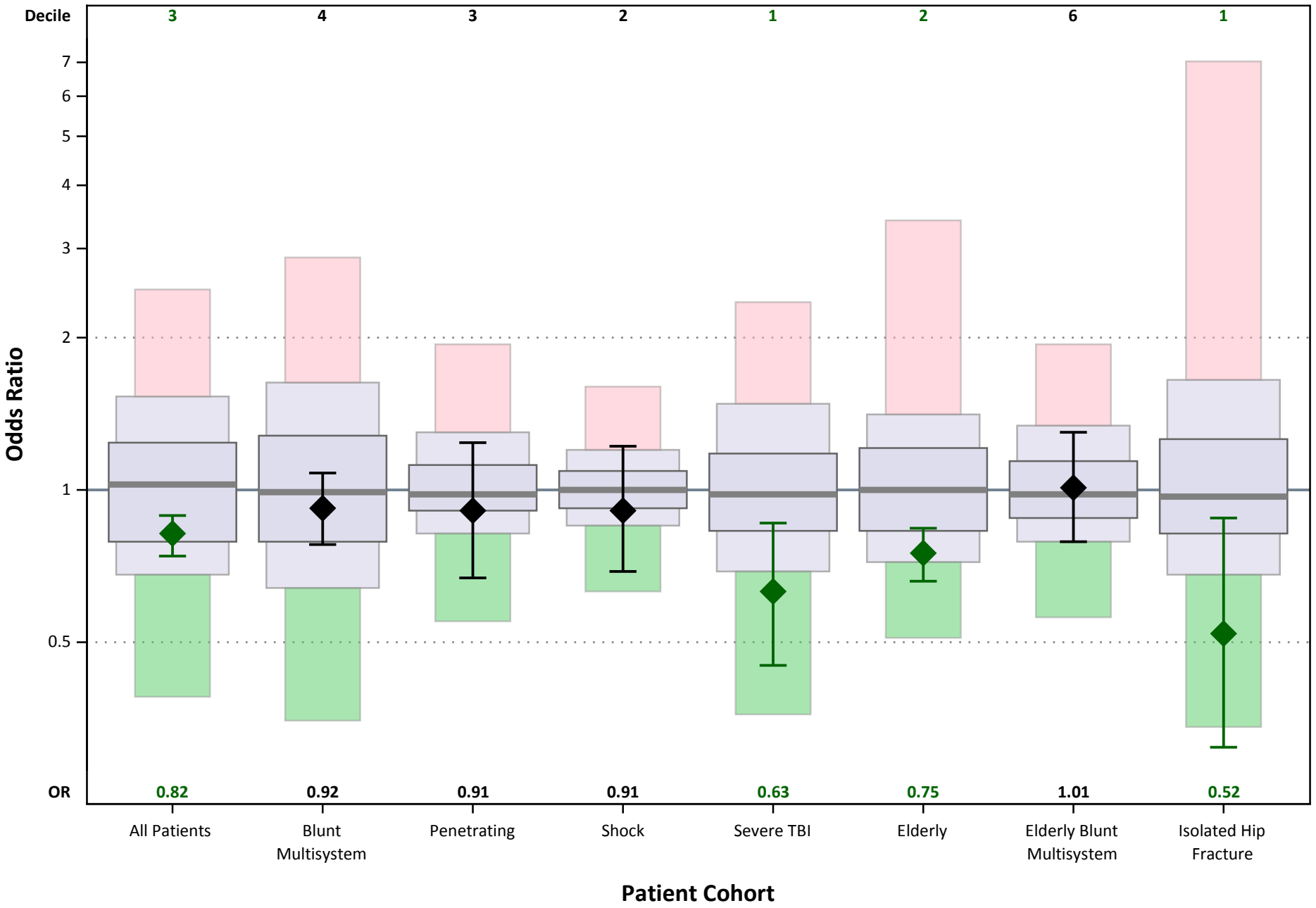
Expected rates are estimated based on statistical models and take into account the risk profile of patients cared for in your center.

Observed rates and expected rates shown below can only be used to approximate the odds ratio due to model factors which account for risk-factor effects, sample size, data transformations, and outcome variability.

Table 4: Risk-Adjusted Major Complications Including Death by Cohort

		Major Complications Including Death			Odds Ratio and 95% Confidence Interval				
Cohort	N	Observed Events	Observed (%)	Expected (%)	Odds Ratio	Lower	Upper	Outlier	Decile
All Patients	7,638	945	12.4	13.9	0.82	0.74	0.89	Low	3
Blunt Multisystem	1,275	329	25.8	26.9	0.92	0.78	1.08	Average	4
Penetrating	338	74	21.9	22.9	0.91	0.67	1.24	Average	3
Shock	239	102	42.7	44.5	0.91	0.69	1.22	Average	2
Severe TBI	224	130	58.0	65.9	0.63	0.45	0.86	Low	1
Elderly	3,020	427	14.1	17.0	0.75	0.66	0.84	Low	2
Elderly Blunt Multisystem	364	113	31.0	30.8	1.01	0.79	1.30	Average	6
Isolated Hip Fracture	258	10	3.9	8.3	0.52	0.31	0.88	Low	1

Figure 4: Risk-Adjusted Major Complications Including Death by Cohort



V. Risk-Adjusted Specific Complications by Complication/Cohort

Each Specific Complication is an isolated outcome and is modeled in the 'All Patients' cohort. Some Specific Complications are also modeled in additional cohorts at a high risk for incidence.

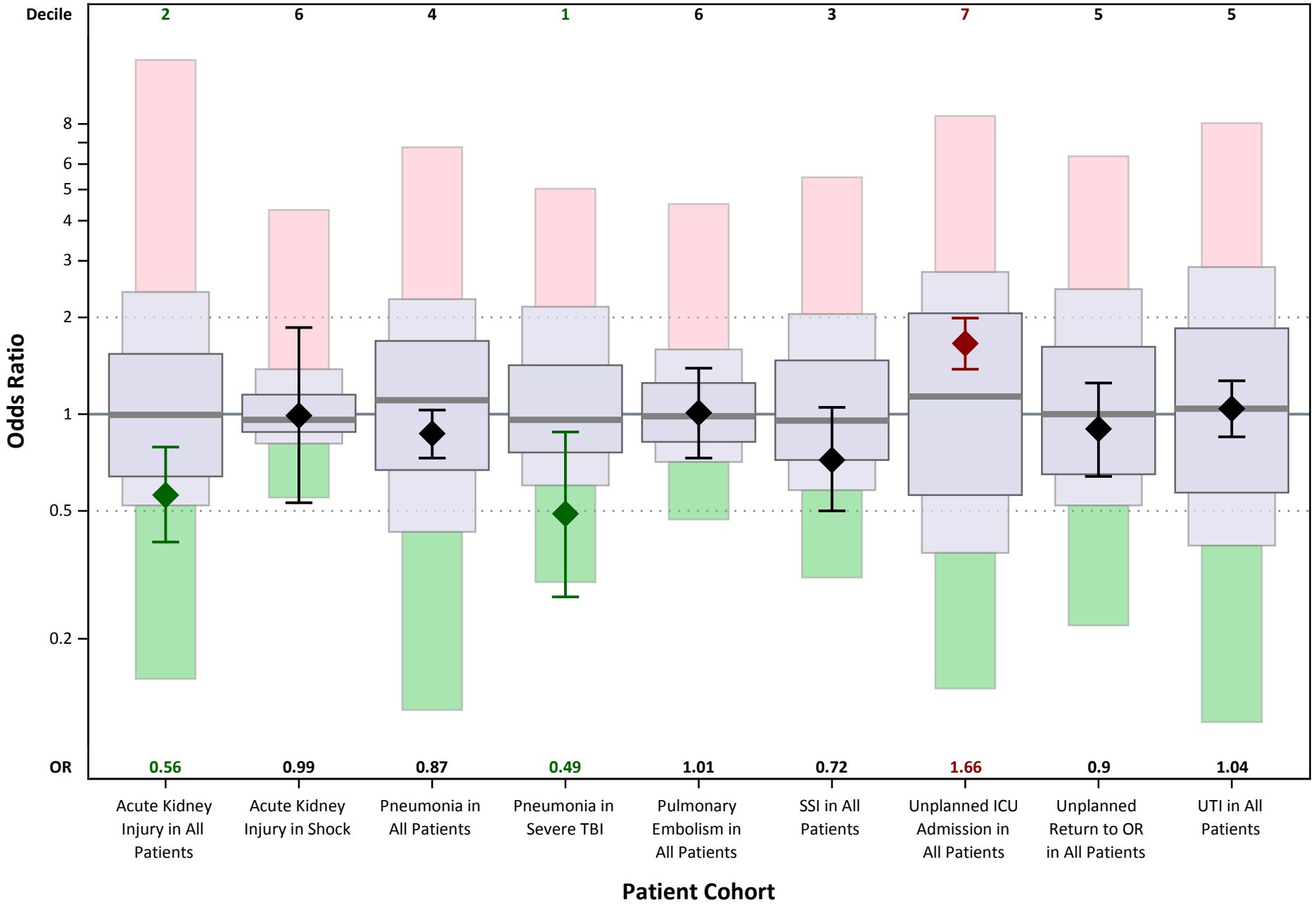
Expected rates are estimated based on statistical models and take into account the risk profile of patients cared for in your center.

Observed rates and expected rates shown below can only be used to approximate the odds ratio due to model factors which account for risk-factor effects, sample size, data transformations, and outcome variability.

Table 5: Risk-Adjusted Specific Complications by Complication/Cohort

			Complication			Odds Ratio and 95% Confidence Interval				
Complication	Cohort	N	Observed Events	Observed (%)	Expected (%)	Odds Ratio	Lower	Upper	Outlier	Decile
Acute Kidney Injury	**All Patients**	7,418	36	0.5	0.9	0.56	0.40	0.79	Low	2
Acute Kidney Injury	**Shock**	196	8	4.1	4.1	0.99	0.53	1.86	Average	6
Pneumonia	**All Patients**	7,418	189	2.5	2.4	0.87	0.73	1.03	Average	4
Pneumonia	**Severe TBI**	162	9	5.6	9.5	0.49	0.27	0.88	Low	1
Pulmonary Embolism	**All Patients**	7,418	37	0.5	0.5	1.01	0.73	1.39	Average	6
SSI	**All Patients**	7,418	28	0.4	0.5	0.72	0.50	1.05	Average	3
Unplanned ICU Admission	**All Patients**	7,418	190	2.6	1.6	1.66	1.38	1.99	High	7
Unplanned Return to OR	**All Patients**	7,418	38	0.5	0.6	0.90	0.64	1.25	Average	5
UTI	**All Patients**	7,418	119	1.6	1.3	1.04	0.85	1.27	Average	5

Figure 5: Risk-Adjusted Specific Complications by Complication/Cohort



VI. TQIP Cohorts

Table 6: Patients by Cohort

		Patients	
Cohort	**Group**	**N**	**%[1,2,3]**
All Patients	**All Others**	261,399	100.0
	Collaborative	7,639	100.0
Blunt Multisystem	**All Others**	45,981	17.6
	Collaborative	1,275	16.7
Penetrating	**All Others**	13,584	5.2
	Collaborative	338	4.4
Shock	**All Others**	10,315	4.0
	Collaborative	239	3.1
Severe TBI	**All Others**	9,381	3.6
	Collaborative	224	2.9
Elderly	**All Others**	86,124	33.0
	Collaborative	3,020	39.5
Elderly Blunt Multisystem	**All Others**	10,471	4.0
	Collaborative	364	4.8
Isolated Hip Fracture	**All Others**	23,130	8.1
	Collaborative	258	3.3

[1] As a percent of the 'All Patients' cohort
[2] IHF patients are excluded from all other cohorts
[3] IHF patients % are calculated as proportion of total patients meeting TQIP inclusion/exclusion criteria

VII. Patient Characteristics

Table 7: Patient Demographic Characteristics by Cohort

		Patients				Race				
Cohort	Group	N	Mean Age (years)	Male (%)	Transfer Patients (%)	White (%)	Black (%)	Asian (%)	Other (%)	Unknown (%)
All Patients	**All Others**	261,399	53	64.7	30.7	75.2	13.7	2.5	8.7	3.2
	Collaborative	7,639	56	62.9	34.2	85.1	11.8	1.1	2.0	1.9
Blunt Multisystem	**All Others**	45,981	47	68.4	25.2	77.2	11.5	2.4	8.9	4.2
	Collaborative	1,275	50	66.7	24.1	89.1	8.2	0.9	1.8	1.8
Penetrating	**All Others**	13,584	33	88.8	17.1	36.7	47.8	1.2	14.3	4.1
	Collaborative	338	32	91.4	17.5	28.8	65.9	1.3	4.1	5.3
Shock	**All Others**	10,315	47	69.3	18.4	69.3	19.0	2.4	9.4	4.0
	Collaborative	239	48	69.5	16.3	78.7	17.4	1.3	2.6	3.8
Severe TBI	**All Others**	9,381	51	72.6	35.2	74.0	12.2	3.0	10.8	5.2
	Collaborative	224	55	71.0	32.1	84.4	12.8	0.5	2.3	2.7
Elderly	**All Others**	86,124	79	47.2	38.2	87.1	5.4	2.9	4.6	2.7
	Collaborative	3,020	79	47.4	42.3	93.4	4.1	1.4	1.1	1.0
Elderly Blunt Multisystem	**All Others**	10,471	77	54.2	34.1	86.9	4.9	3.3	5.0	3.9
	Collaborative	364	78	54.1	33.5	93.6	3.6	1.4	1.4	0.8
Isolated Hip Fracture	**All Others**	23,130	82	30.7	15.8	89.9	4.4	1.7	4.1	2.2
	Collaborative	258	83	30.6	27.1	98.1	0.8	0.4	0.8	0.4

VII. Patient Characteristics

Table 8: Patient Injury Severity by Cohort

Cohort	Group	Patients (N)	Pre-Hospital Cardiac Arrest (%)	Shock (%)	Median ISS	Mean SBP (mmHg)	Mean Pulse (bpm)	ED GCS Motor 4 or less (%)	ED GCS Total 8 or less (%)
All Patients	**All Others**	261,399	1.2	4.0	14.0	137.6	88.6	10.3	10.2
	Collaborative	7,639	0.7	3.1	16.0	141.3	87.3	8.5	8.2
Blunt Multisystem	**All Others**	45,981	2.7	9.2	26.0	129.6	95.2	24.5	24.5
	Collaborative	1,275	1.6	7.6	26.0	133.3	93.3	20.6	20.9
Penetrating	**All Others**	13,584	3.0	12.1	13.0	124.5	98.3	14.1	13.4
	Collaborative	338	3.3	10.1	14.0	128.1	96.0	15.0	14.0
Shock	**All Others**	10,315	7.1	100.0	22.0	74.5	97.7	36.5	35.7
	Collaborative	239	3.8	100.0	22.0	75.7	95.2	37.7	37.6
Severe TBI	**All Others**	9,381	5.3	6.9	25.0	140.7	91.1	91.0	100.0
	Collaborative	224	3.6	5.4	25.0	144.7	89.2	90.6	100.0
Elderly	**All Others**	86,124	0.9	2.6	14.0	147	82.5	6.4	6.1
	Collaborative	3,020	0.4	2.0	16.0	150.7	82.7	6.0	5.1
Elderly Blunt Multisystem	**All Others**	10,471	2.6	8.4	25.0	136.9	86.5	14.4	13.8
	Collaborative	364	0.8	5.8	25.0	144.1	84.9	10.1	8.1
Isolated Hip Fracture	**All Others**	23,130	0.2	0.0	9.0	149.9	80.7	0.4	0.2
	Collaborative	258	0.0	0.0	9.0	149.6	80.8	0.5	0.0

VII. Patient Characteristics

Table 9: Selected Mechanisms of Injury by Cohort

Cohort	Group	Patients (N)	Fall (%)	MVT Occupant and Other (%)	MVT Motorcyclist (%)	Pedestrian Pedal (%)	Struck by/Against (%)	Firearm (%)	Cut/Pierce (%)	Other (%)
All Patients	**All Others**	261,399	42.8	22.9	6.8	7.2	5.3	6.0	3.0	5.9
	Collaborative	7,639	50.0	21.0	5.7	5.1	5.0	4.8	2.2	6.1
Blunt Multisystem	**All Others**	45,981	21.0	43.2	13.4	12.5	2.6	0.0	0.0	7.0
	Collaborative	1,275	31.7	40.7	10.8	7.9	2.4	0.0	0.0	6.6
Penetrating	**All Others**	13,584	0.0	0.0	0.0	0.0	0.0	55.4	44.6	0.0
	Collaborative	338	0.0	0.0	0.0	0.0	0.0	61.8	38.2	0.0
Shock	**All Others**	10,315	20.5	28.5	8.4	11.1	2.5	16.8	7.3	4.6
	Collaborative	239	24.7	25.1	8.0	11.3	4.6	17.6	5.0	3.8
Severe TBI	**All Others**	9,381	48.4	13.3	4.4	7.2	7.5	14.2	0.4	4.4
	Collaborative	224	55.4	12.1	1.8	5.8	7.6	14.7	0.0	2.7
Elderly	**All Others**	86,124	75.6	13.0	1.7	4.0	1.9	0.6	0.3	2.7
	Collaborative	3,020	79.5	11.2	1.1	2.9	2.1	0.5	0.3	2.5
Elderly Blunt Multisystem	**All Others**	10,471	47.4	32.1	4.8	9.7	1.5	0.0	0.0	4.5
	Collaborative	364	64.8	23.4	2.2	3.9	1.7	0.0	0.0	4.1
Isolated Hip Fracture	**All Others**	23,130	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Collaborative	258	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

VII. Patient Characteristics

Table 10: Resource Utilization by Cohort

Cohort	Group	Patients (N)	ICU Care (%)	Median ICU LOS[1] (days)	Mechanical Ventilation (%)	Median Duration of Ventilation[2] (days)	Median LOS (days)
All Patients	**All Others**	261,399	47.2	3.0	18.8	3.0	5.0
	Collaborative	7,639	47.9	3.0	17.4	3.0	5.0
Blunt Multisystem	**All Others**	45,981	74.2	5.0	42.7	5.0	9.0
	Collaborative	1,275	75.1	4.0	39.7	5.0	8.0
Penetrating	**All Others**	13,584	54.5	3.0	36.1	2.0	6.0
	Collaborative	338	63.6	3.0	39.9	2.0	7.0
Shock	**All Others**	10,315	74.2	5.0	56.7	3.0	8.0
	Collaborative	239	78.2	4.0	57.7	3.0	8.0
Severe TBI	**All Others**	9,381	89.8	4.0	88.6	3.0	6.0
	Collaborative	224	94.6	4.0	93.3	2.0	5.0
Elderly	**All Others**	86,124	48.8	3.0	13.7	4.0	5.0
	Collaborative	3,020	49.7	3.0	13.5	3.0	5.0
Elderly Blunt Multisystem	**All Others**	10,471	73.2	4.0	34.4	5.0	8.0
	Collaborative	364	71.4	4.0	30.8	5.0	8.0
Isolated Hip Fracture	**All Others**	23,130	9.7	3.0	2.4	2.0	6.0
	Collaborative	258	5.0	2.0	2.7	1.0	6.0

[1] Among patients requiring ICU care
[2] Among patients requiring ventilator support

VII. Patient Characteristics

Table 11: Comorbid Conditions by Cohort*

		Patients	Cardiovascular Disease						Cancer	
Cohort	Group	N	Congestive Heart Failure (%)	History of Angina[1] (%)	History of Myocardial Infarction (%)	Stroke (%)	Hypertension (%)	Peripheral Vascular Disease (%)	Chemotherapy for Cancer (%)	Disseminated Cancer (%)
All Patients	**All Others**	256,916	3.4	0.1	1.2	2.5	33.6	0.7	0.3	0.6
	Collaborative	7,525	4.5	0.0	1.7	3.9	42.2	1.6	0.2	0.7
Blunt Multisystem	**All Others**	44,544	2.1	0.1	0.8	1.5	24.8	0.4	0.2	0.4
	Collaborative	1,221	2.6	0.0	1.2	2.4	33.2	1.0	0.3	0.4
Penetrating	**All Others**	13,045	0.3	0.0	0.2	0.3	8.0	0.1	0.0	0.1
	Collaborative	314	0.3	0.0	0.0	0.0	9.6	0.0	0.3	0.0
Shock	**All Others**	9,797	2.9	0.0	1.0	1.3	22.8	0.5	0.4	0.6
	Collaborative	206	6.3	0.0	2.9	4.4	26.7	0.5	0.5	1.0
Severe TBI	**All Others**	8,875	2.8	0.0	1.1	2.9	28.2	0.5	0.4	0.7
	Collaborative	208	4.3	0.0	1.4	6.7	39.4	1.0	0.5	0.5
Elderly	**All Others**	85,522	8.1	0.1	2.6	5.5	64.8	1.4	0.7	1.4
	Collaborative	3,009	9.1	0.0	2.8	7.3	71.8	3.3	0.3	1.1
Elderly Blunt Multisystem	**All Others**	10,299	6.8	0.1	2.3	4.5	59.2	1.2	0.6	1.1
	Collaborative	359	7.5	0.0	2.8	5.3	69.4	2.5	0.6	0.8
Isolated Hip Fracture	**All Others**	23,067	9.7	0.1	2.4	5.7	66.4	1.7	0.7	1.3
	Collaborative	258	12.4	0.0	2.3	6.6	78.7	5.4	0.0	1.9

[1] Within past 1 month
* Excluding patients with unknown comorbid condition information

VII. Patient Characteristics

Table 11: Comorbid Conditions by Cohort (continued) *

		Patients	Substance Abuse		
Cohort	Group	N	Alcohol Use Disorder (%)	Drug Use Disorder (%)	Current Smoker (%)
All Patients	**All Others**	256,916	9.2	8.4	21.7
	Collaborative	7,525	6.5	5.5	21.9
Blunt Multisystem	**All Others**	44,544	9.4	10.2	22.3
	Collaborative	1,221	7.0	6.7	23.0
Penetrating	**All Others**	13,045	8.7	20.6	30.1
	Collaborative	314	7.3	22.0	35.4
Shock	**All Others**	9,797	11.7	10.8	20.0
	Collaborative	206	10.7	9.7	26.7
Severe TBI	**All Others**	8,875	15.0	8.5	14.4
	Collaborative	208	10.1	5.3	15.4
Elderly	**All Others**	85,522	4.4	0.8	7.5
	Collaborative	3,009	2.8	0.3	6.2
Elderly Blunt Multisystem	**All Others**	10,299	4.8	1.2	8.2
	Collaborative	359	2.5	0.3	7.2
Isolated Hip Fracture	**All Others**	23,067	2.1	0.4	7.6
	Collaborative	258	1.6	0.0	7.0

* Excluding patients with unknown comorbid condition information

VII. Patient Characteristics

Table 11: Comorbid Conditions by Cohort (continued) *

		Patients	Other								
Cohort	Group	N	Cirrhosis (%)	Bleeding Disorder (%)	Dementia (%)	Major Psychiatric Illness (%)	Diabetes (%)	Chronic Renal Failure (%)	COPD (%)	Functional Dependence (%)	Steroid Use (%)
All Patients	**All Others**	256,916	1.0	7.8	4.3	10.2	13.1	1.5	6.5	3.7	0.7
	Collaborative	7,525	1.0	21.2	3.9	14.3	16.0	0.8	12.9	5.1	1.3
Blunt Multisystem	**All Others**	44,544	1.0	4.9	2.2	9.1	10.2	0.8	5.0	1.8	0.5
	Collaborative	1,221	1.2	15.1	2.5	13.0	13.4	0.1	11.6	3.8	0.9
Penetrating	**All Others**	13,045	0.3	0.7	0.2	10.8	3.0	0.1	2.4	0.2	0.1
	Collaborative	314	0.3	2.9	0.0	11.8	3.8	0.0	7.0	0.0	0.3
Shock	**All Others**	9,797	1.6	5.9	1.5	10.4	9.5	1.2	5.2	2.2	0.6
	Collaborative	206	1.5	13.6	1.5	14.6	13.1	1.5	10.7	2.4	1.9
Severe TBI	**All Others**	8,875	1.4	10.5	3.0	9.7	11.6	1.7	4.9	2.5	0.5
	Collaborative	208	0.0	24.5	1.9	12.5	17.8	0.5	13.0	4.8	0.5
Elderly	**All Others**	85,522	0.9	18.7	12.3	10.0	23.6	2.9	10.9	8.8	1.3
	Collaborative	3,009	1.0	41.6	9.5	14.5	26.7	1.0	17.4	10.8	2.0
Elderly Blunt Multisystem	**All Others**	10,299	1.2	15.9	8.7	8.0	22.1	2.2	10.2	6.0	1.1
	Collaborative	359	1.7	38.7	8.6	14.8	25.6	0.3	15.6	12.0	2.0
Isolated Hip Fracture	**All Others**	23,067	0.7	14.4	19.5	10.8	20.6	3.7	13.0	13.4	1.6
	Collaborative	258	1.2	39.5	10.5	11.2	23.3	1.9	22.1	10.5	4.3

* Excluding patients with unknown comorbid condition information

VIII. In-Hospital Events

Table 12: Complications by Cohort*

		Patients	Organ Dysfunction				
Cohort	Group	N	Acute Renal Failure (%)	Acute Respiratory Distress Syndrome (%)	Cardiac Arrest with CPR (%)	Stroke (%)	Myocardial Infarction (%)
All Patients	**All Others**	258,168	1.0	0.8	1.3	0.4	0.3
	Collaborative	7,638	0.5	0.4	1.3	0.3	0.5
Blunt Multisystem	**All Others**	45,560	2.3	2.2	3.2	1.0	0.5
	Collaborative	1,275	1.3	1.1	3.1	0.8	1.2
Penetrating	**All Others**	13,375	1.8	1.1	3.4	0.4	0.1
	Collaborative	338	1.2	0.0	3.3	0.0	0.0
Shock	**All Others**	10,206	3.8	2.4	7.7	0.9	0.6
	Collaborative	239	3.4	1.3	6.3	0.8	0.8
Severe TBI	**All Others**	9,285	1.2	1.8	3.6	1.1	0.3
	Collaborative	224	0.5	0.9	1.3	0.9	0.0
Elderly	**All Others**	85,148	1.2	0.6	1.3	0.5	0.6
	Collaborative	3,020	0.6	0.4	1.3	0.5	0.9
Elderly Blunt Multisystem	**All Others**	10,396	3.0	1.5	4.3	1.2	1.3
	Collaborative	364	2.2	0.8	3.6	1.4	2.8
Isolated Hip Fracture	**All Others**	22,899	1.1	0.3	0.5	0.4	0.6
	Collaborative	258	0.0	0.0	0.8	0.0	0.4

* Excluding patients with unknown complications information

VIII. In-Hospital Events

Table 12: Complications by Cohort (continued) *

		Patients	Infection								
Cohort	Group	N	Urinary Tract Infection /CAUTI[2] (%)	Superficial Surgical Site Infection (%)	Deep Surgical Site Infection (%)	Organ/Space Surgical Site Infection (%)	Pneumonia /VAP[2] (%)	Intubated Pneumonia[1] (%)	CRBSI /CLABSI[2] (%)	Severe Sepsis (%)
All Patients	**All Others**	258,168	2.2/0.5	0.3	0.3	0.2	3.5/0.9	17.1	0.1/0.1	0.7
	Collaborative	7,638	1.8/0.5	0.3	0.1	0.1	3.0/0.4	15.1	0.0/0.1	1.0
Blunt Multisystem	**All Others**	45,560	4.1/1.3	0.6	0.6	0.4	9.6/3.1	21.3	0.4/0.2	1.6
	Collaborative	1,275	3.8/1.6	0.6	0.1	0.2	8.6/2.0	19.3	0.0/0.4	2.8
Penetrating	**All Others**	13,375	1.9/0.3	1.1	1.4	1.6	3.6/1.0	10.5	0.3/0.1	1.4
	Collaborative	338	1.1/0.0	2.4	0.6	0.6	5.7/0.0	13.2	0.0/0.0	2.1
Shock	**All Others**	10,206	4.5/1.1	1.1	1.1	1.0	9.8/3.4	18.4	0.5/0.3	2.1
	Collaborative	239	4.2/2.1	0.4	0.8	0.4	10.5/2.1	18.2	0.0/0.0	4.2
Severe TBI	**All Others**	9,285	3.5/0.8	0.3	0.2	0.2	10.9/3.5	13.7	0.3/0.1	1.1
	Collaborative	224	1.8/0.0	0.0	0.0	0.0	5.3/0.0	5.6	0.0/0.0	1.3
Elderly	**All Others**	85,148	3.1/0.6	0.1	0.1	0.1	3.1/0.6	16.6	0.1/0.0	0.7
	Collaborative	3,020	2.9/1.0	0.2	0.0	0.0	2.3/0.3	13.0	0.0/0.2	1.2
Elderly Blunt Multisystem	**All Others**	10,396	5.4/1.9	0.3	0.2	0.2	7.9/2.3	20.7	0.4/0.0	1.9
	Collaborative	364	6.2/3.4	0.3	0.0	0.0	6.9/1.1	16.3	0.0/1.1	3.0
Isolated Hip Fracture	**All Others**	22,899	2.5/0.3	0.1	0.0	0.0	1.4/0.1	14.0	0.0/0.0	0.4
	Collaborative	258	1.1/0.0	0.0	0.0	0.0	0.0/0.0	0.0	0.0/0.0	0.4

[1] Among patients with ventilator days > 1
[2] Due to change in definition, data summaries are reported for both 2015 and 2016 admissions separated by the forward slash
* Excluding patients with unknown complications information

VIII. In-Hospital Events

Table 12: Complications by Cohort (continued) *

		Patients	Other							
Cohort	Group	N	Decubitus Ulcer (%)	Drug or Alcohol Withdrawal (%)	Deep Vein Thrombosis (DVT) (%)	Pulmonary Embolism (%)	Extremity Compartment Syndrome (%)	Unplanned Intubation (%)	Unplanned Return to OR (%)	Unplanned Admission to ICU[1] (%)
All Patients	**All Others**	258,168	0.7	1.3	1.4	0.6	0.2	1.6	0.7	1.9
	Collaborative	7,638	0.7	1.0	1.3	0.5	0.2	1.8	0.5	2.5
Blunt Multisystem	**All Others**	45,560	1.9	1.6	3.4	1.4	0.4	3.2	1.4	2.9
	Collaborative	1,275	1.7	0.8	4.2	1.6	0.3	3.5	0.9	3.8
Penetrating	**All Others**	13,375	0.8	1.0	1.9	1.0	0.4	1.5	3.2	2.2
	Collaborative	338	0.3	0.3	2.7	0.6	0.3	1.2	3.9	3.0
Shock	**All Others**	10,206	2.3	1.7	4.0	1.6	0.7	3.1	2.8	2.9
	Collaborative	239	2.1	2.1	5.4	1.3	0.0	2.9	2.9	3.4
Severe TBI	**All Others**	9,285	1.2	2.3	2.5	0.7	0.0	2.6	1.0	2.0
	Collaborative	224	0.5	1.8	1.8	0.0	0.0	1.8	0.5	2.7
Elderly	**All Others**	85,148	0.7	0.7	1.2	0.4	0.0	2.1	0.4	2.5
	Collaborative	3,020	0.7	0.5	0.9	0.2	0.0	2.3	0.3	3.2
Elderly Blunt Multisystem	**All Others**	10,396	1.8	0.8	3.0	1.0	0.2	5.0	0.9	4.2
	Collaborative	364	1.4	0.3	3.0	0.8	0.0	4.4	0.6	5.5
Isolated Hip Fracture	**All Others**	22,899	0.6	0.2	0.4	0.4	0.0	0.6	0.1	1.7
	Collaborative	258	0.4	0.0	0.0	0.4	0.0	0.4	0.0	0.4

[1] Among patients with ICU LOS more than one day
* Excluding patients with unknown complications information

VIII. In-Hospital Events

Table 13: Time to Death by Cohort

		Patients	All Deaths[1]		In-Hospital Deaths[2]		Time to In-Hospital Death (days)			In-Hospital	
Cohort	Group	N	N	%	N	%	Median	25th Percentile	75th Percentile	Deaths within 72 Hours (%)	Deaths after 30 Days (%)
All Patients	**All Others**	261,399	17,468	6.7	15,402	5.9	4.0	2.0	9.0	44.5	2.5
	Collaborative	7,639	482	6.3	442	5.8	4.0	2.0	9.0	49.8	0.9
Blunt Multisystem	**All Others**	45,981	5,975	13.0	5,229	11.4	4.0	2.0	9.0	46.4	3.1
	Collaborative	1,275	159	12.5	147	11.5	4.0	2.0	10.0	49.0	0.7
Penetrating	**All Others**	13,584	1,150	8.5	858	6.3	1.0	1.0	3.0	76.7	2.3
	Collaborative	338	39	11.5	27	8.0	2.0	1.0	2.0	92.6	0.0
Shock	**All Others**	10,315	2,772	26.9	2,183	21.2	2.0	1.0	6.0	64.8	2.0
	Collaborative	239	65	27.2	53	22.2	2.0	1.0	10.0	62.3	1.9
Severe TBI	**All Others**	9,381	4,278	45.6	3,728	39.7	3.0	2.0	6.0	60.3	1.2
	Collaborative	224	116	51.8	109	48.7	2.0	2.0	5.0	64.2	0.9
Elderly	**All Others**	86,124	8,548	9.9	7,991	9.3	5.0	3.0	10.0	35.1	2.3
	Collaborative	3,020	249	8.2	242	8.0	5.0	2.0	10.0	40.1	0.8
Elderly Blunt Multisystem	**All Others**	10,471	2,123	20.3	1,914	18.3	5.0	2.0	10.0	38.8	3.3
	Collaborative	364	67	18.4	64	17.6	5.5	2.0	13.5	37.5	0.0
Isolated Hip Fracture	**All Others**	23,130	776	3.4	765	3.3	7.0	4.0	11.0	16.6	1.2
	Collaborative	258	6	2.3	6	2.3	4.0	3.0	8.0	33.3	0.0

[1] Including deaths in the ED, deaths in the hospital, and discharged/transferred to hospice care
[2] Including deaths in the hospital

VIII. In-Hospital Events

Table 14: Discharge Disposition by Cohort

		Patients	Discharged Home		Discharged/ Transferred to Skilled Nursing Facility		Discharged/ Transferred to Inpatient Rehab or Designated Unit		Discharged/ Transferred to Long Term Care Hospital (LTCH)		Expired[1]		Other	
Cohort	**Group**	**N**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
All Patients	**All Others**	261,399	155,974	59.7	34,057	13.0	35,821	13.7	2,862	1.1	17,468	6.7	15,217	5.8
	Collaborative	7,639	4,147	54.3	1,148	15.0	1,501	19.7	87	1.1	482	6.3	274	3.6
Blunt Multisystem	**All Others**	45,981	19,054	41.4	5,480	11.9	10,894	23.7	1,348	2.9	5,975	13.0	3,230	7.0
	Collaborative	1,275	437	34.3	171	13.4	426	33.4	34	2.7	159	12.5	48	3.8
Penetrating	**All Others**	13,584	9,893	72.8	164	1.2	644	4.7	85	0.6	1,150	8.5	1,648	12.1
	Collaborative	338	230	68.1	8	2.4	17	5.0	2	0.6	39	11.5	42	12.4
Shock	**All Others**	10,315	3,601	34.9	1,029	10.0	1,773	17.2	308	3.0	2,772	26.9	832	8.1
	Collaborative	239	76	31.8	32	13.4	44	18.4	8	3.4	65	27.2	14	5.9
Severe TBI	**All Others**	9,381	1,909	20.4	641	6.8	1,643	17.5	291	3.1	4,278	45.6	619	6.6
	Collaborative	224	32	14.3	14	6.3	50	22.3	10	4.5	116	51.8	2	0.9
Elderly	**All Others**	86,124	33,375	38.8	24,585	28.6	14,496	16.8	1,205	1.4	8,548	9.9	3,915	4.6
	Collaborative	3,020	1,028	34.0	896	29.7	717	23.7	56	1.9	249	8.3	74	2.5
Elderly Blunt Multisystem	**All Others**	10,471	2,127	20.3	2,875	27.5	2,311	22.1	419	4.0	2,123	20.3	616	5.9
	Collaborative	364	66	18.1	97	26.7	111	30.5	18	5.0	67	18.4	5	1.4
Isolated Hip Fracture	**All Others**	23,130	3,283	14.2	12,068	52.2	6,072	26.3	175	0.8	776	3.4	756	3.3
	Collaborative	258	31	12.0	143	55.4	64	24.8	1	0.4	6	2.3	13	5.0

[1] Including deaths in the ED, deaths in the hospital, and discharged/transferred to hospice care

IX. Processes of Care: Operative Skeletal Fixation

Table 15: Time to Operative Fixation in Elderly Patients with Isolated Hip Fracture

	Patients	Missing Time to Operative Fixation		Operative Fixation more than 48 Hours	
Group	**N**	**N**	**%**	**N**	**%**
All Others	18,999	279	1.0	2,090	11.2
Collaborative	231	0	0.0	21	9.1

Table 16: Time to Operative Fixation in Patients with Mid-Shaft Femur Fracture

	Patients	Missing Time to Operative Fixation		Operative Fixation more than 24 Hours	
Group	**N**	**N**	**%**	**N**	**%**
All Others	10,215	186	2.0	3,032	30.2
Collaborative	265	3	1.0	54	20.6

Table 17: Time to Operative Fixation in Patients with Open Tibia or Open Tibia/Fibula Shaft Fracture

	Patients	Missing Time to Operative Fixation		Operative Fixation more than 12 Hours	
Group	**N**	**N**	**%**	**N**	**%**
All Others	4,235	89	2.0	1,223	29.5
Collaborative	78	0	0.0	23	29.5
Note: Operative fixation time threshold changed from 12 hours to 24 hours to reflect external standards					

IX. Processes of Care: Spleen

Table 18: Procedures for Patients with Blunt Splenic Injuries by Cohort

		Patients	Operative Management		Splenic Preservation		Angiography with or without Embolization		Time to Operative Management (hours)[1]		
Cohort	Group	N	N	%	N	%	N	%	Median	25th Percentile	75th Percentile
Blunt Splenic Injury (BSI)	**All Others**	11,819	2,517	21.3	9,504	80.4	1,884	15.9	1.7	1.0	3.8
	Collaborative	308	58	18.8	254	82.5	93	30.2	1.3	0.9	1.9
Isolated BSI	**All Others**	888	216	24.3	685	77.1	182	20.5	2.5	1.3	6.4
	Collaborative	43	5	11.6	38	88.4	20	46.5	1.0	0.8	1.2

[1] Among patients with an operation

Table 19: ICU and Hospital LOS for Patients with Non-Operative Isolated Blunt Splenic Injuries

	Patients	ICU Admission[1]		ICU Length of Stay (days)			Hospital Length of Stay (days)		
Group	N	N	%	Median	25th Percentile	75th Percentile	Median	25th Percentile	75th Percentile
All Others	672	429	63.8	3.0	2.0	3.0	4.0	3.0	6.0
Collaborative	38	25	65.8	2.0	2.0	3.0	4.0	3.0	5.0

[1] Any ICU stay with ICU LOS of 1 day or more

IX. Processes of Care: Venous Thromboembolism Prophylaxis

Table 20: Pharmacologic VTE Prophylaxis by Cohort

		Patients[1]	VTE Prophylaxis				Time to VTE Prophylaxis (days)		
Cohort	Group	N	N	%	No Prophylaxis (%)	Unknown (%)	Median	25th Percentile	75th Percentile
All Patients	**All Others**	253,743	131,162	60.4	39.6	14.5	2.0	1.0	3.0
	Collaborative	7,419	5,043	73.8	26.2	7.9	2.0	1.0	3.0
Blunt Multisystem	**All Others**	43,187	28,091	74.9	25.1	13.2	2.0	2.0	4.0
	Collaborative	1,199	952	85.5	14.5	7.2	2.0	1.0	4.0
Penetrating	**All Others**	12,642	8,091	75.9	24.1	15.6	2.0	1.0	3.0
	Collaborative	303	262	88.8	11.2	2.6	1.0	1.0	2.0
Shock	**All Others**	8,437	5,498	76.0	24.0	14.2	2.0	1.0	4.0
	Collaborative	196	153	84.1	15.9	7.1	2.0	1.0	4.0
Severe TBI	**All Others**	7,013	3,006	50.7	49.3	15.5	4.0	2.0	6.0
	Collaborative	162	95	62.5	37.5	6.2	3.0	2.0	4.0
Elderly	**All Others**	83,496	38,739	54.6	45.4	15.0	2.0	1.0	3.0
	Collaborative	2,938	1,989	74.6	25.4	9.3	2.0	1.0	3.0
Elderly Blunt Multisystem	**All Others**	9,666	5,745	69.3	30.7	14.2	3.0	2.0	4.0
	Collaborative	341	265	82.6	17.4	5.9	2.0	1.0	4.0
Isolated Hip Fracture	**All Others**	23,064	16,501	85.0	15.0	15.8	2.0	1.0	2.0
	Collaborative	258	216	94.7	5.3	11.6	2.0	1.0	2.0

[1] Excluding deaths in the ED, deaths within the first 48 hours of arrival, and deaths with unknown time to death

IX. Processes of Care: Venous Thromboembolism Prophylaxis

Table 21: Pharmacologic VTE Prophylaxis when LOS is more than 4 Days by Cohort

		Patients[1]	LOS more than 4 Days		Days to VTE Prophylaxis when LOS more than 4 Days		
Cohort	Group	N	N	VTE Prophylaxis %	Median	25th Percentile	75th Percentile
All Patients	**All Others**	253,743	151,168	74.5	2.0	1.0	3.0
	Collaborative	7,419	4,443	88.3	2.0	1.0	3.0
Blunt Multisystem	**All Others**	43,187	35,623	81.5	3.0	2.0	4.0
	Collaborative	1,199	990	92.1	3.0	2.0	4.0
Penetrating	**All Others**	12,642	9,237	84.1	2.0	1.0	3.0
	Collaborative	303	234	95.2	2.0	1.0	2.0
Shock	**All Others**	8,437	6,981	83.1	3.0	1.0	4.0
	Collaborative	196	161	92.8	2.0	1.0	4.0
Severe TBI	**All Others**	7,013	5,445	61.1	4.0	2.0	7.0
	Collaborative	162	125	74.4	3.0	2.0	4.0
Elderly	**All Others**	83,496	52,916	67.1	2.0	1.0	3.0
	Collaborative	2,938	1,902	86.6	2.0	1.0	3.0
Elderly Blunt Multisystem	**All Others**	9,666	8,034	75.8	3.0	2.0	4.0
	Collaborative	341	282	88.3	2.0	2.0	4.0
Isolated Hip Fracture	**All Others**	23,064	17,963	86.9	2.0	1.0	2.0
	Collaborative	258	195	94.7	2.0	1.0	2.0

[1] Excluding deaths in the ED, deaths within the first 48 hours of arrival, and deaths with unknown time to death

IX. Processes of Care: Venous Thromboembolism Prophylaxis

Table 22: Pharmacologic VTE Prophylaxis Type by Cohort

		VTE Prophylaxis	Unfractionated Heparin		LMWH		Direct Thrombin or Oral Xa Inhibitor		Coumadin		Other	
Cohort	**Group**	**N**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
All Patients	**All Others**	131,384	31,792	24.2	95,632	72.8	912	0.7	1,258	1.0	1,790	1.4
	Collaborative	5,050	1,703	33.7	2,810	55.6	7	0.1	36	0.7	494	9.8
Blunt Multisystem	**All Others**	28,172	7,039	25.0	20,695	73.5	88	0.3	83	0.3	267	1.0
	Collaborative	954	379	39.7	494	51.8	0	0.0	0	0.0	81	8.5
Penetrating	**All Others**	8,102	1,596	19.7	6,445	79.6	8	0.1	8	0.1	45	0.6
	Collaborative	263	84	31.9	172	65.4	1	0.4	0	0.0	6	2.3
Shock	**All Others**	5,537	1,416	25.6	4,017	72.6	21	0.4	29	0.5	54	1.0
	Collaborative	156	61	39.1	84	53.9	0	0.0	0	0.0	11	7.1
Severe TBI	**All Others**	3,039	1,354	44.6	1,642	54.0	7	0.2	5	0.2	31	1.0
	Collaborative	96	50	52.1	39	40.6	0	0.0	0	0.0	7	7.3
Elderly	**All Others**	38,855	12,701	32.7	23,944	61.6	513	1.3	946	2.4	751	1.9
	Collaborative	1,992	878	44.1	838	42.1	4	0.2	28	1.4	244	12.3
Elderly Blunt Multisystem	**All Others**	5,781	1,881	32.5	3,729	64.5	36	0.6	54	0.9	81	1.4
	Collaborative	266	130	48.9	106	39.9	0	0.0	0	0.0	30	11.3
Isolated Hip Fracture	**All Others**	16,520	3,333	20.2	11,243	68.1	544	3.3	797	4.8	603	3.7
	Collaborative	216	53	24.5	129	59.7	2	0.9	15	6.9	17	7.9

IX. Processes of Care: Severe Traumatic Brain Injury (sTBI)

Table 23: Cerebral Monitoring

		Patients	ICP Monitoring		Time to ICP Monitoring (hours)			Missing Time to ICP Monitoring	
Cohort	Group	N	N	%	Median[1]	25th Percentile	75th Percentile	N	%[2]
Severe TBI	**All Others**	9,381	1,811	19.3	3.1	1.9	6.6	36	2.0
	Collaborative	224	42	18.8	2.7	2.0	6.8	2	4.8

[1] Median time (in hours) between ED admission and cerebral monitor placement based on the 'Cerebral Monitor Date/Time' TQIP Process Measures fields.
[2] Among patients with Cerebral monitoring

Table 24: Cerebral Monitoring Method

		ICP Monitoring	External Ventricular Drain		Other Pressure Monitoring Device		Intraparenchymal Oxygen Monitor		Jugular Venous Bulb	
Cohort	Group	N	N	%	N	%	N	%	N	%
Severe TBI	**All Others**	1,811	981	54.2	1,014	56.0	83	4.6	21	1.2
	Collaborative	42	18	42.9	31	73.8	11	26.2	0	0.0

Note: Multiple methods are possible for an individual patient

IX. Processes of Care: Severe Traumatic Brain Injury (sTBI)

Table 25: Tracheostomy Management by sTBI Cohort

		Patients	Tracheostomy		Time to Tracheostomy (days)			Tracheostomy within 7 days of Admission[1]	
Cohort	**Group**	**N**	**N**	**%**	**Median**	**25th Percentile**	**75th Percentile**	**N**	**%**
Severe TBI	**All Others**	9,381	1,158	12.3	9.0	6.0	12.0	395	39.2
	Collaborative	224	31	13.8	8.5	6.0	11.0	12	40.0

[1] Among patients who had a tracheostomies with known times to procedure

IX. Processes of Care: Hemorrhagic Shock

Table 26: Hemorrhagic Shock Management

	Patients	Surgery for Hemorrhage Control[1]		Angiography[2]		Neither	
Group	**N**	**N**	**%**	**N**	**%**	**N**	**%**
All Others	4,749	2,337	49.8	786	16.9	1,920	41.5
Collaborative	114	57	50.0	17	15.2	50	44.6

Note: Patients may have both surgery for hemorrhage control and an angiography

[1] Surgery for hemorrhage control within the first 24 hours of ED/hospital arrival
[2] Angiogram within the first 24 hours of ED/hospital arrival

Table 27: Angiography for Hemorrhagic Shock

	Patients	Angiogram[1]		Time to Angiogram (hours)			Missing Time to Angiogram		Angiogram with Abdomen AIS Severity Greater Than 2 or Pelvic Fracture		
Group	**N**	**N**	**%**	**Median**	**25th Percentile**	**75th Percentile**	**N**	**%[2]**	**N**	**Angiogram (N)[1]**	**%**
All Others	4,749	786	16.9	3.0	1.6	5.1	30	3.8	2,481	563	22.7
Collaborative	114	17	15.2	3.4	2.2	6.1	1	5.9	59	12	20.3

[1] Angiogram within the first 24 hours of ED/hospital arrival
[2] Among patients with an angiogram

IX. Processes of Care: Hemorrhagic Shock

Table 28: Embolization for Hemorrhagic Shock

					Embolization Site[1]													
	Patients	Angiogram[1]	Angiogram with Embolization[1]		Liver		Spleen		Kidney		Pelvic[2]		Peripheral Vascular		Aorta		Other	
Group	N	N	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
All Others	4,749	749	432	57.7	68	15.7	68	15.7	27	6.3	215	49.8	38	8.8	14	3.2	42	9.7
Collaborative	114	17	12	70.6	2	16.7	2	16.7	2	16.7	5	41.7	2	16.7	1	8.3	0	0.0

[1] Angiogram within first 24 hours of ED/hospital arrival
[2] Includes Pelvic (illac, gluteal, obturator) and Retroperitoneum (lumbar, sacral)

Table 29: Surgery for Hemorrhage Control in Hemorrhagic Shock Patients

	Patients	Surgery for Hemorrhage Control[1]		Time to Surgery for Hemorrhage Control (hours)			Missing Time to Surgery for Hemorrhage Control	
Group	N	N	%	Median	25th Percentile	75th Percentile	N	%[2]
All Others	4,749	2,337	49.8	0.9	0.6	1.9	30	1.3
Collaborative	114	57	50.0	0.8	0.6	1.3	0	0.0

[1] Surgery for hemorrhage control within the first 24 hours of ED/hospital arrival

IX. Processes of Care: Hemorrhagic Shock

Table 30: Surgery for Hemorrhage Control Type in Hemorrhagic Shock Patients

			Surgery for Hemorrhage Control Type[2]													
	Patients	Surgery for Hemorrhage Control[1]	Laparotomy		Thoracotomy		Sternotomy		Extremity (Peripheral Vascular)		Neck		Mangled Extremity/ Traumatic Amputation		Other Skin/ Soft Tissue[3]	
Group	N	N	N	%	N	%	N	%	N	%	N	%	N	%	N	%
All Others	4,749	2,337	1,499	64.1	307	13.1	57	2.4	295	12.6	59	2.5	113	4.8	7	0.3
Collaborative	114	57	41	71.9	7	12.3	1	1.8	7	12.3	0	0.0	1	1.8	0	0.0

[1] Surgery for hemorrhage control within the first 24 hours of ED/hospital arrival
[2] Among patients with surgery for hemorrhage control within first 24 hours of ED/hospital arrival
[3] Surgery for this hemorrhage control type was collected starting with 2016 admissions only

IX. Processes of Care: Withdrawal of Life Supporting Treatment

Table 31: Withdrawal of Life Supporting Treatment among Deaths by Cohort

		Patients	Deaths		Withdrawal of Life Supporting Treatment[1]		Time to Withdrawal of Life Supporting Treatment[1] (days)			Missing Time to Withdrawal of Life Supporting Treatment[2]	
Cohort	Group	N	N	%	N	%	Median	25th Percentile	75th Percentile	N	%
All Patients	**All Others**	261,399	17,468	6.7	6,803	38.9	4.0	1.0	9.0	443	6.4
	Collaborative	7,639	482	6.3	233	48.3	3.5	1.0	9.0	25	10.3
Blunt Multisystem	**All Others**	45,981	5,975	13.0	2,363	39.5	4.0	2.0	10.0	152	6.4
	Collaborative	1,275	159	12.5	78	49.1	5.0	1.0	13.0	10	12.2
Penetrating	**All Others**	13,584	1,150	8.5	154	13.4	3.0	1.0	7.0	5	3.2
	Collaborative	338	39	11.5	4	10.3	2.0	1.0	6.0	1	25.0
Shock	**All Others**	10,315	2,772	26.9	830	29.9	2.0	1.0	7.0	51	6.1
	Collaborative	239	65	27.2	25	38.5	3.5	1.0	11.5	5	20.0
Severe TBI	**All Others**	9,381	4,278	45.6	1,980	46.3	2.0	1.0	5.0	126	6.3
	Collaborative	224	116	51.8	74	63.8	2.0	1.0	5.0	3	4.1
Elderly	**All Others**	86,124	8,548	9.9	3,958	46.3	4.0	1.0	8.0	260	6.4
	Collaborative	3,020	249	8.2	144	57.8	3.0	1.0	8.0	20	13.1
Elderly Blunt Multisystem	**All Others**	10,471	2,123	20.3	1,032	48.6	4.0	2.0	10.0	67	6.4
	Collaborative	364	67	18.4	39	58.2	5.0	2.0	13.5	6	14.3
Isolated Hip Fracture	**All Others**	23,130	776	3.4	208	26.8	5.0	3.0	9.0	24	10.8
	Collaborative	258	6	2.3	2	33.3	2.0	2.0	2.0	1	50.0

[1] Among patients who died
[2] Among patients with withdrawal of life-supporting treatment