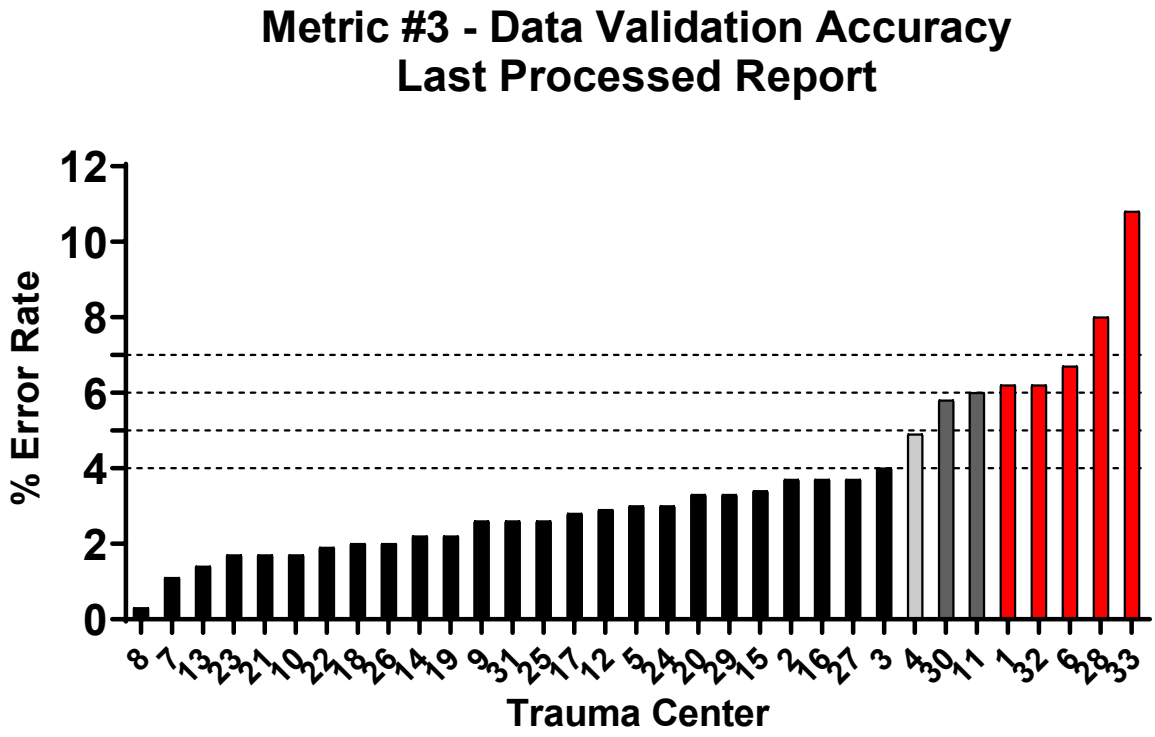
M·TQIP

Individual Site Summary Report

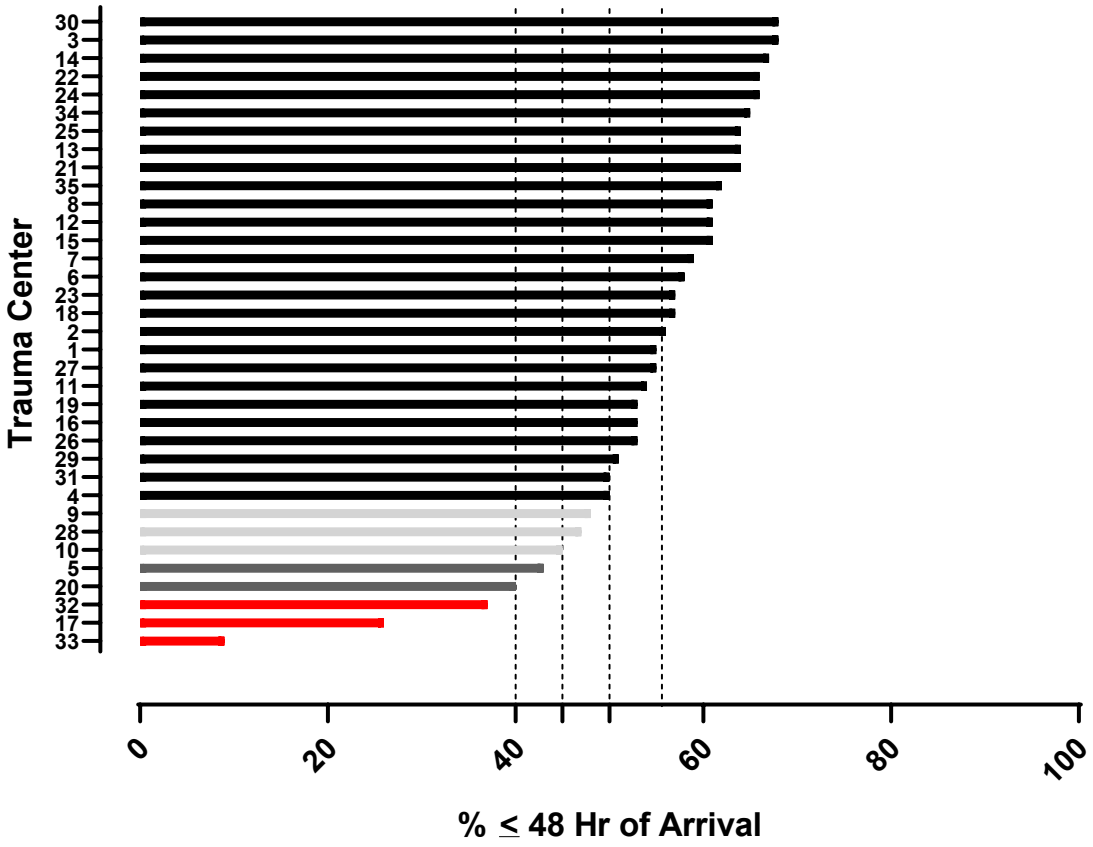
November 1, 2017 through January 31, 2020

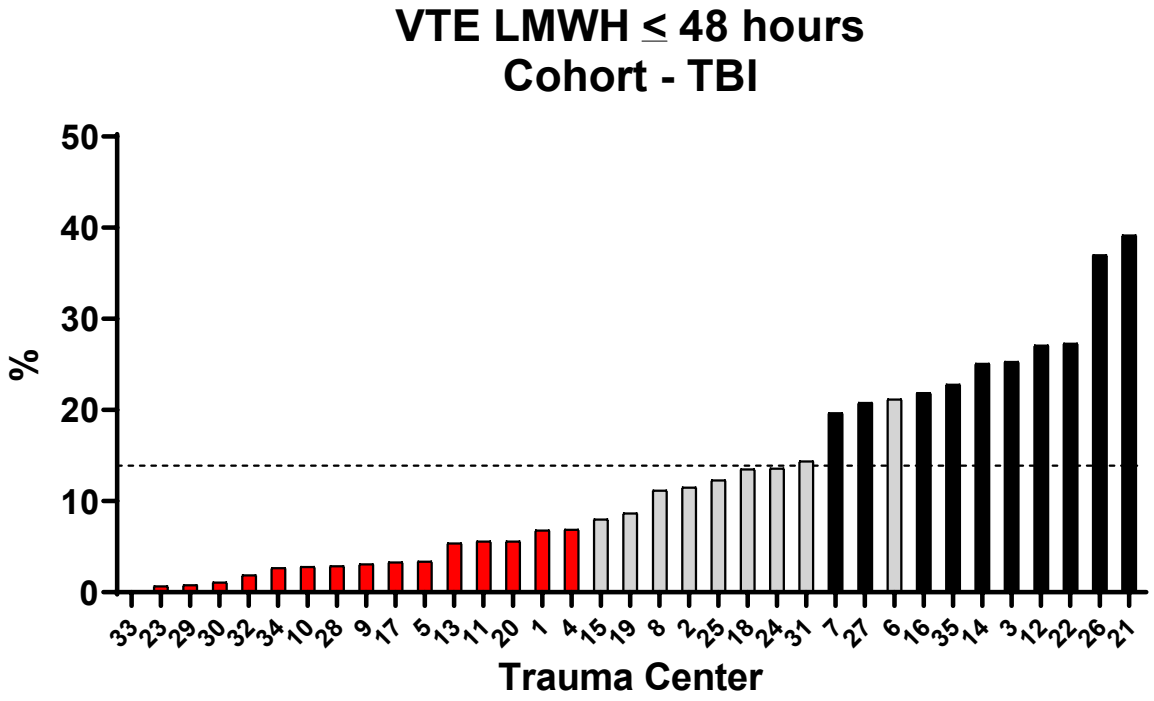
Issue May 13, 2020

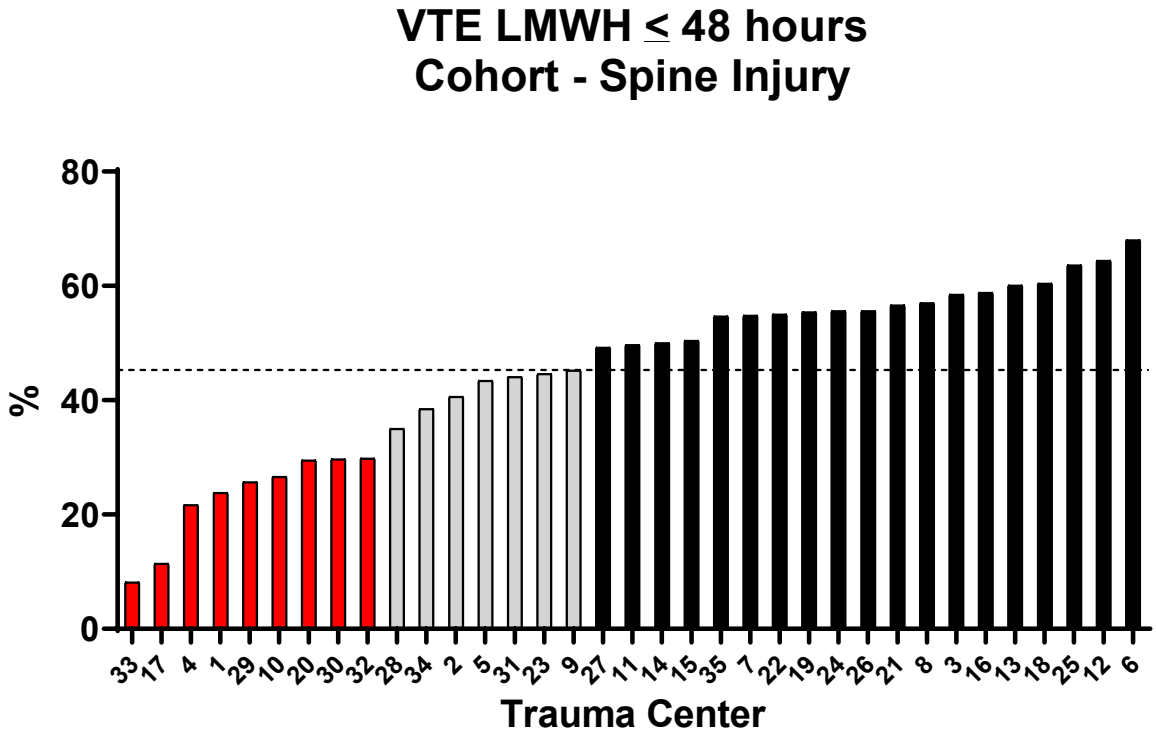
Contents


Metric #3 - Data Validation Accuracy
Last Processed Report
% Error Rate
0
2
4
6
8
10
12
8 7 13 23 21 10 22 18 26 14 19 9 31 25 17 12 5 24 20 29 15 2 16 27 3 4 30 11 1 32 6 28 33
Trauma Center

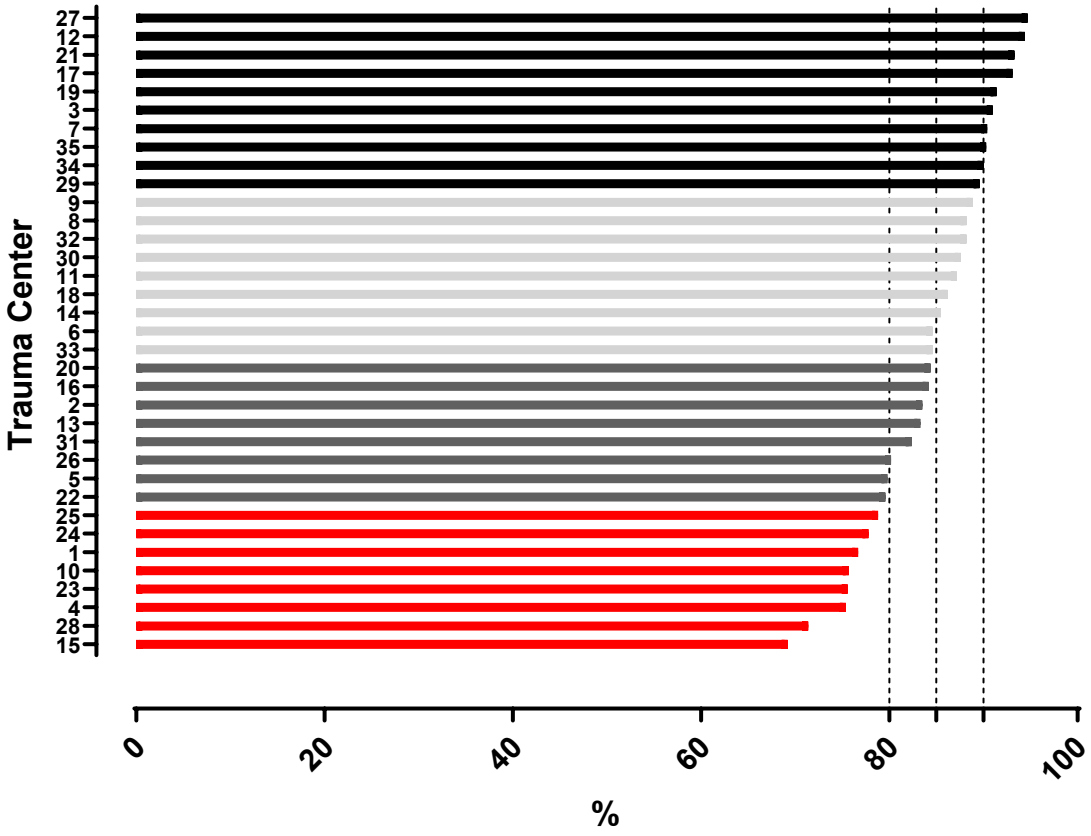
Metric #4 - VTE Prophylaxis LMWH Timeliness
Cohort 2 - Admit to Trauma
1/1/19 - 1/31/20



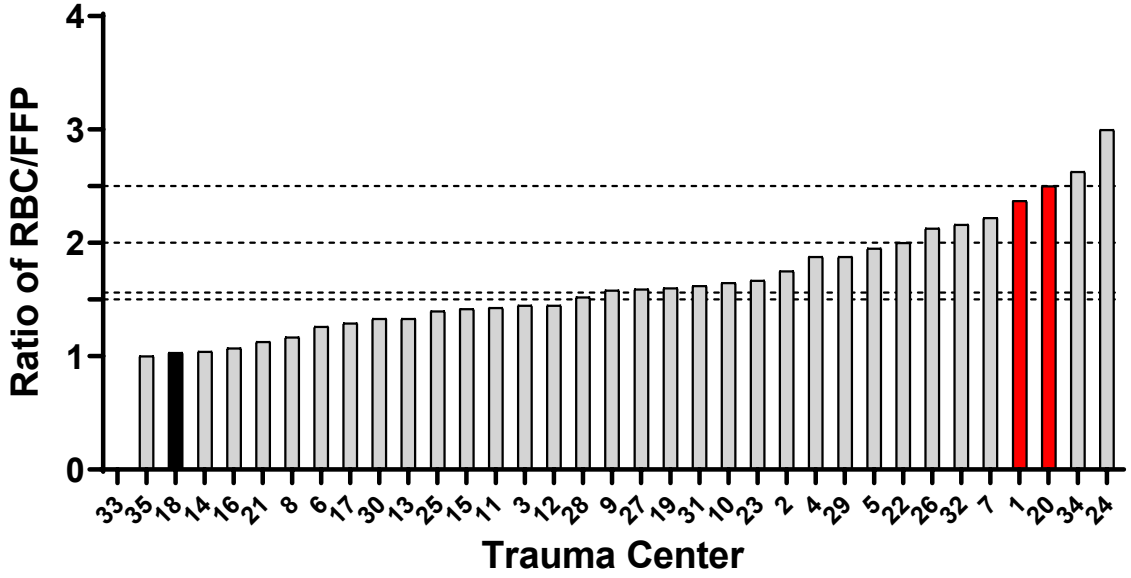

VTE LMWH ≤ 48 hours
Cohort - TBI
%
50
40
30
20
10
0
33 23 29 30 32 34 10 28 9 17 5 13 11 20 1 4 15 19 8 2 25 18 24 31 7 27 6 16 35 14 3 12 22 26 21
Trauma Center


VTE LMWH ≤ 48 hours
Cohort - Spine Injury
%
80
60
40
20
0
33 17 4 1 29 10 20 30 32 28 34 2 5 31 23 9 27 11 14 15 35 7 22 19 24 26 21 8 3 16 13 18 25 12 6
Trauma Center

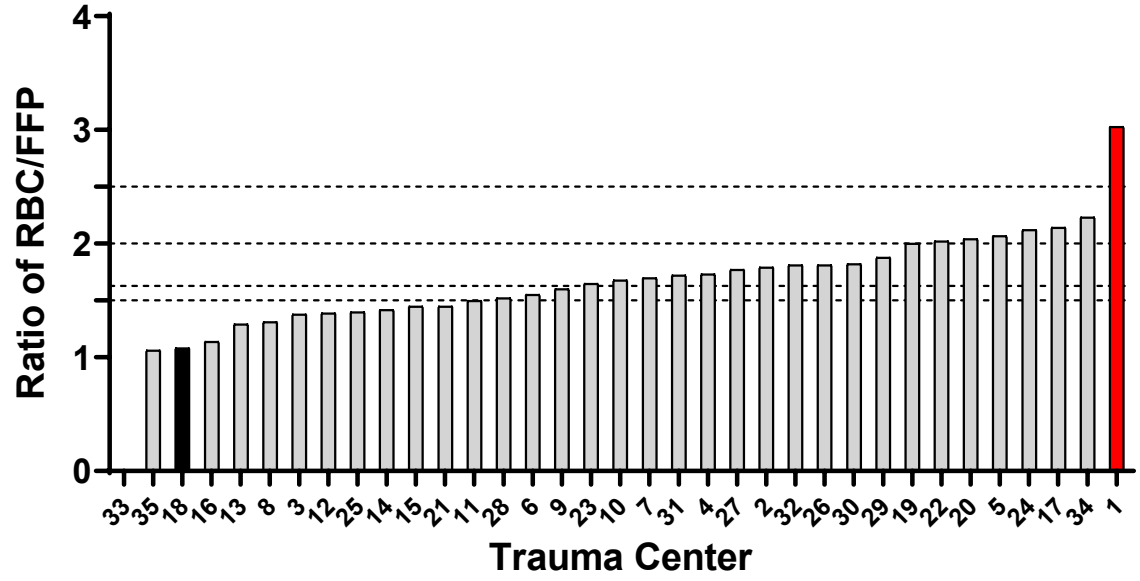
Metric #5 - Timely Surgical Hip Repair ≥ 65 years
Cohort 8 - Isolated Hip Fracture
7/1/19 - 1/31/20



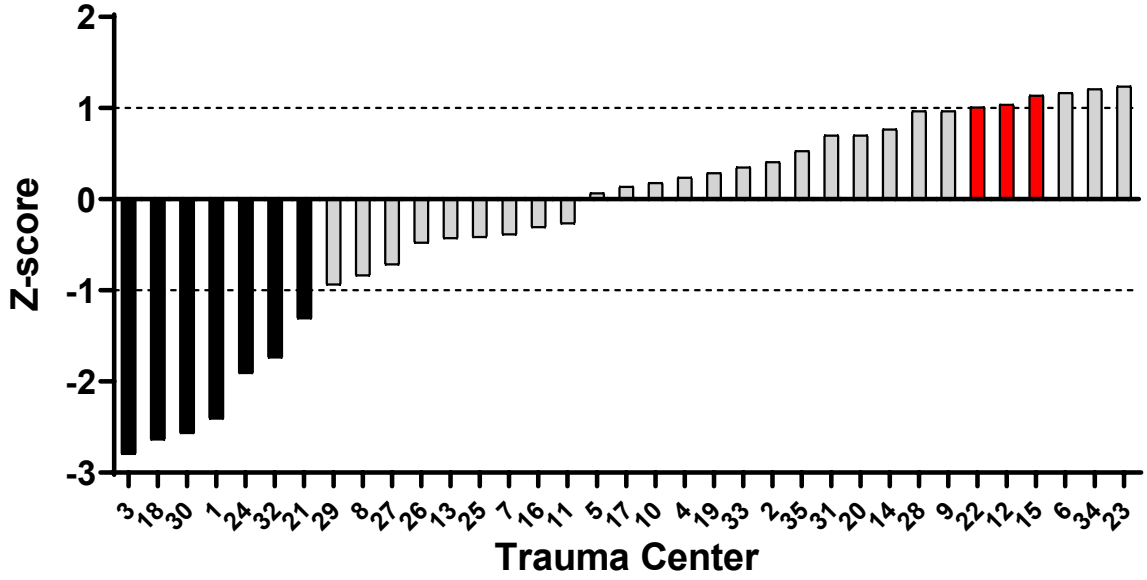
Metric #6 - RBC to FFP Ratio - Mean
Cohort 1 - MTQIP All
1/1/19 - 1/31/20



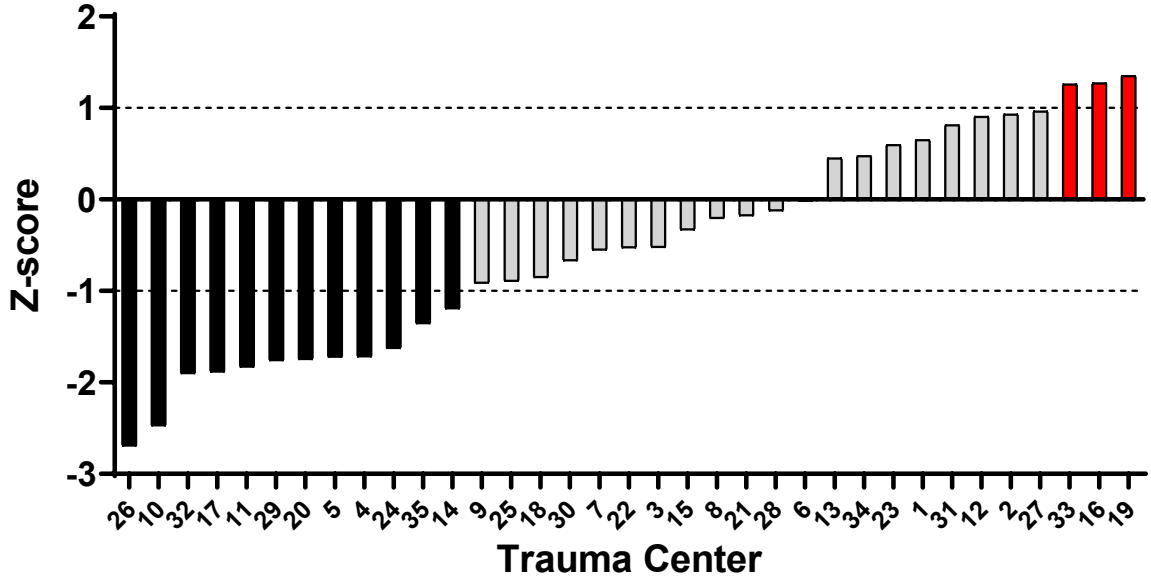
RBC to FFP Ratio - Mean
Cohort 1 - MTQIP All
11/1/17 - 1/31/20



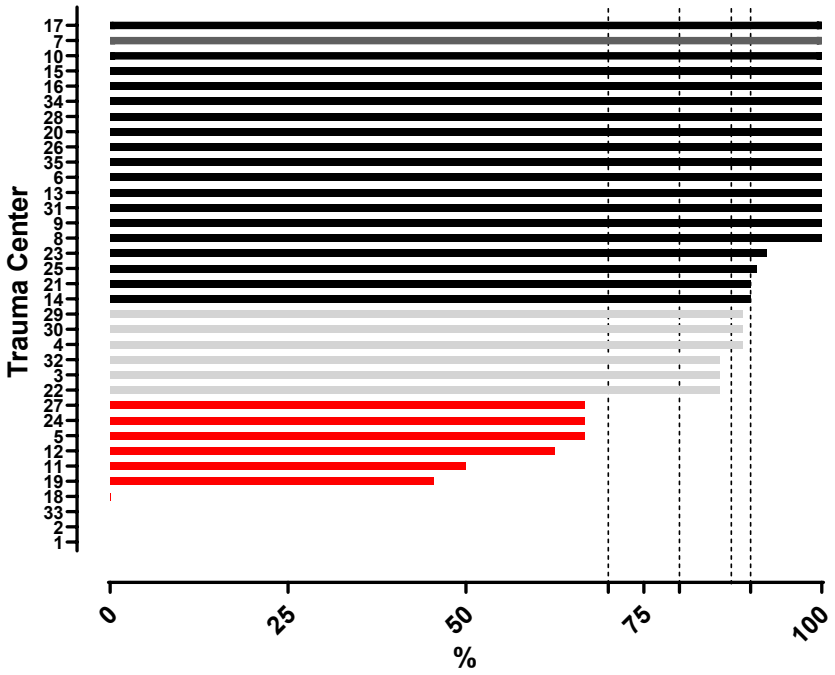
Metric #7 - Z-score - Serious Complication Rate
Cohort 2 - Admit to Trauma
7/1/17 - 1/31/20



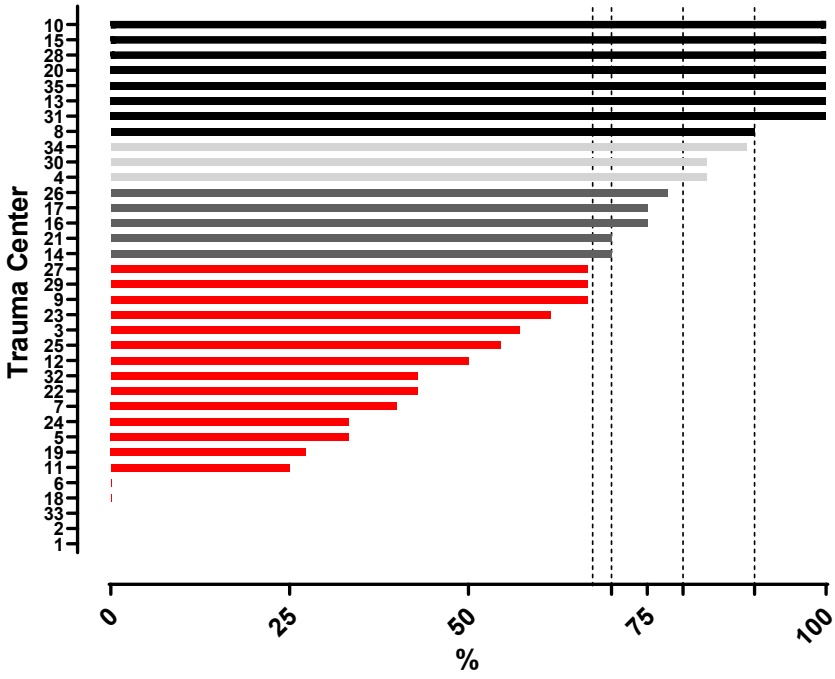
Metric #8 - Z-score - Mortality Rate
Cohort 2 - Admit to Trauma
7/1/17 - 1/31/20



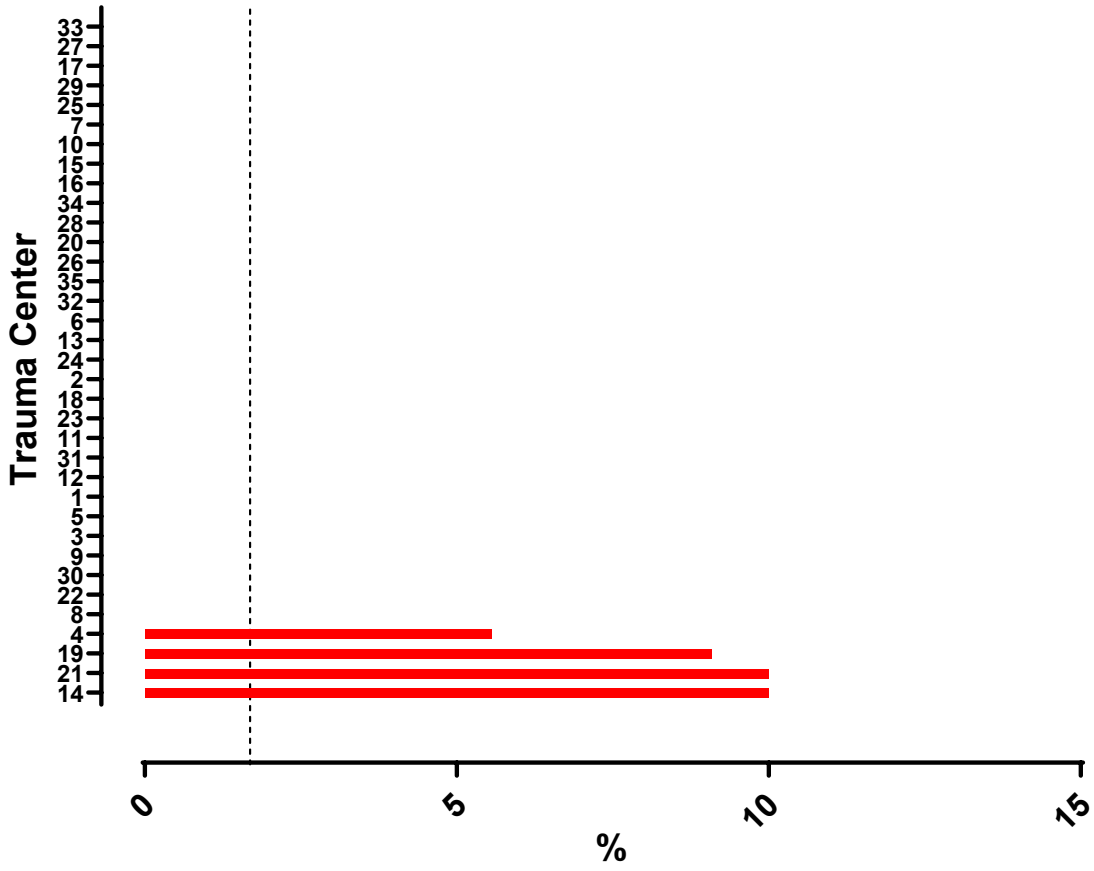
Metric #9 - ED Head CT ≤ 120 min
Cohort 1 - MTQIP All, TBI on Anticoagulant (Excluding ASA)
7/1/19 - 1/31/20



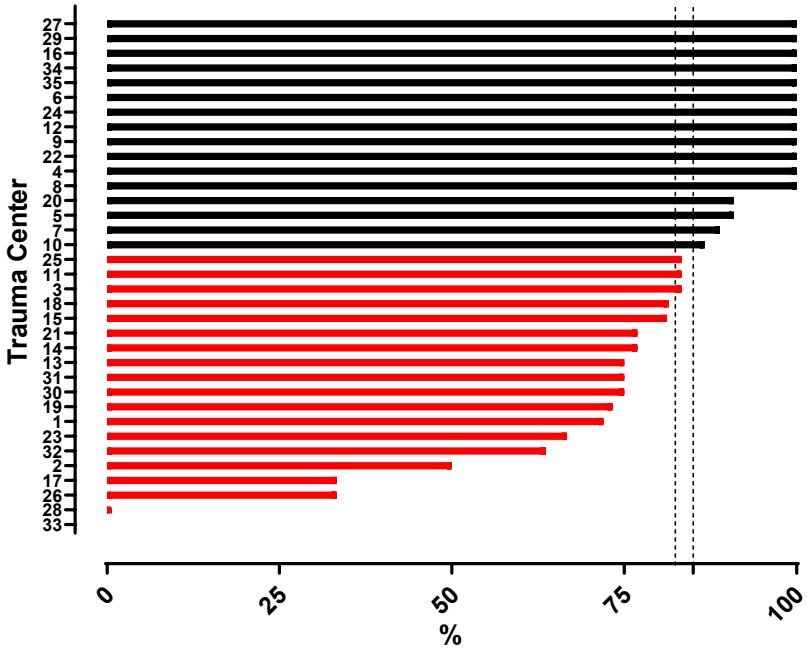
ED Head CT ≤ 60 min
Cohort 1 - MTQIP All, TBI on Anticoagulant (Excluding ASA)
7/1/19 - 1/31/20



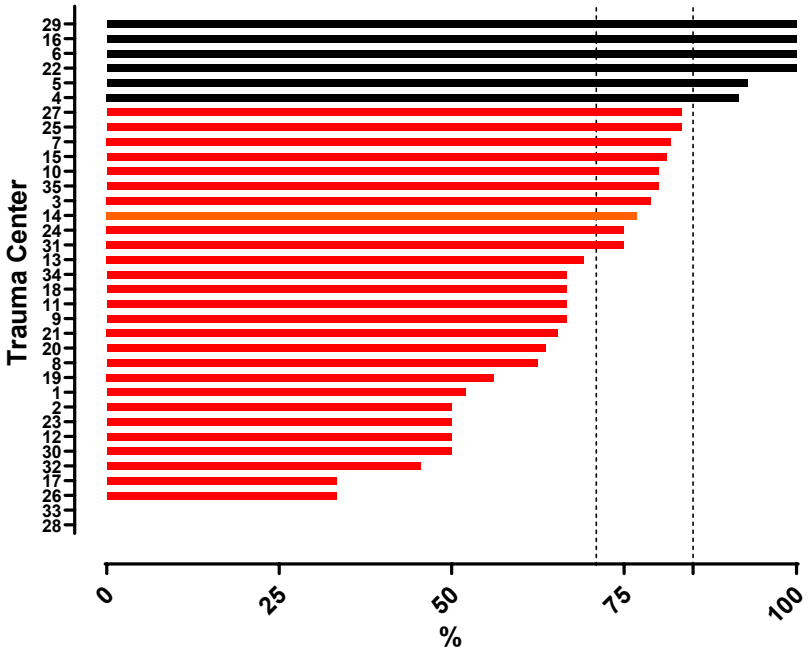
ED Head CT Missing - Code, Date or Time
Cohort 1 - MTQIP All, TBI on Anticoagulant (Excluding ASA)
7/1/19 - 1/31/20



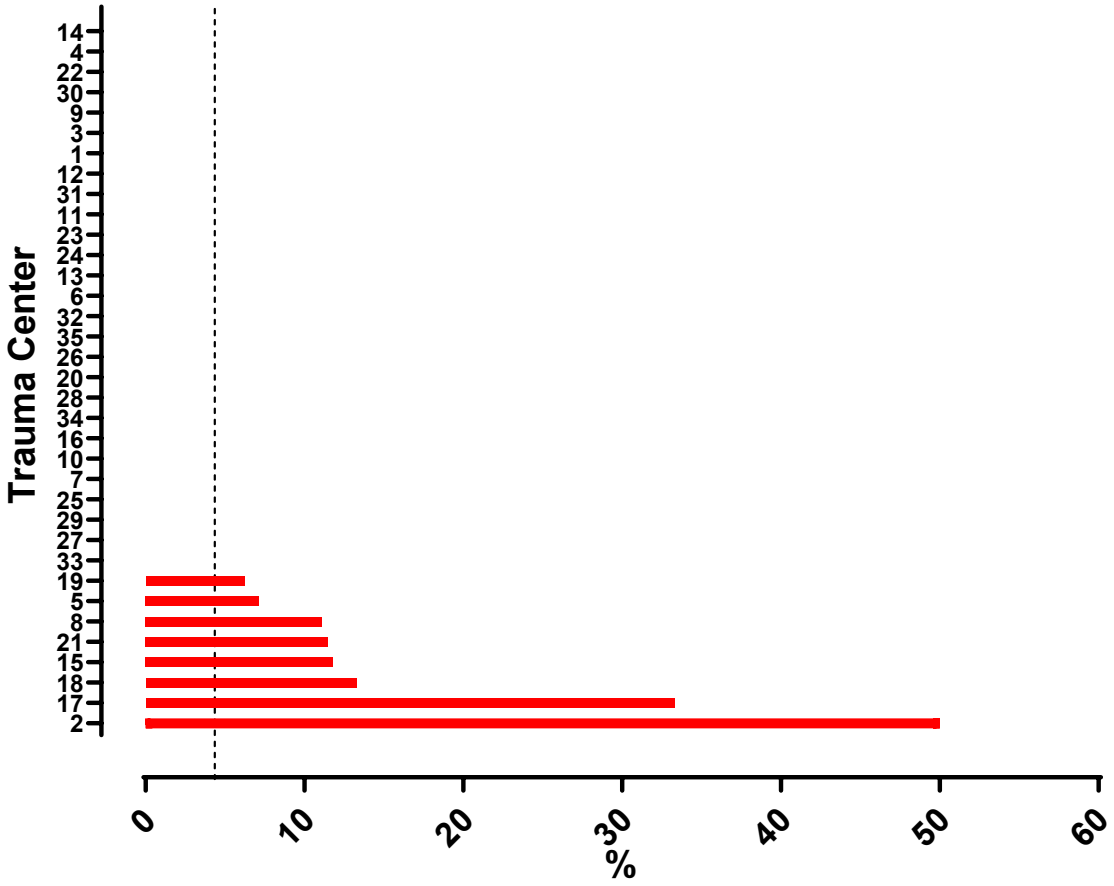
Metric #10 - Open Fracture - Time to Abx ≤ 120 min
Cohort 1 - MTQIP All
7/1/19 - 1/31/20



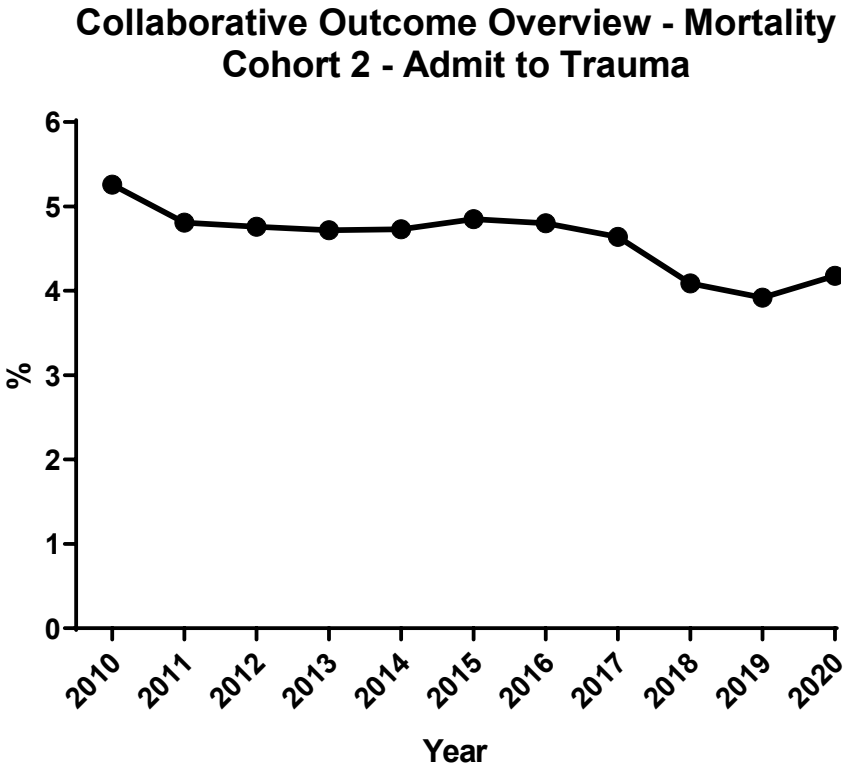
Open Fracture - Time to Abx ≤ 60 min
Cohort 1 - MTQIP All
7/1/19 - 1/31/20

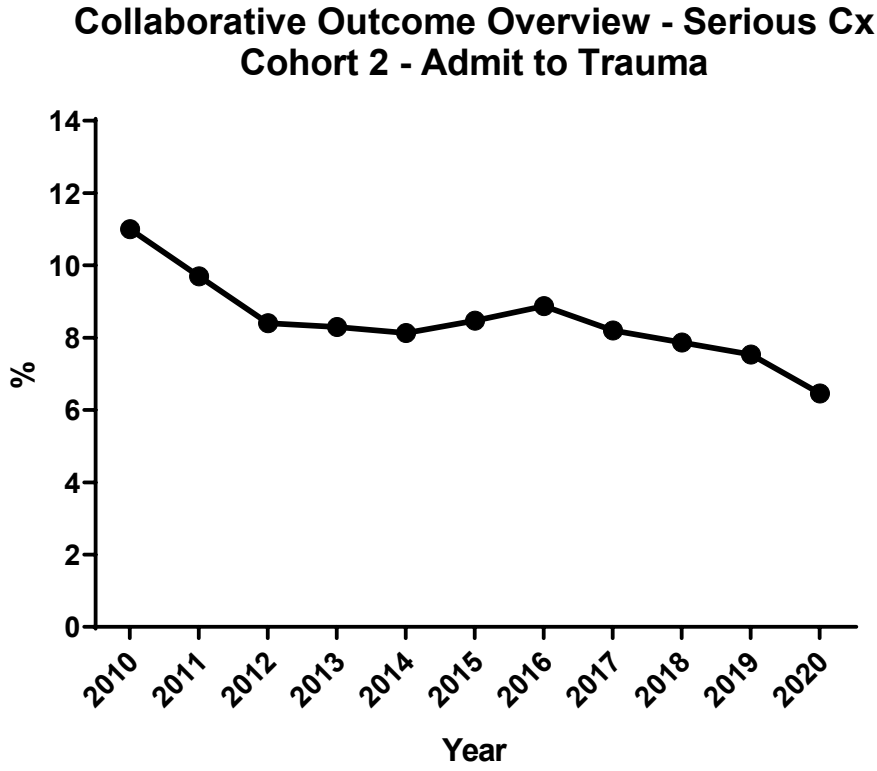


Open Fracture - Missing Type, Date or Time
Cohort 1 - MTQIP All
7/1/19 - 1/31/20

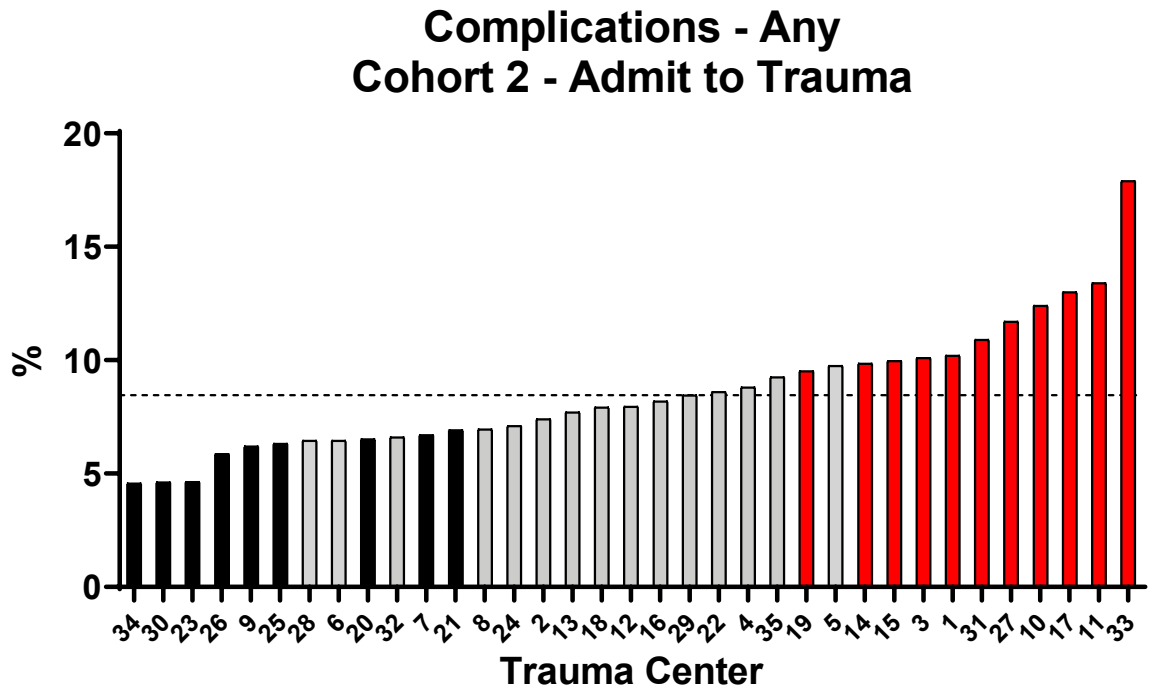


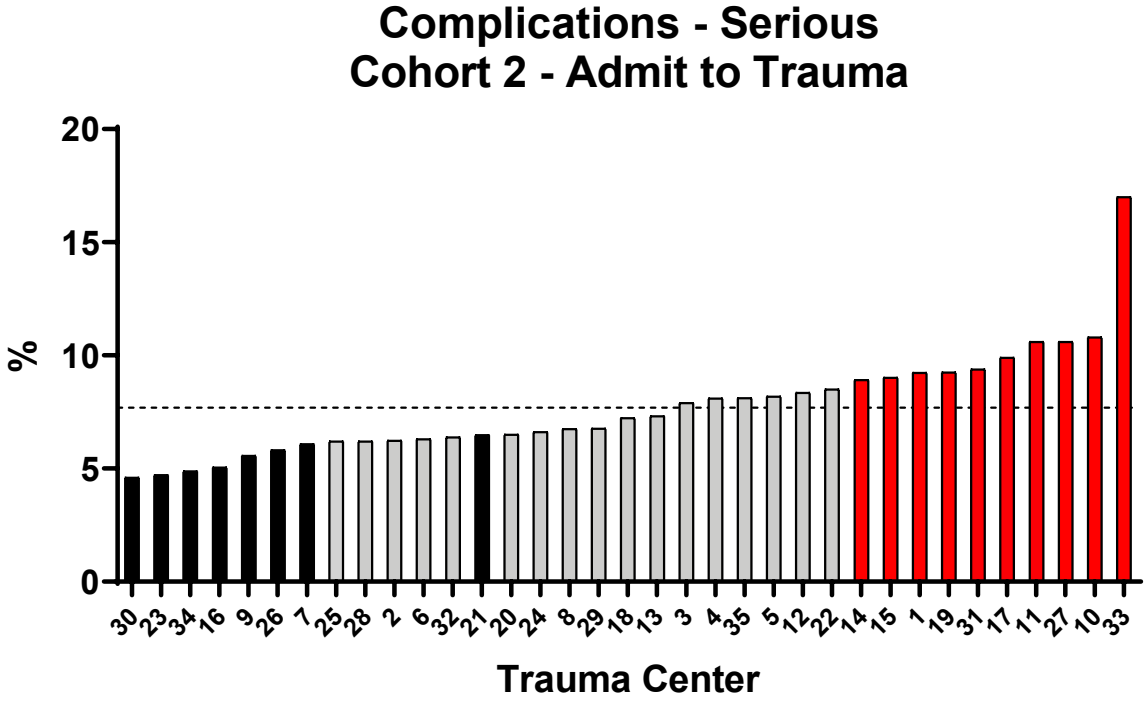
Trends

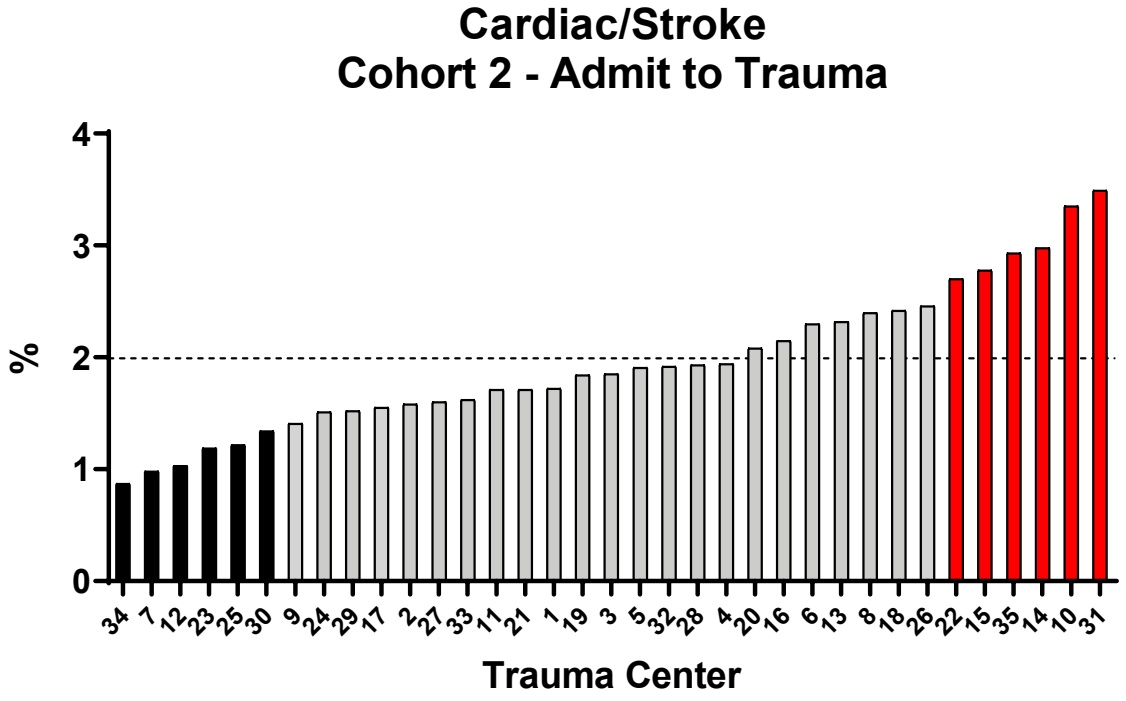

Collaborative Outcome Overview - Mortality
Cohort 2 - Admit to Trauma
%
0
1
2
3
4
5
6
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

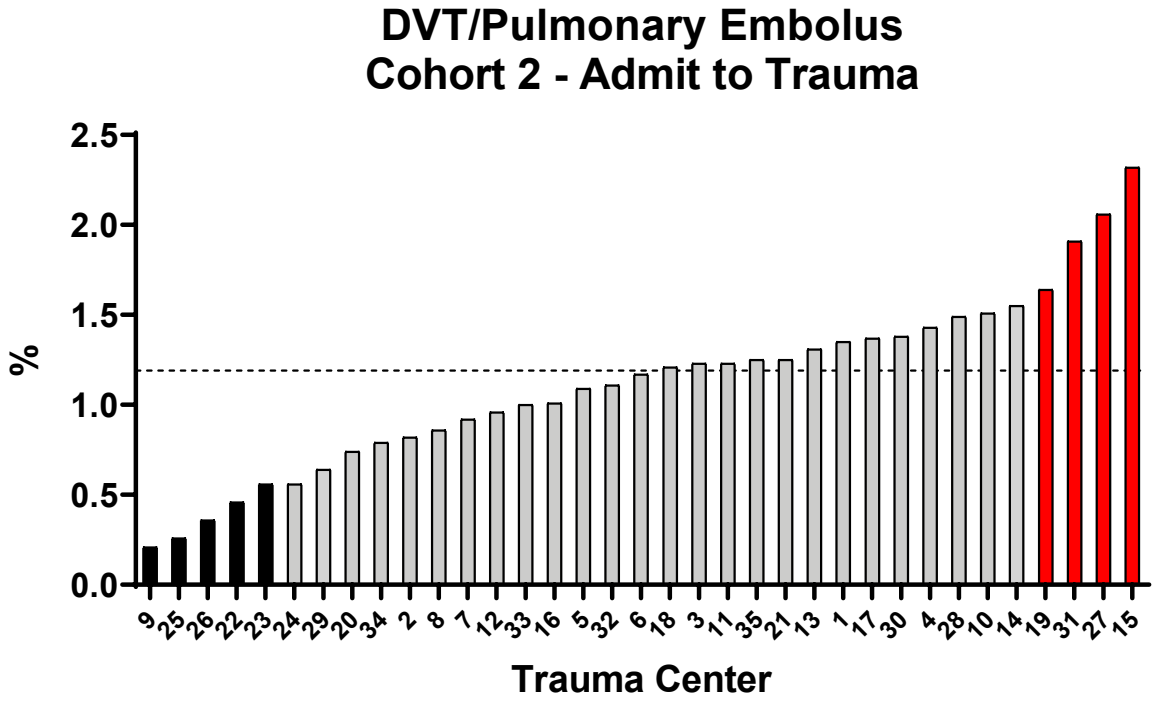

Collaborative Outcome Overview - Serious Cx
Cohort 2 - Admit to Trauma
%
0
2
4
6
8
10
12
14
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

Outcomes

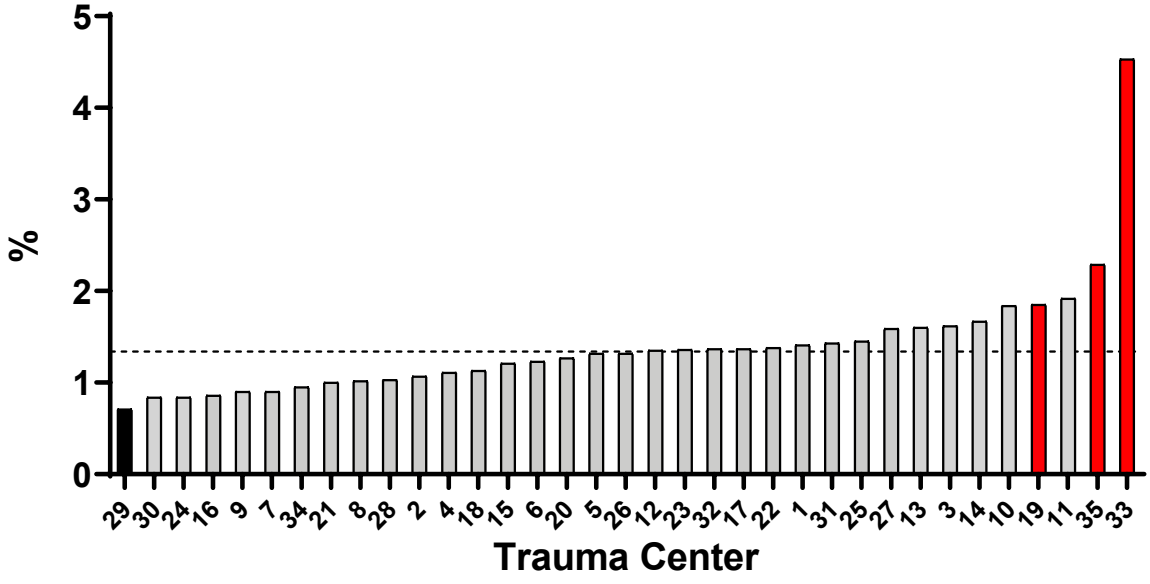

Complications - Any
Cohort 2 - Admit to Trauma
20
15
10
5
0
%
34 30 23 26 9 25 28 6 20 32 7 21 8 24 2 13 18 12 16 29 22 4 35 19 5 14 15 3 1 31 27 10 17 11 33
Trauma Center


Complications - Serious
Cohort 2 - Admit to Trauma
20
15
10
5
0
%
30 23 34 16 9 26 7 25 28 2 6 32 21 20 24 8 29 18 13 3 4 35 5 12 22 14 15 1 19 31 17 11 27 10 33
Trauma Center

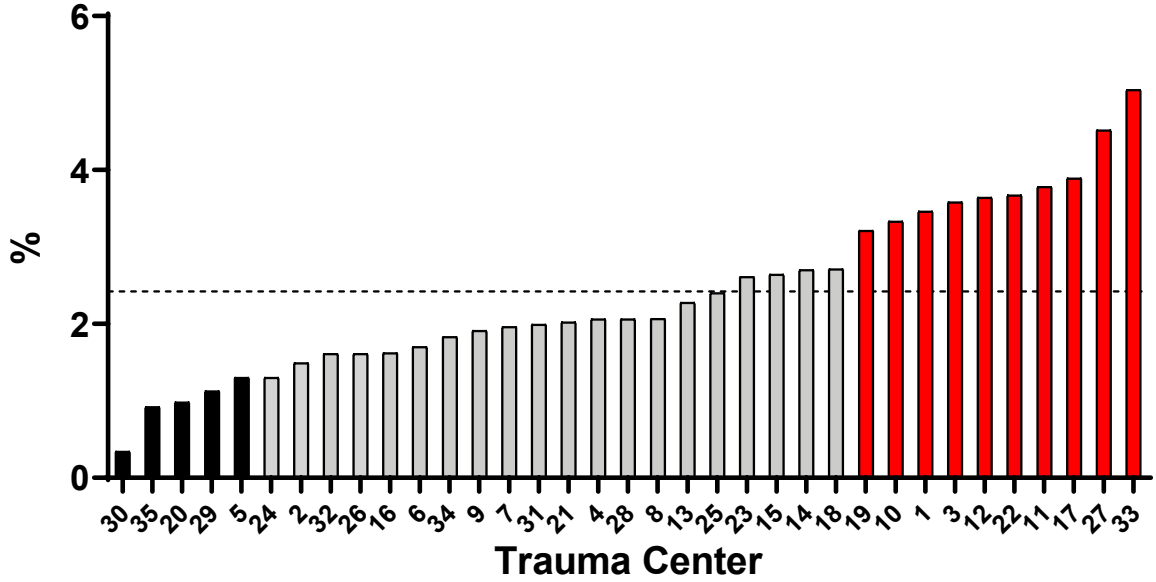

Cardiac/Stroke
Cohort 2 - Admit to Trauma
%
0
1
2
3
4
34 7 12 23 25 30 9 24 29 17 2 27 33 11 21 1 19 3 5 32 28 4 20 16 6 13 8 18 26 22 15 35 14 10 31
Trauma Center


DVT/Pulmonary Embolus
Cohort 2 - Admit to Trauma
%
0.0
0.5
1.0
1.5
2.0
2.5
9 25 26 22 23 24 29 20 34 2 8 7 12 33 16 5 32 6 18 3 11 35 21 13 1 17 30 4 28 10 14 19 31 27 15
Trauma Center

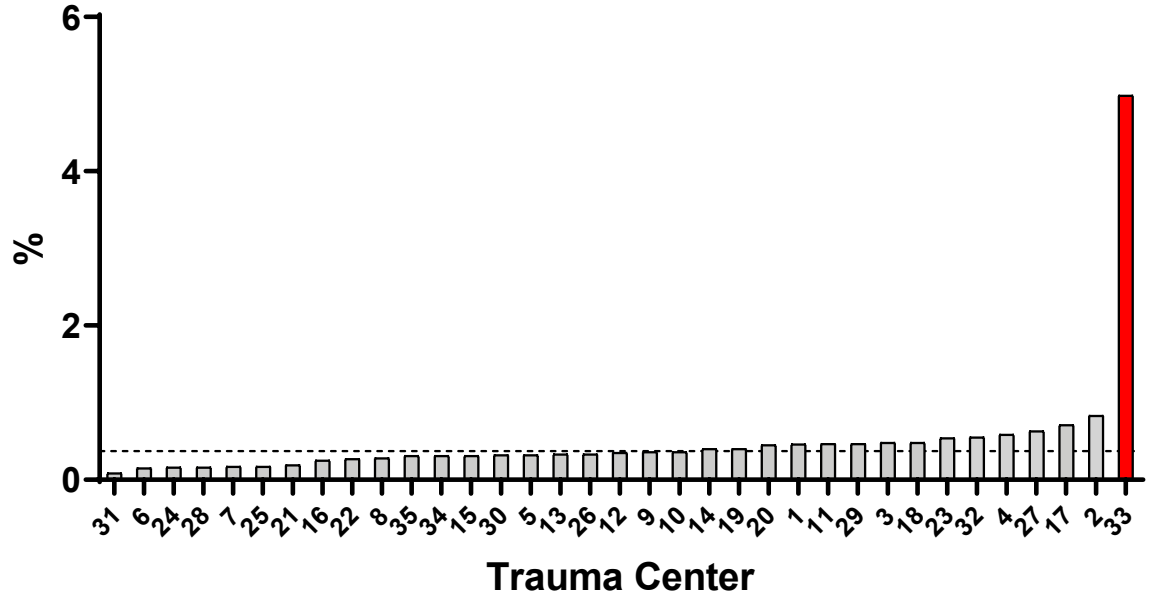
Unplanned Intubation
Cohort 2 - Admit to Trauma



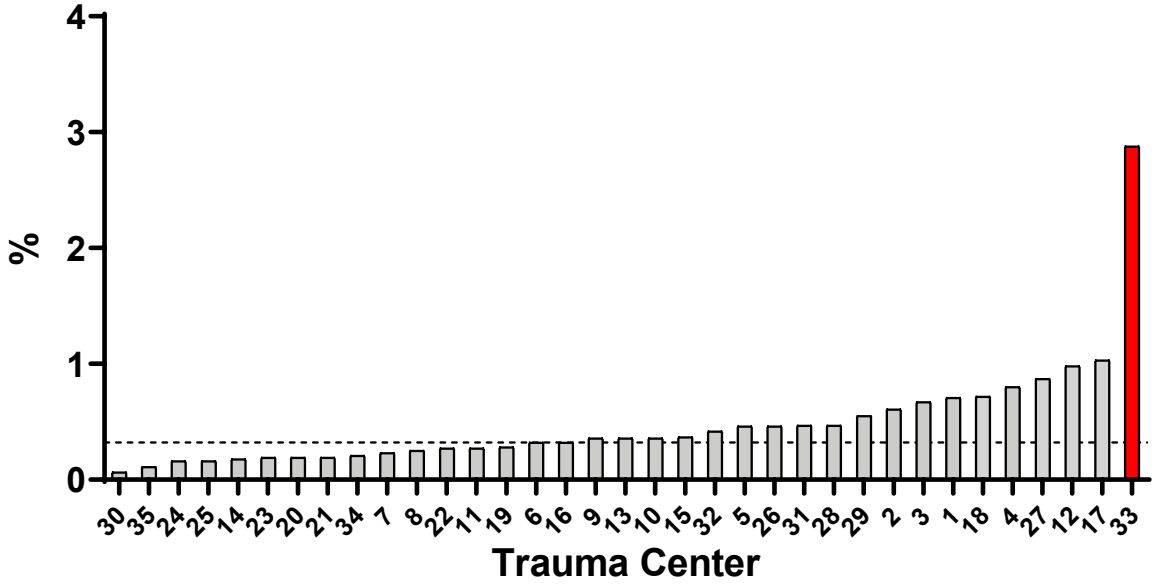
Pneumonia
Cohort 2 - Admit to Trauma



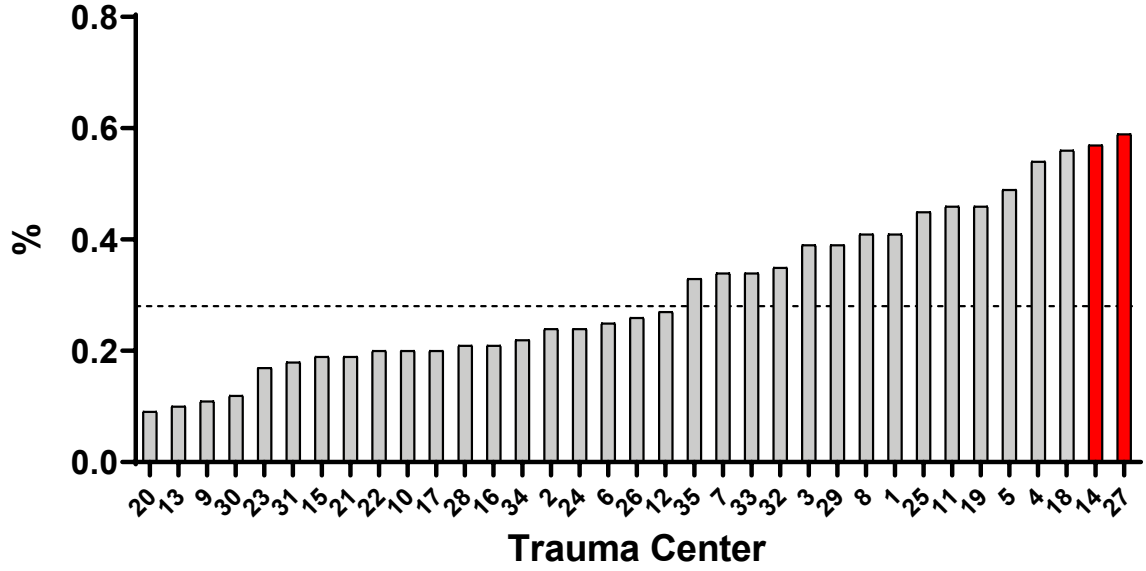
Acute Kidney Injury
Cohort 2 - Admit to Trauma



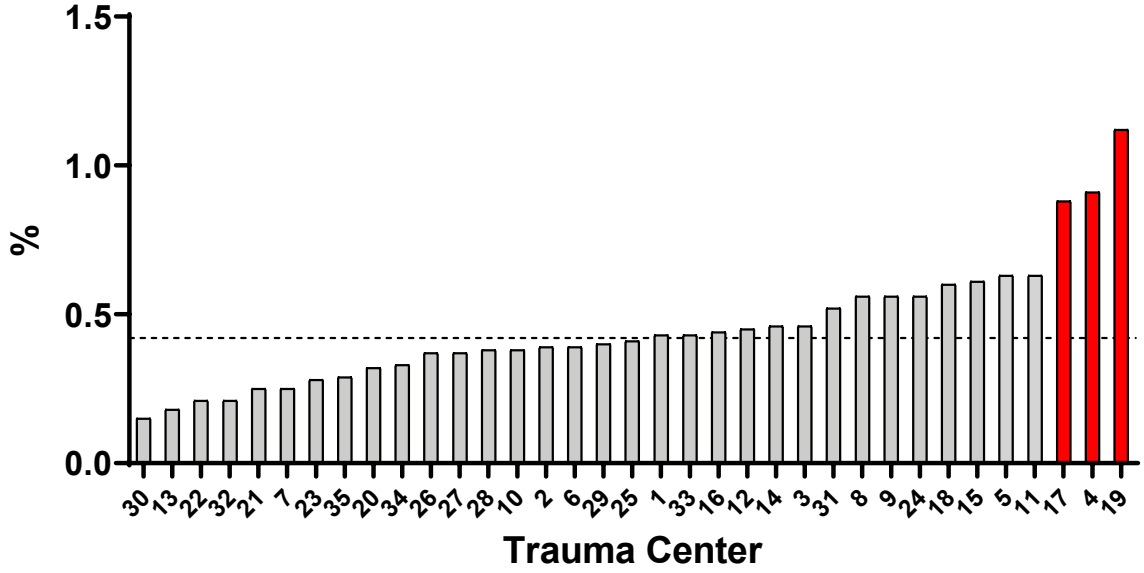
CAUTI
Cohort 2 - Admit to Trauma

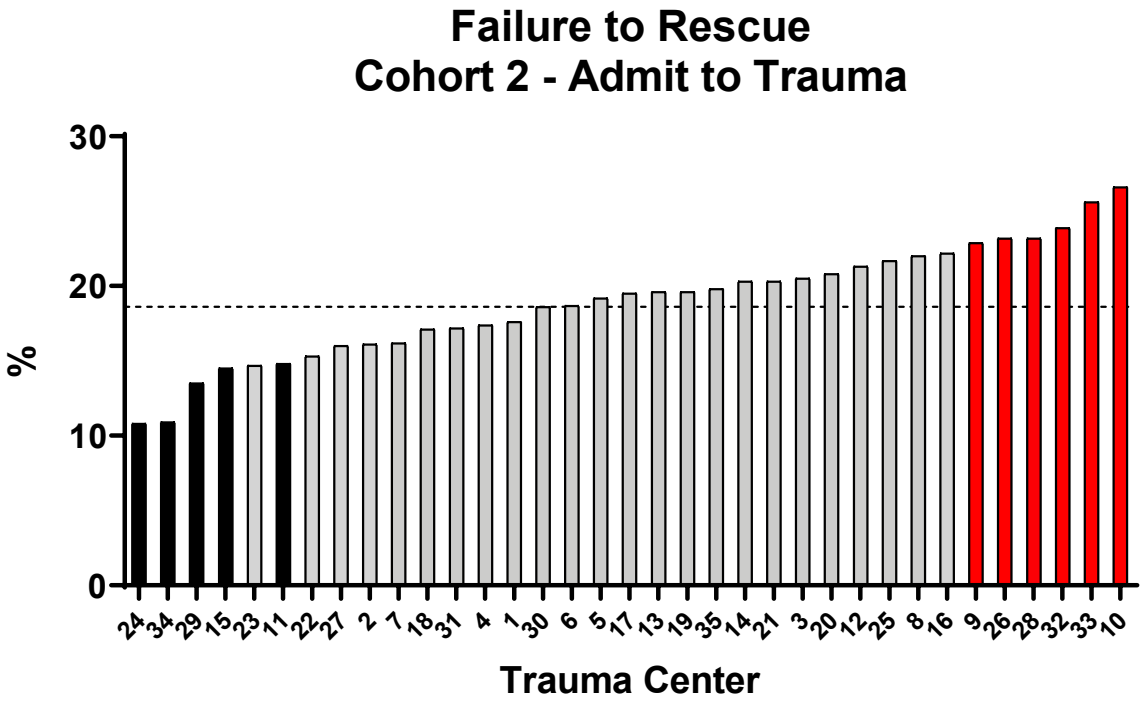


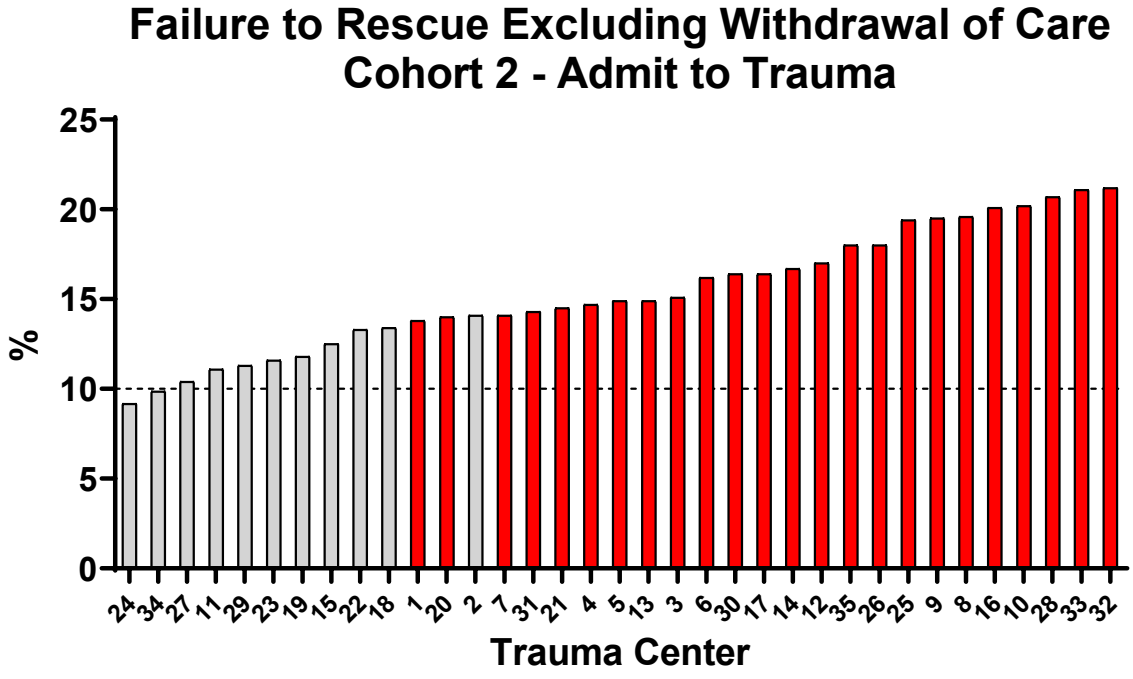
C. Difficile Colitis
Cohort 2 - Admit to Trauma

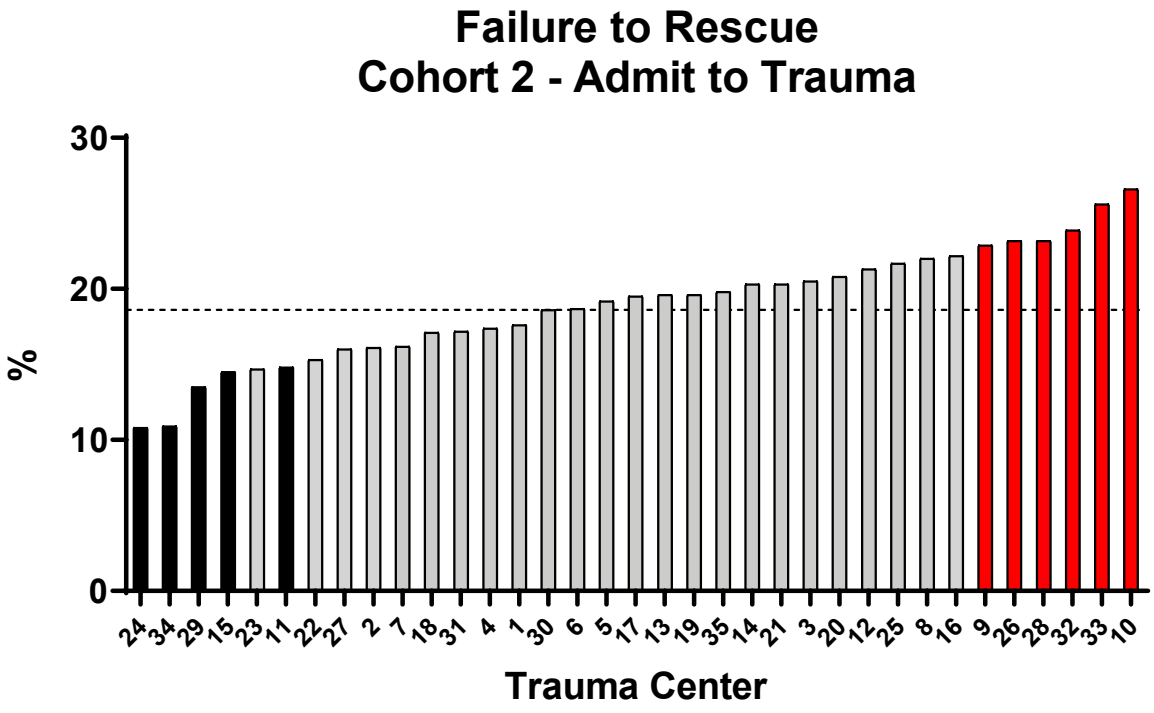


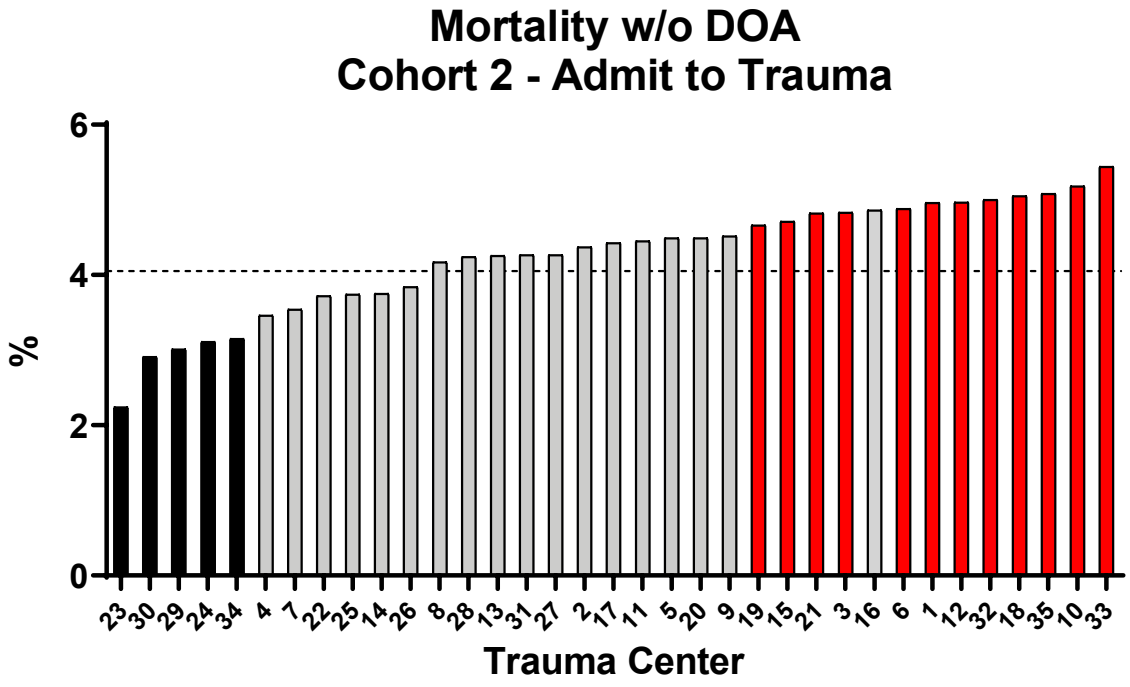
Sepsis
Cohort 2 - Admit to Trauma



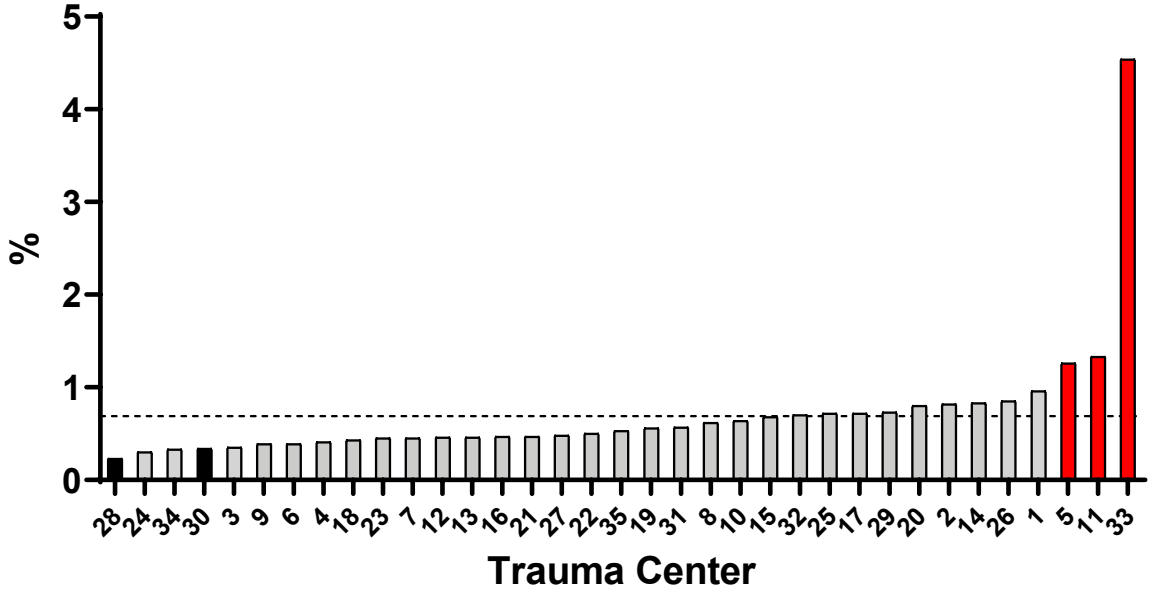

Failure to Rescue
Cohort 2 - Admit to Trauma
30
20
10
0
%
24 34 29 15 23 11 22 27 2 7 18 31 4 1 30 6 5 17 13 19 35 14 21 3 20 12 25 8 16 9 26 28 32 33 10
Trauma Center


Failure to Rescue Excluding Withdrawal of Care
Cohort 2 - Admit to Trauma
25
20
15
10
5
0
%
24 34 27 11 29 23 19 15 22 18 1 20 2 7 31 21 4 5 13 3 6 30 17 14 12 35 26 25 9 8 16 10 28 33 32
Trauma Center

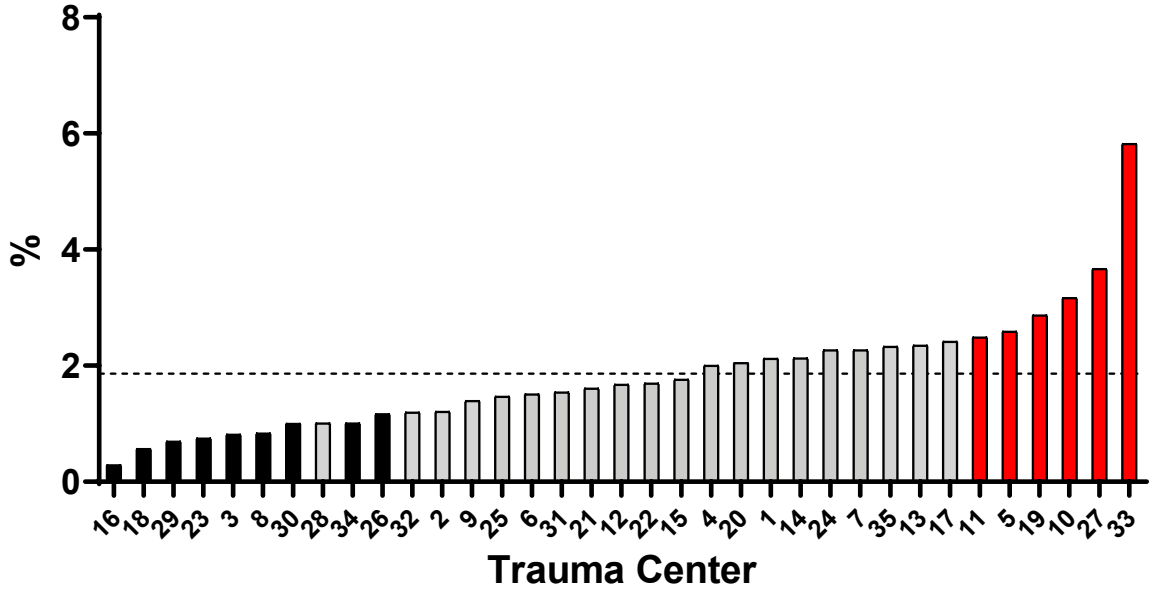

Failure to Rescue
Cohort 2 - Admit to Trauma
30
20
10
0
%
24 34 29 15 23 11 22 27 2 7 18 31 4 1 30 6 5 17 13 19 35 14 21 3 20 12 25 8 16 9 26 28 32 33 10
Trauma Center


Mortality w/o DOA
Cohort 2 - Admit to Trauma
6
4
2
0
%
23 30 29 24 34 4 7 22 25 14 26 8 28 13 31 27 2 17 11 5 20 9 19 15 21 3 16 6 1 12 32 18 35 10 33
Trauma Center

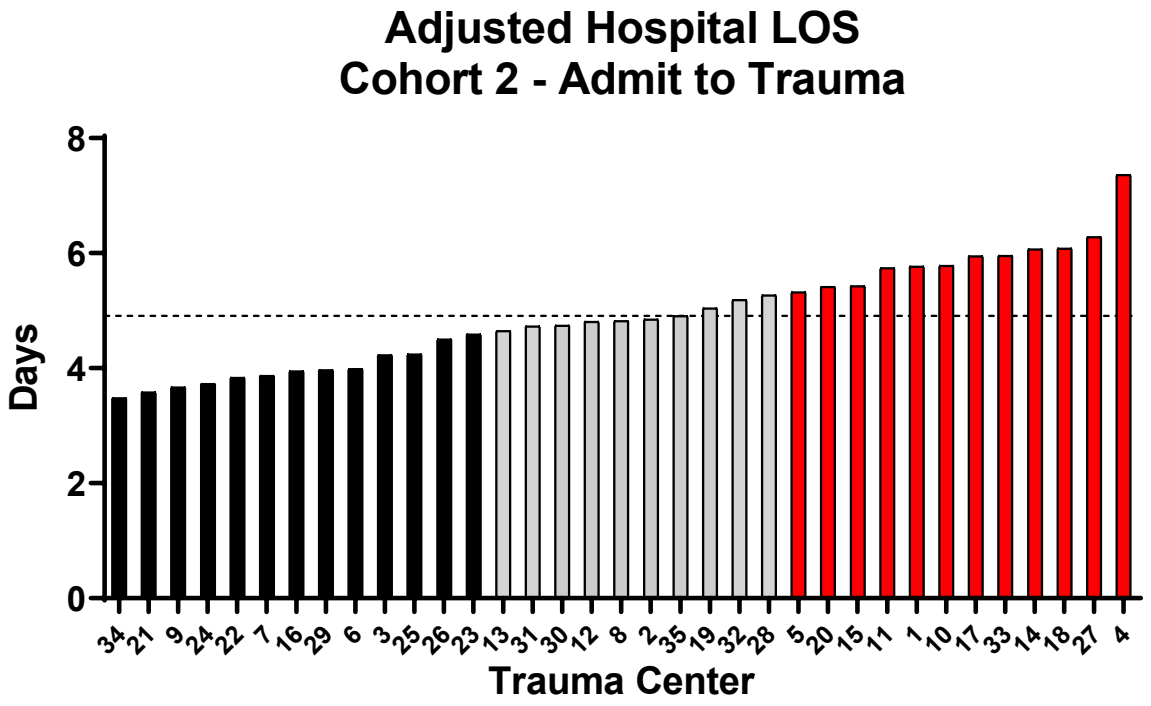
Unplanned Return to OR
Cohort 2 - Admit to Trauma

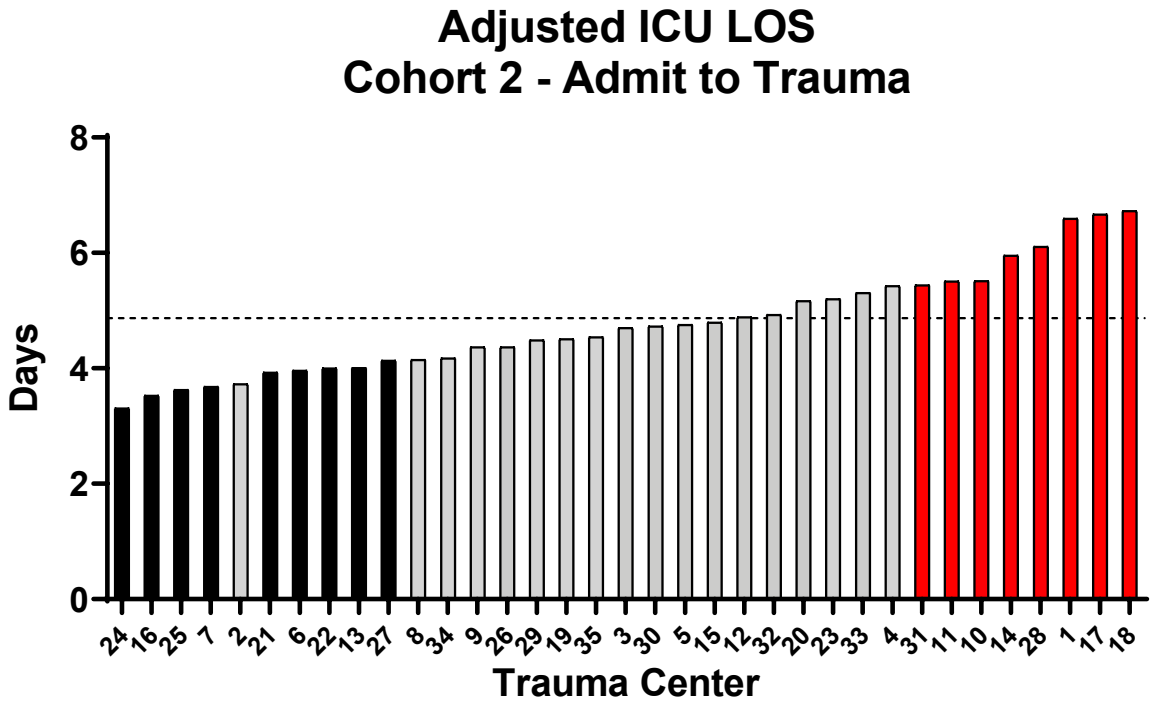


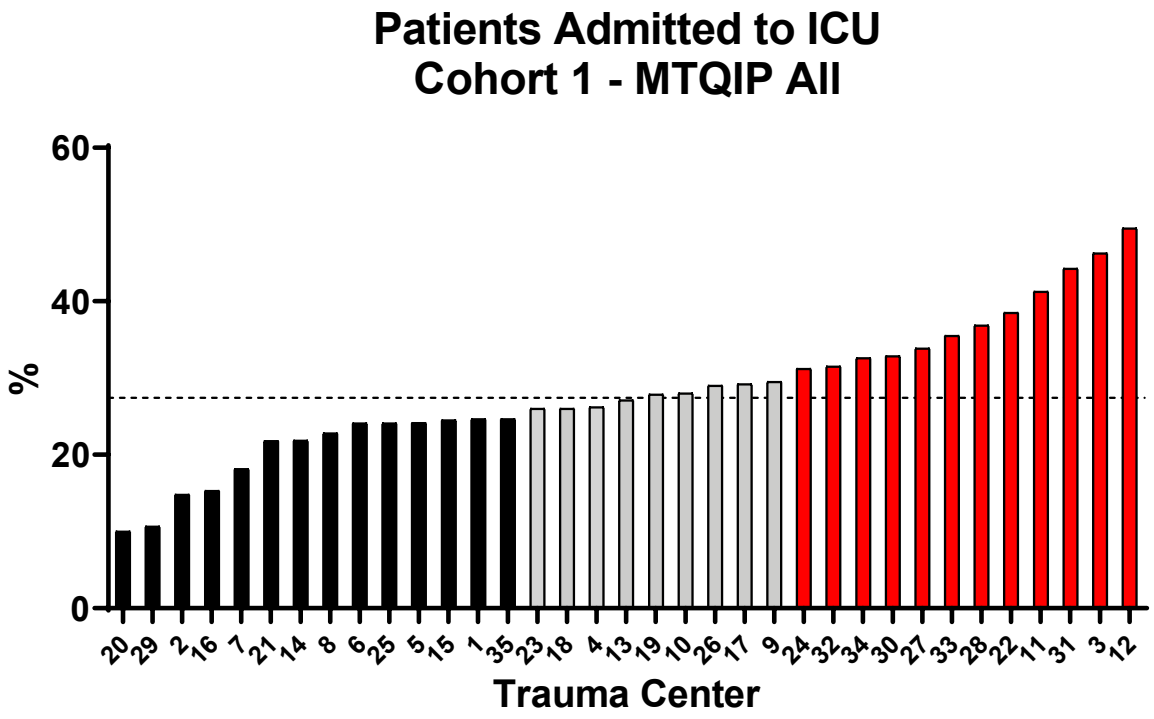
Unplanned Admit to ICU
Cohort 2 - Admit to Trauma

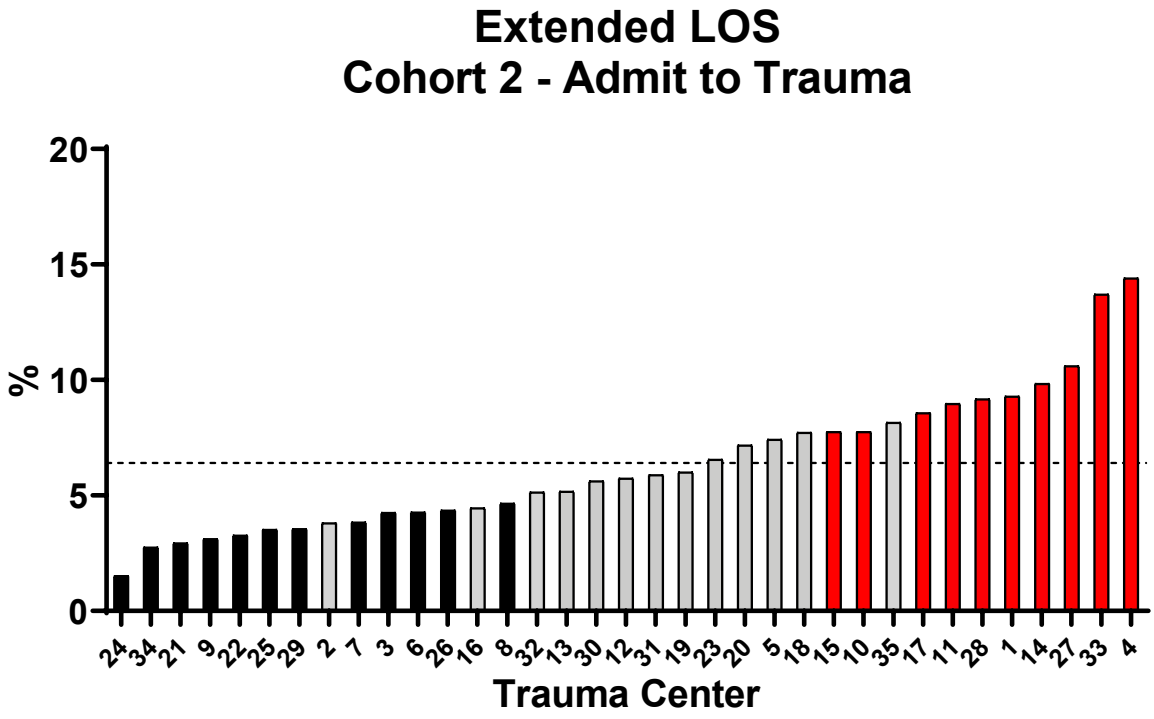


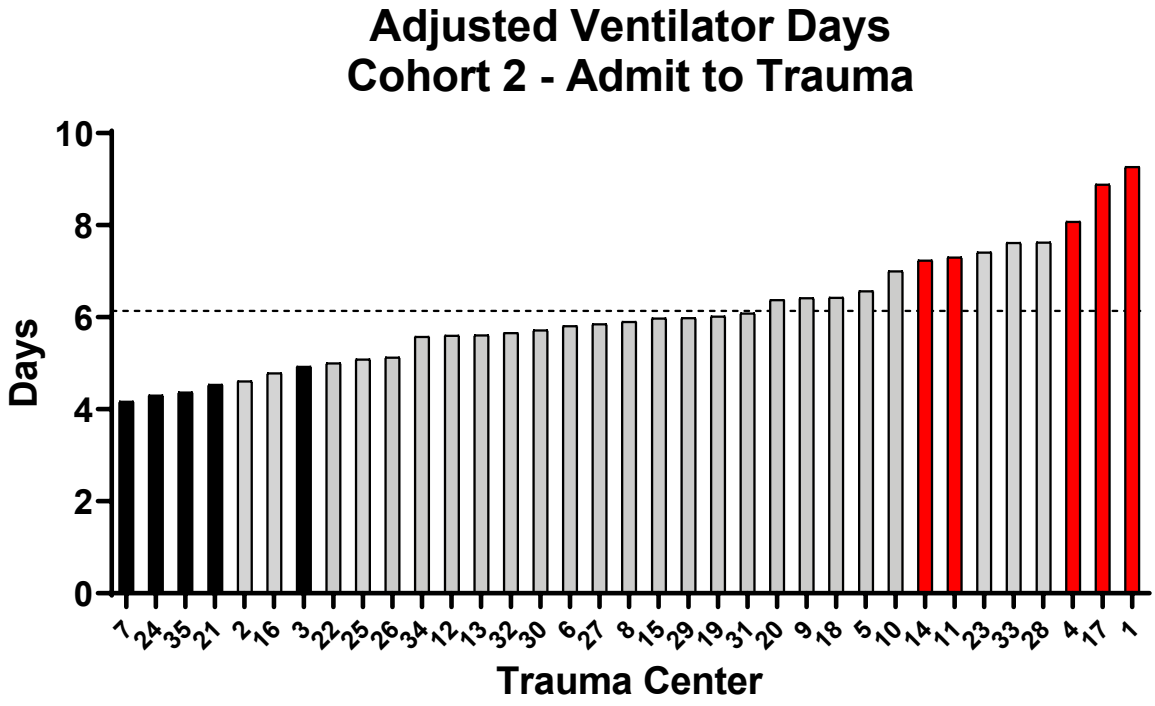
Resource Utilization

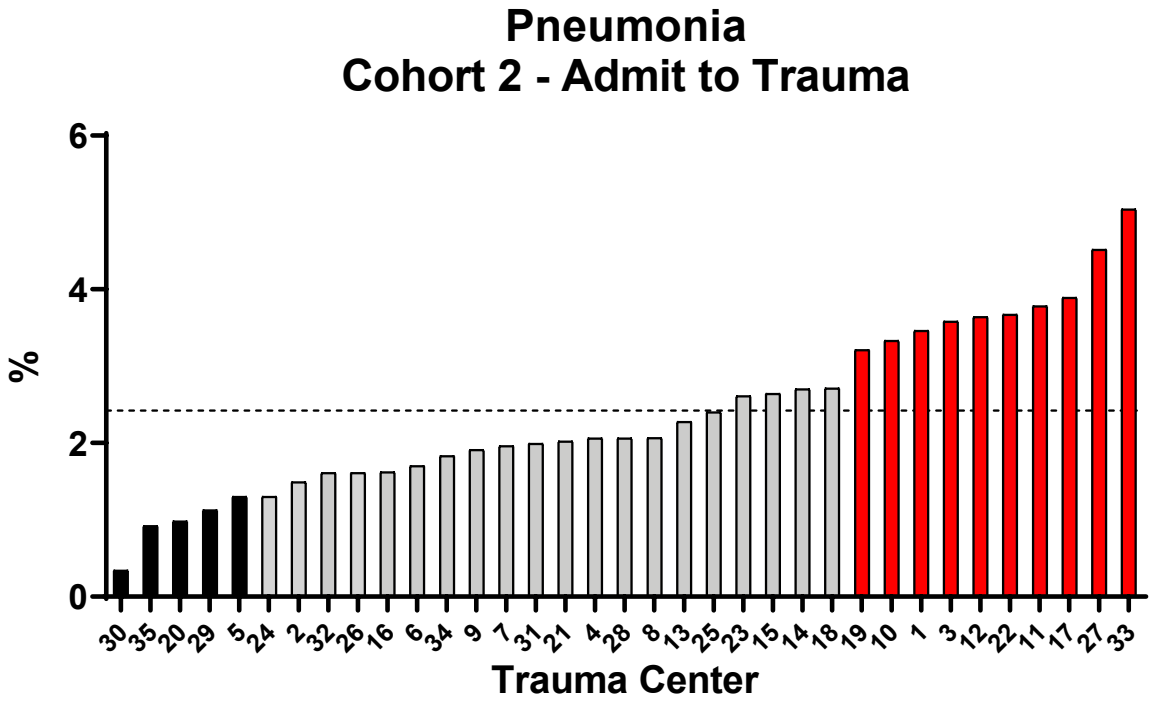


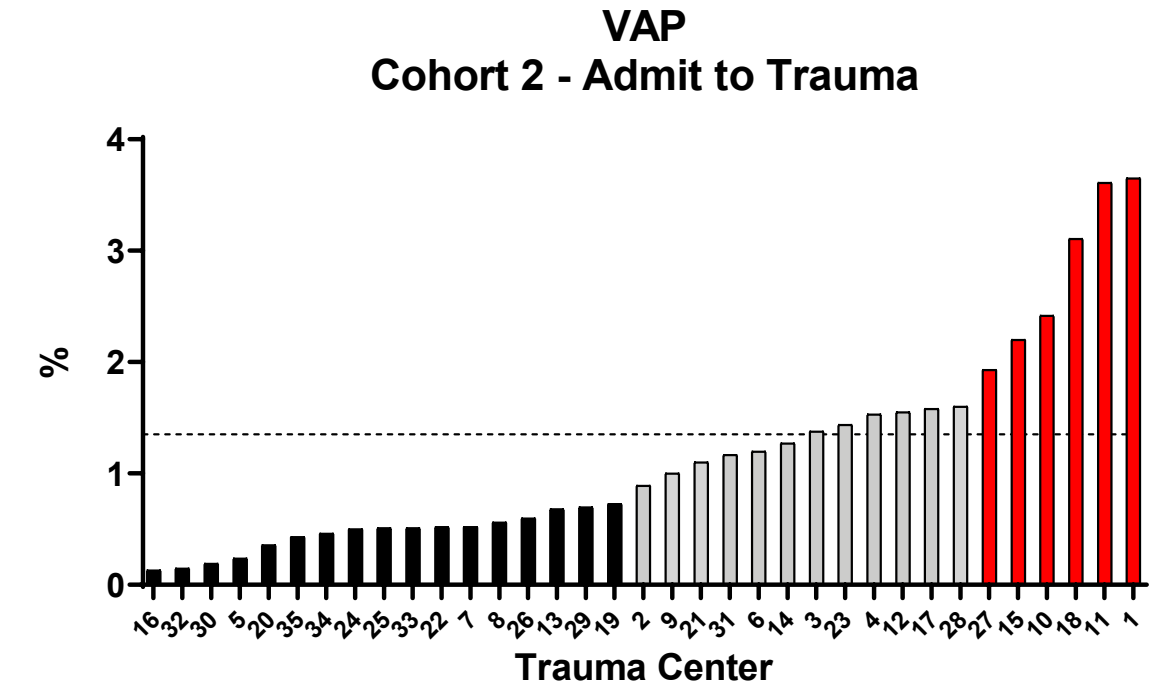


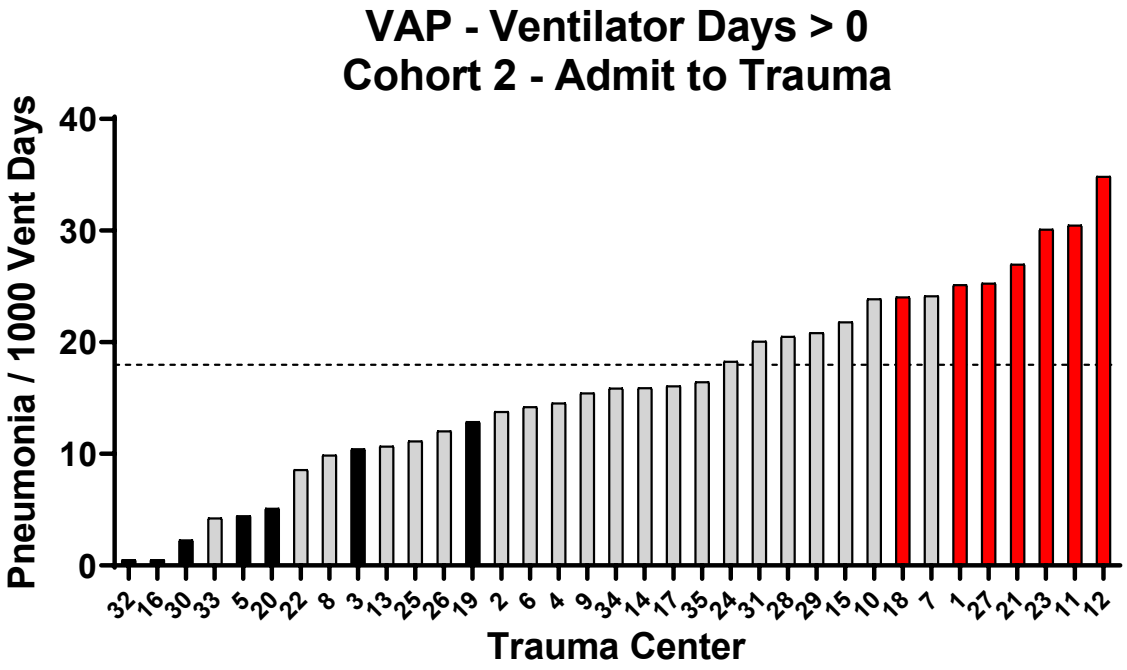

Patients Admitted to ICU
Cohort 1 - MTQIP All
60
40
20
0
%
20 29 2 16 7 21 14 8 6 25 5 15 1 35 23 18 4 13 19 10 26 17 9 24 32 34 30 27 33 28 22 11 31 3 12
Trauma Center

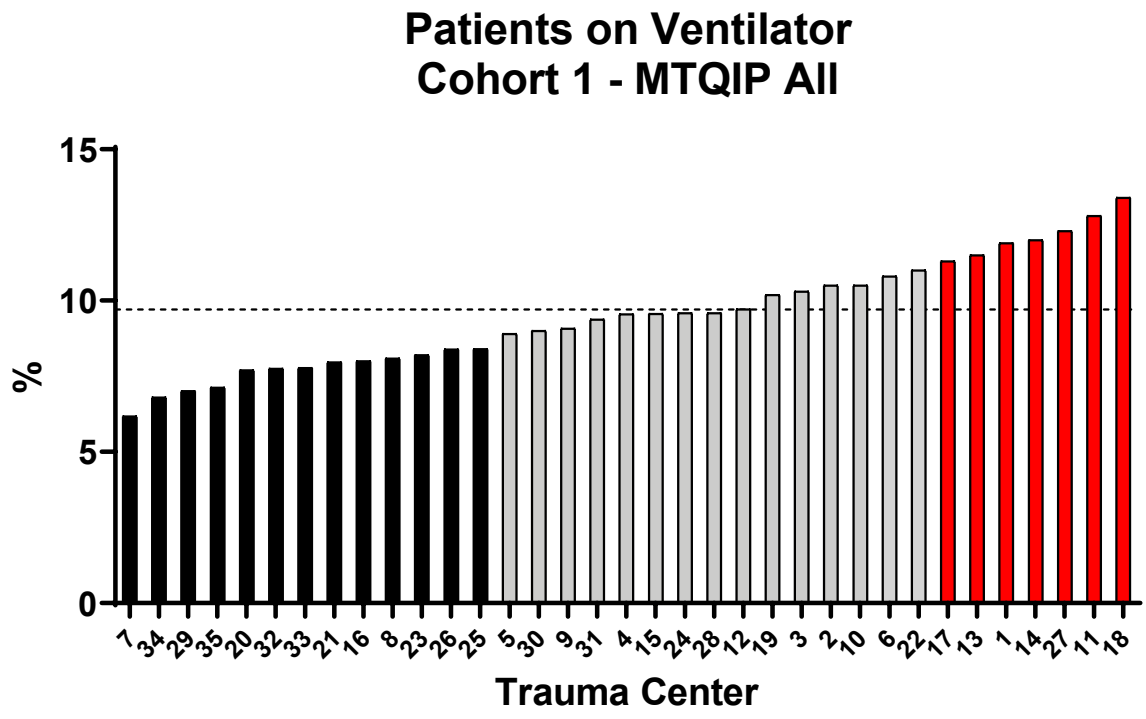

Extended LOS
Cohort 2 - Admit to Trauma
20
15
10
5
0
%
24 34 21 9 22 25 29 2 7 3 6 26 16 8 32 13 30 12 31 19 23 20 5 18 15 10 35 17 11 28 1 14 27 33 4
Trauma Center

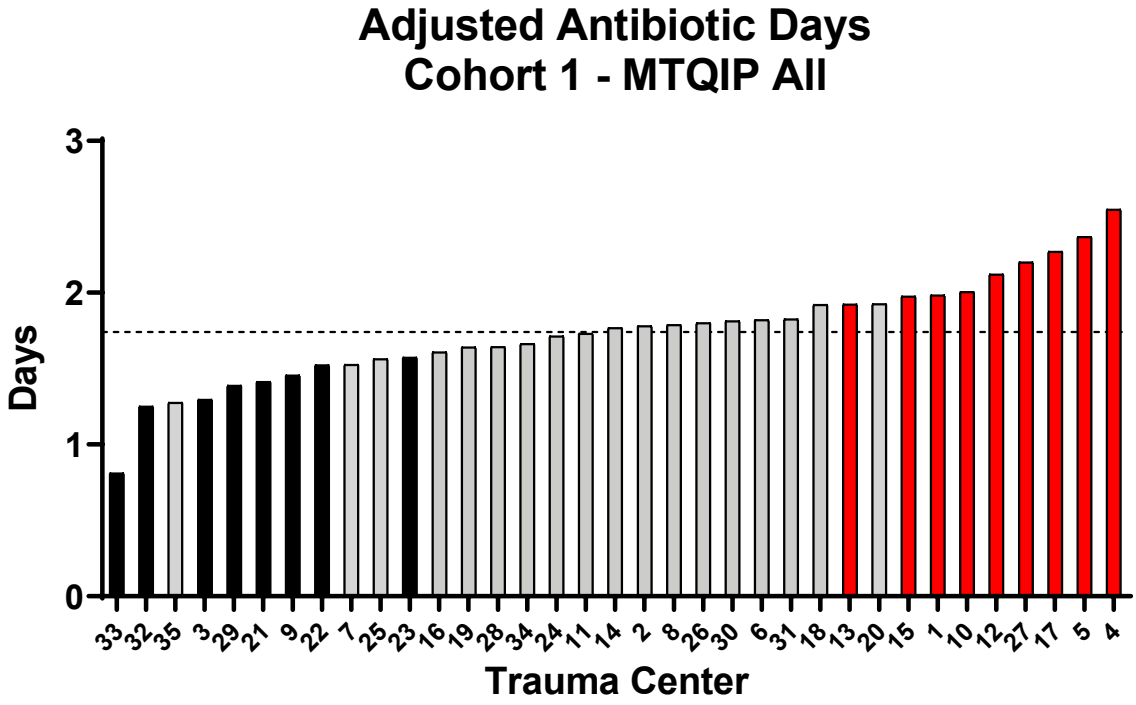

Adjusted Ventilator Days
Cohort 2 - Admit to Trauma
Days
10
8
6
4
2
0
7 24 35 21 2 16 3 22 25 26 34 12 13 32 30 6 27 8 15 29 19 31 20 9 18 5 10 14 11 23 33 28 4 17 1
Trauma Center

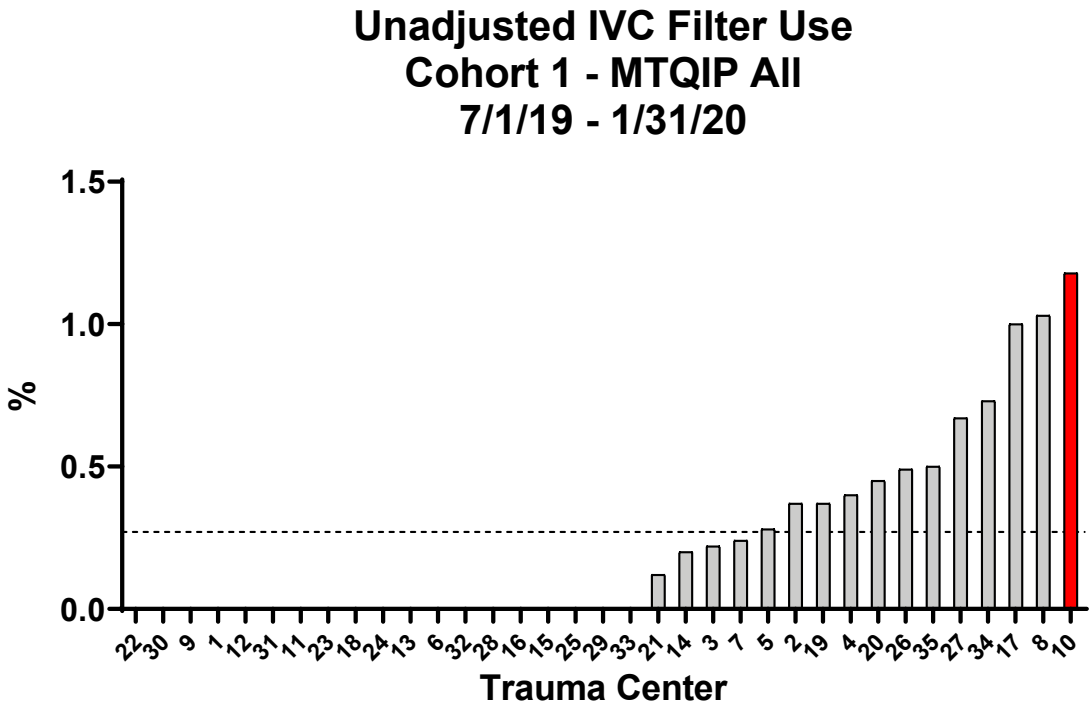

Pneumonia
Cohort 2 - Admit to Trauma
%
6
4
2
0
30 35 20 29 5 24 2 32 26 16 6 34 9 7 31 21 4 28 8 13 25 23 15 14 18 19 10 1 3 12 22 11 17 27 33
Trauma Center

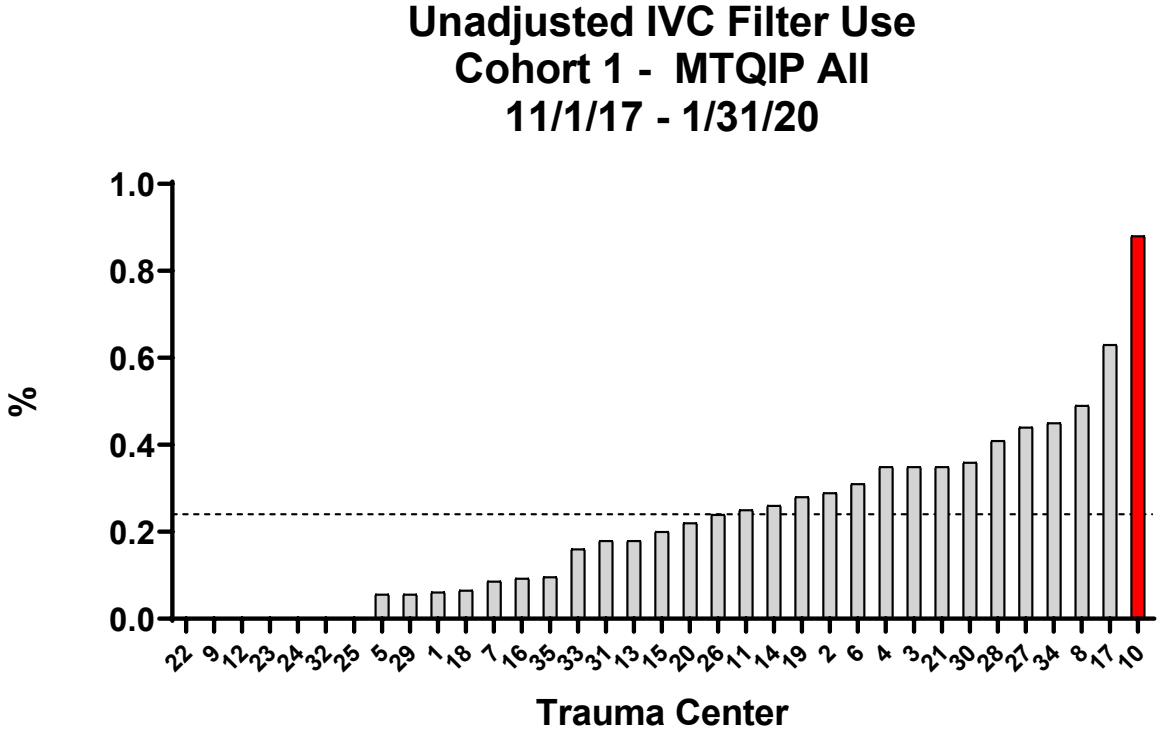

VAP
Cohort 2 - Admit to Trauma
%
0
1
2
3
4
16 32 30 5 20 35 34 24 25 33 22 7 8 26 13 29 19 2 9 21 31 6 14 3 23 4 12 17 28 27 15 10 18 11 1
Trauma Center

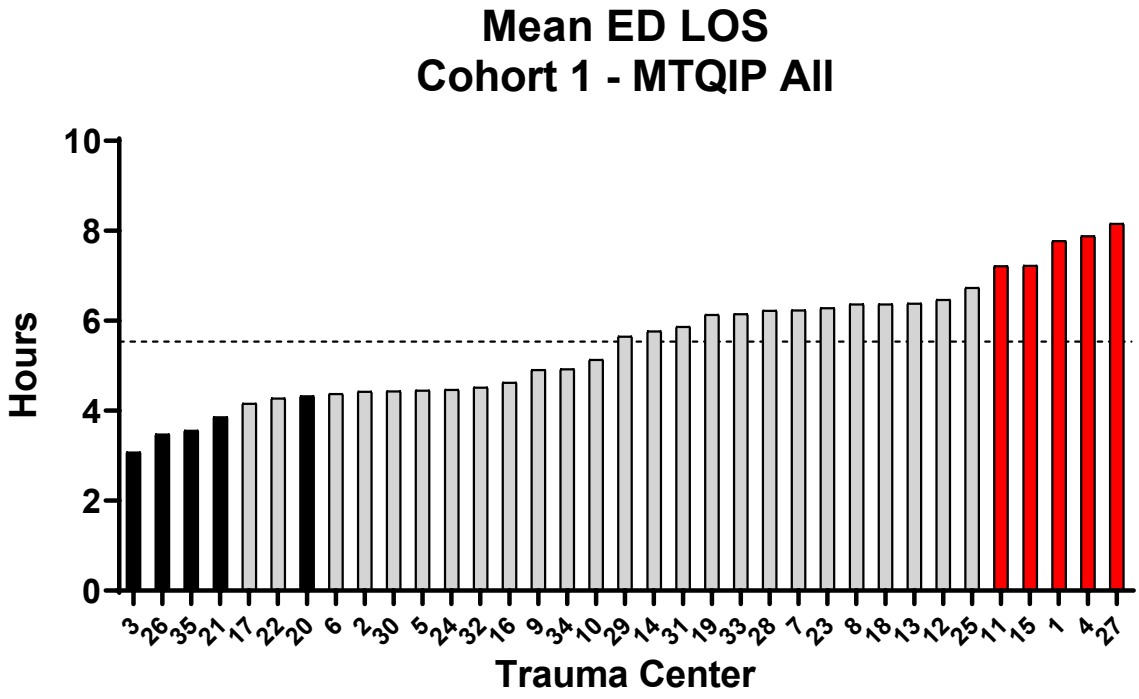

VAP - Ventilator Days > 0
Cohort 2 - Admit to Trauma
Pneumonia / 1000 Vent Days
0
10
20
30
40
32 16 30 33 5 20 22 8 3 13 25 26 19 2 6 4 9 34 14 17 35 24 31 28 29 15 10 18 7 1 27 21 23 11 12
Trauma Center

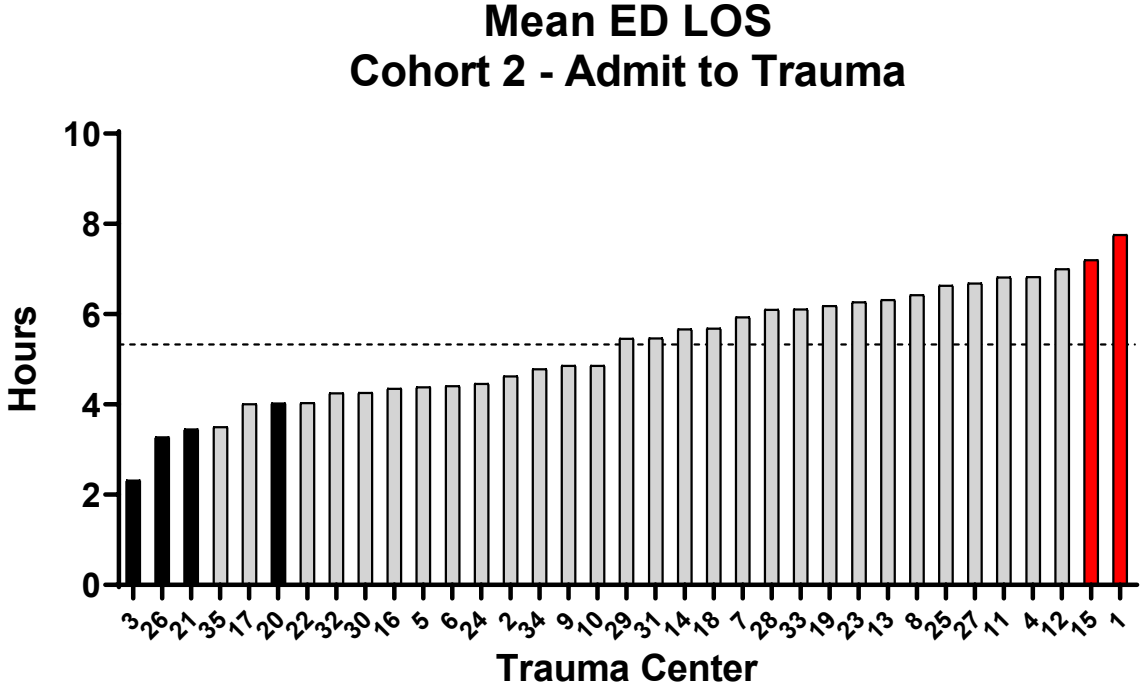

Patients on Ventilator
Cohort 1 - MTQIP All
15
10
5
0
%
7 34 29 35 20 32 33 21 16 8 23 26 25 5 30 9 31 4 15 24 28 12 19 3 2 10 6 22 17 13 1 14 27 11 18
Trauma Center

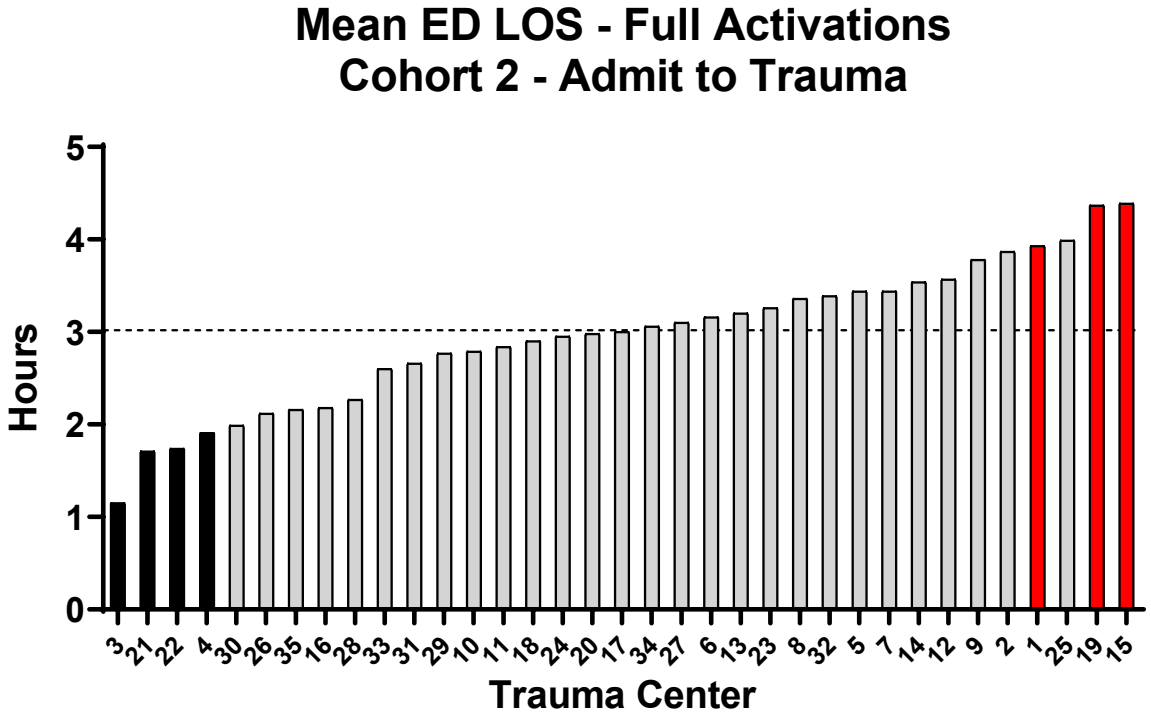

Adjusted Antibiotic Days
Cohort 1 - MTQIP All
3
2
1
0
Days
33 32 35 3 29 21 9 22 7 25 23 16 19 28 34 24 11 14 2 8 26 30 6 31 18 13 20 15 1 10 12 27 17 5 4
Trauma Center

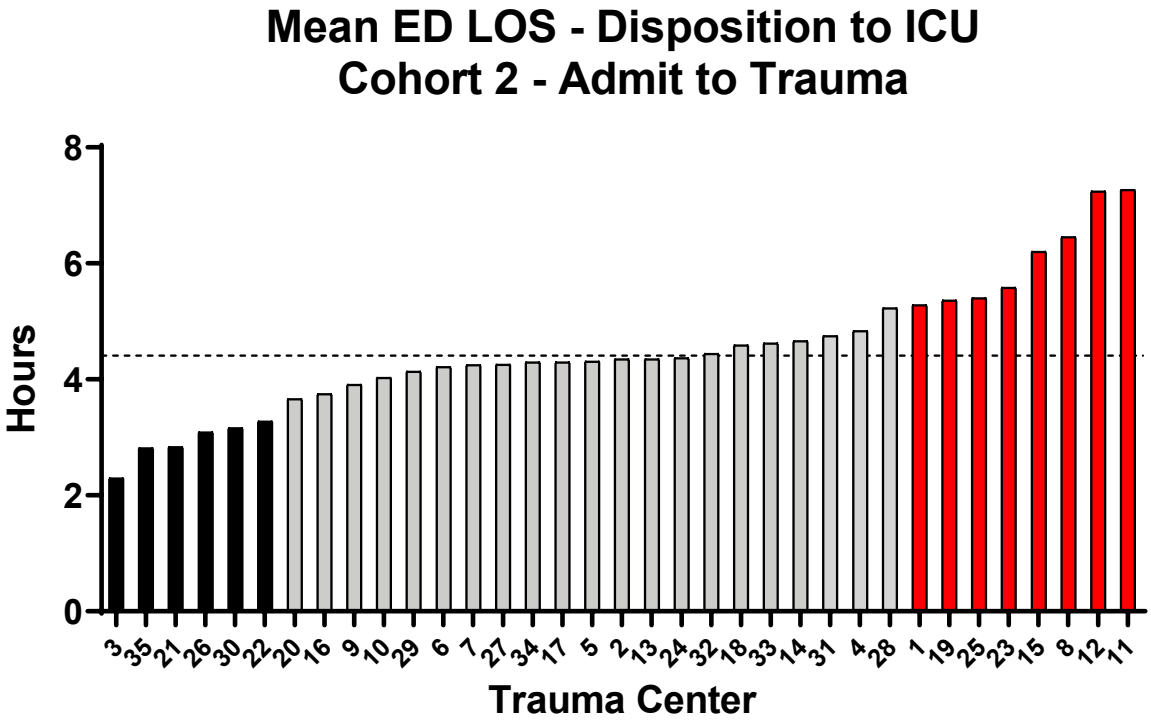

Unadjusted IVC Filter Use
Cohort 1 - MTQIP All
7/1/19 - 1/31/20
1.5
1.0
0.5
0.0
%
22 30 9 1 12 31 11 23 18 24 13 6 32 28 16 15 25 29 33 21 14 3 7 5 2 19 4 20 26 35 27 34 17 8 10
Trauma Center

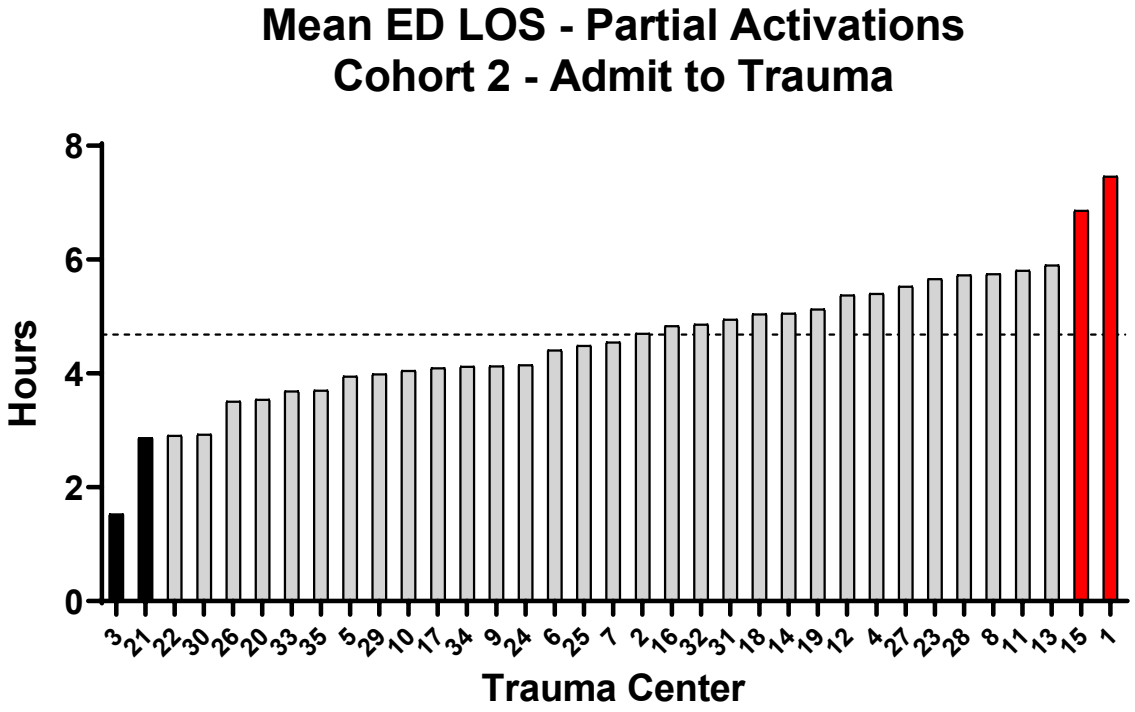

Unadjusted IVC Filter Use
Cohort 1 - MTQIP All
11/1/17 - 1/31/20
1.0
0.8
0.6
0.4
0.2
0.0
%
22 9 12 23 24 32 25 5 29 1 18 7 16 35 33 31 13 15 20 26 11 14 19 2 6 4 3 21 30 28 27 34 8 17 10
Trauma Center

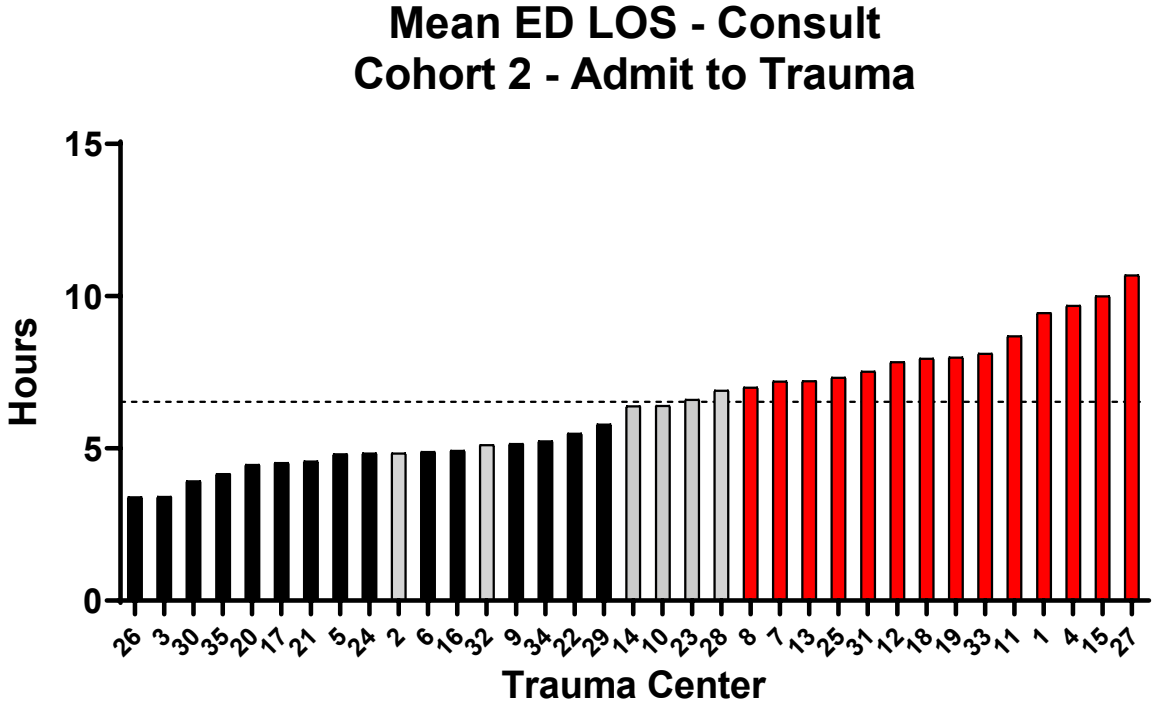

Mean ED LOS
Cohort 1 - MTQIP All
Hours
10
8
6
4
2
0
3 26 35 21 17 22 20 6 2 30 5 24 32 16 9 34 10 29 14 31 19 33 28 7 23 8 18 13 12 25 11 15 1 4 27
Trauma Center


Mean ED LOS
Cohort 2 - Admit to Trauma
Hours
10
8
6
4
2
0
3 26 21 35 17 20 22 32 30 16 5 6 24 2 34 9 10 29 31 14 18 7 28 33 19 23 13 8 25 27 11 4 12 15 1
Trauma Center

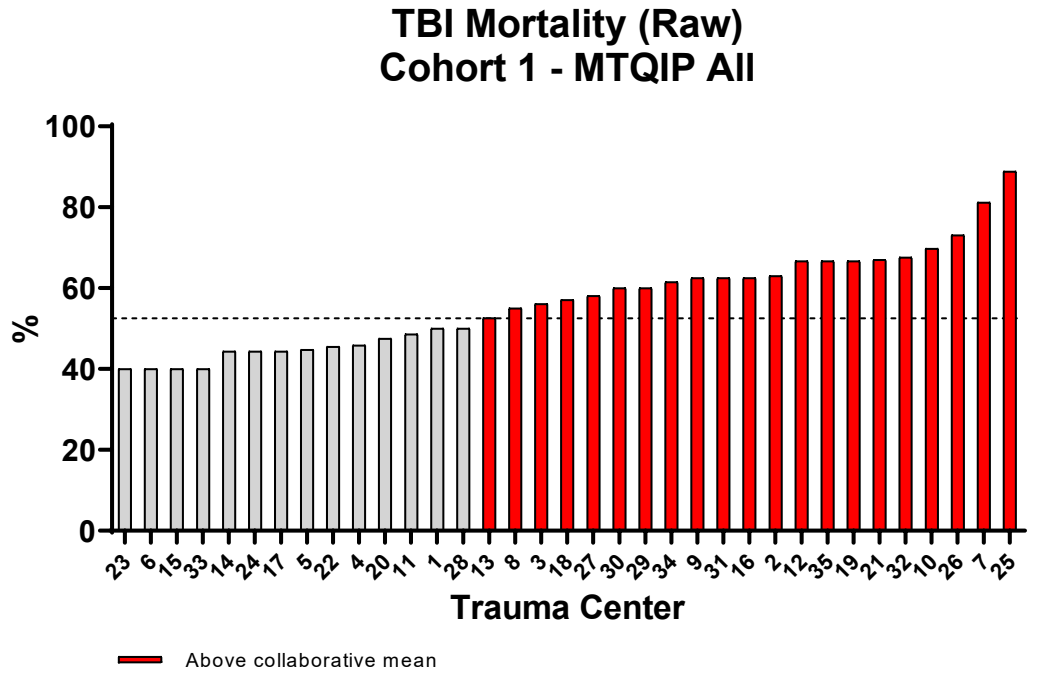

Mean ED LOS - Full Activations
Cohort 2 - Admit to Trauma
Hours
0
1
2
3
4
5
3 21 22 4 30 26 35 16 28 33 31 29 10 11 18 24 20 17 34 27 6 13 23 8 32 5 7 14 12 9 2 1 25 19 15
Trauma Center

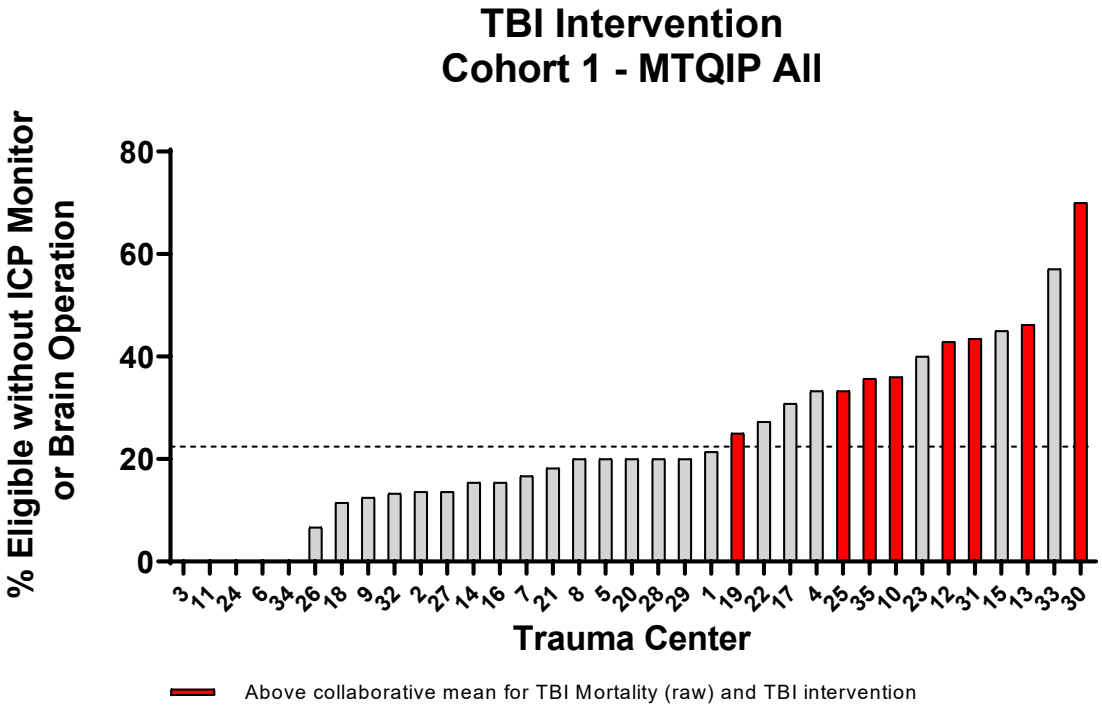

Mean ED LOS - Disposition to ICU
Cohort 2 - Admit to Trauma
Hours
0
2
4
6
8
3 35 21 26 30 22 20 16 9 10 29 6 7 27 34 17 5 2 13 24 32 18 33 14 31 4 28 1 19 25 23 15 8 12 11
Trauma Center

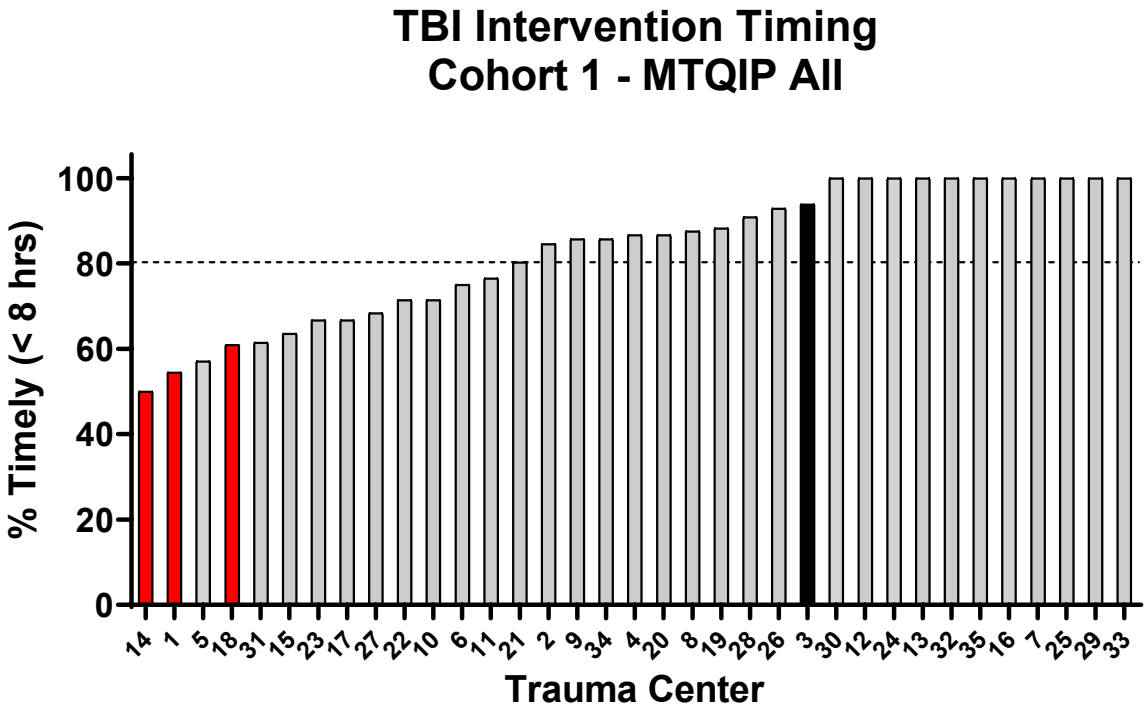

Mean ED LOS - Partial Activations
Cohort 2 - Admit to Trauma
Hours
0
2
4
6
8
3 21 22 30 26 20 33 35 5 29 10 17 34 9 24 6 25 7 2 16 32 31 18 14 19 12 4 27 23 28 8 11 13 15 1
Trauma Center


Mean ED LOS - Consult
Cohort 2 - Admit to Trauma
Hours
0
5
10
15
26 3 30 35 20 17 21 5 24 2 6 16 32 9 34 22 29 14 10 23 28 8 7 13 25 31 12 18 19 33 11 1 4 15 27
Trauma Center

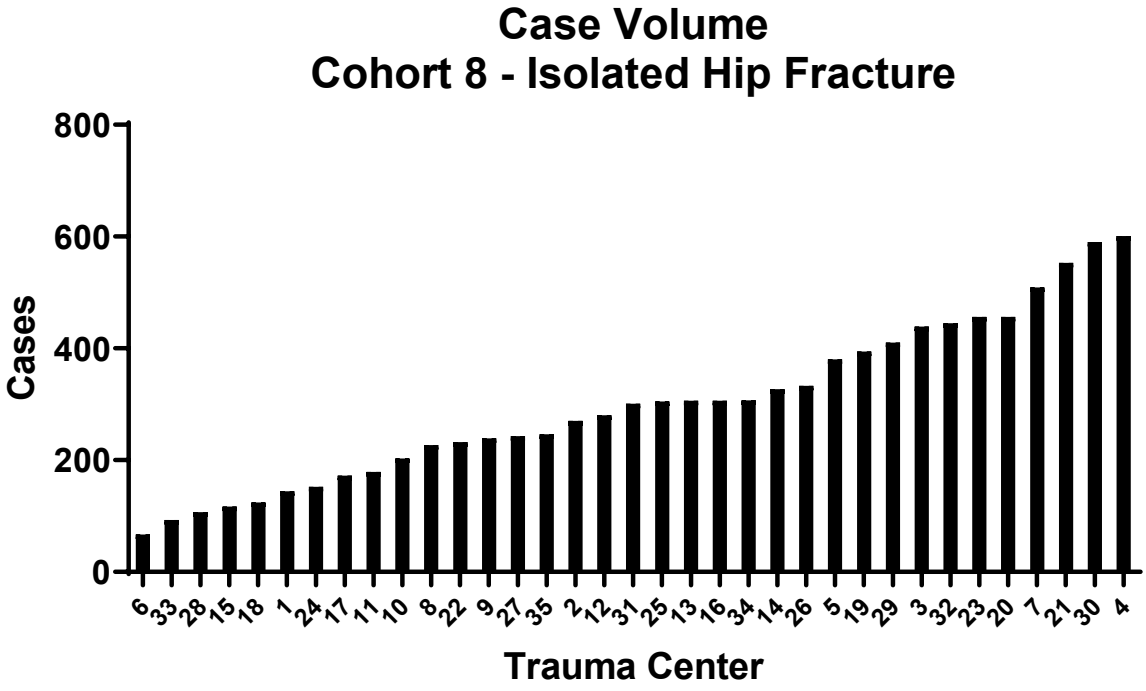
Process Measures



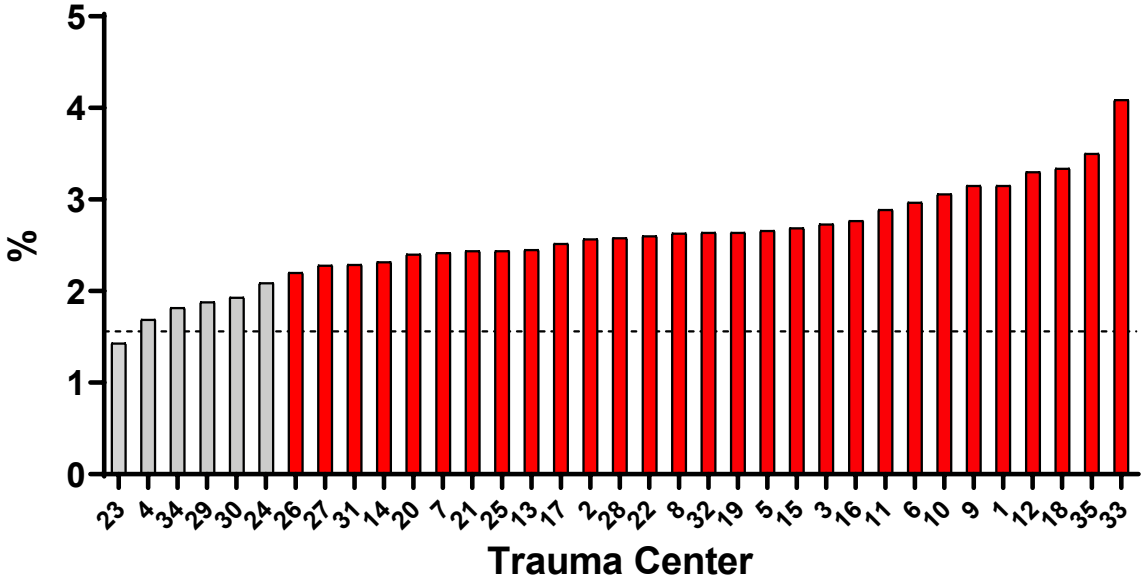



TBI Intervention Timing
Cohort 1 - MTQIP All
% Timely (< 8 hrs)
100
80
60
40
20
0
14 1 5 18 31 15 23 17 27 22 10 6 11 21 2 9 34 4 20 8 19 28 26 3 30 12 24 13 32 35 16 7 25 29 33
Trauma Center

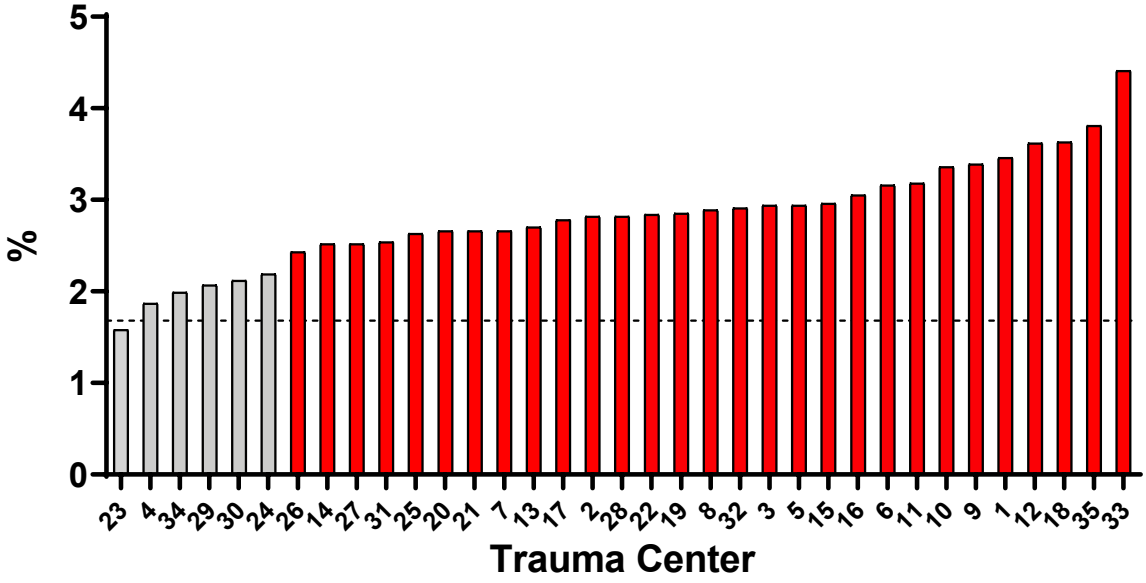
Isolated Hip Fracture



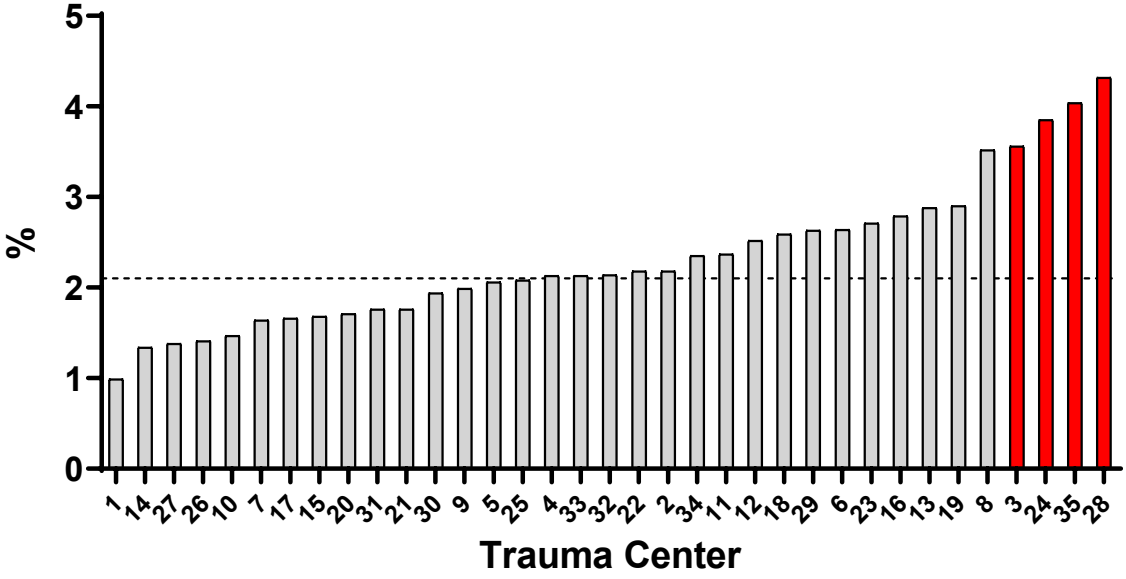
Mortality w/o DOA
Cohort 8 - Isolated Hip Fracture



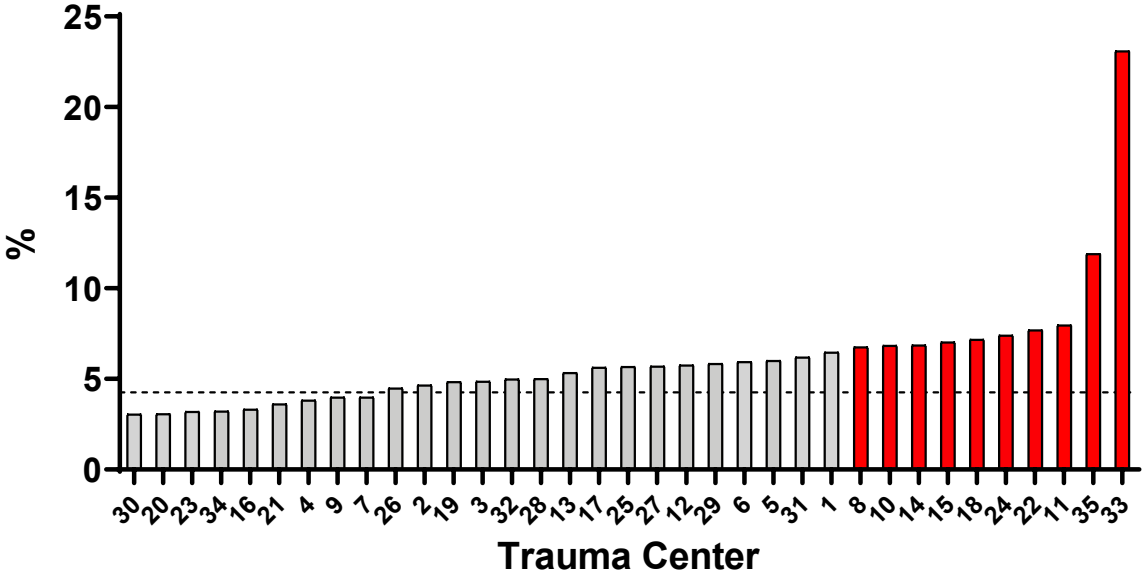
Mortality w/o DOA, Age ≥ 65
Cohort 8 - Isolated Hip Fracture



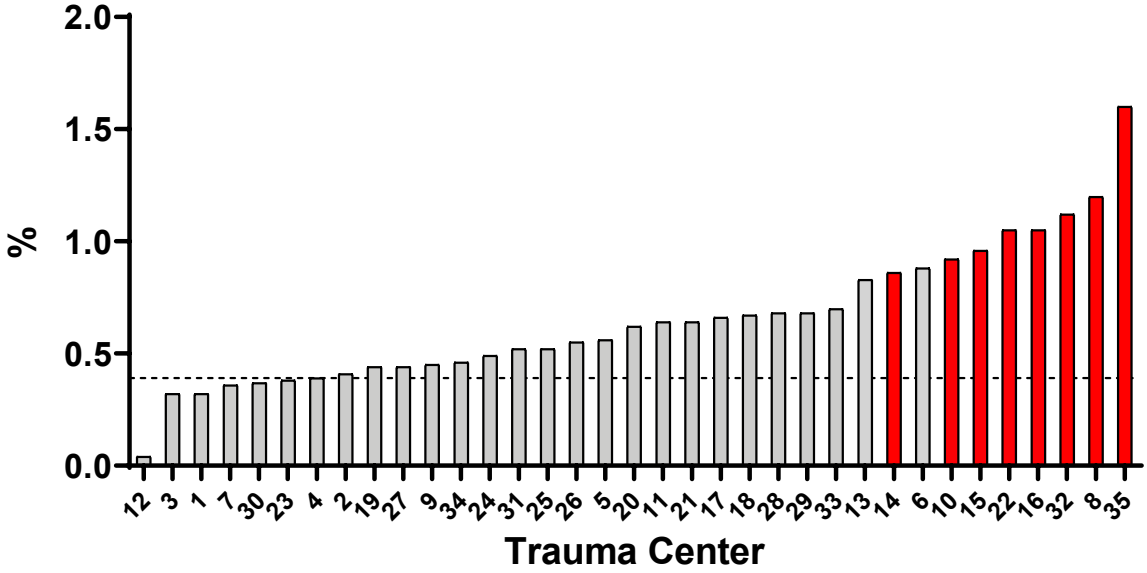
Mortality or Hospice w/o DOA
Cohort 8 - Isolated Hip Fracture



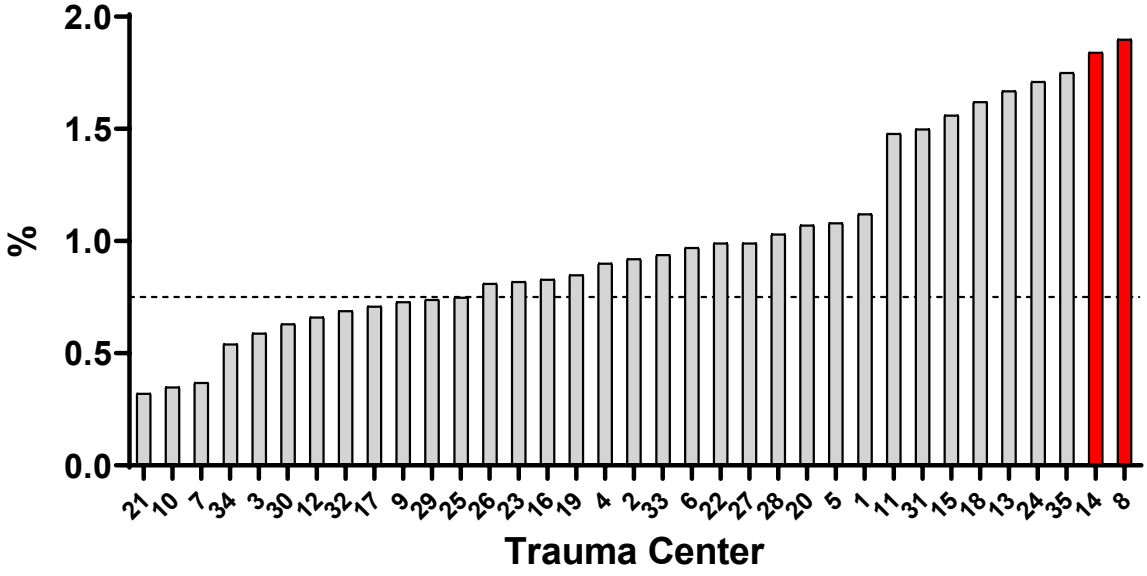
Serious Complications
Cohort 8 - Isolated Hip Fracture



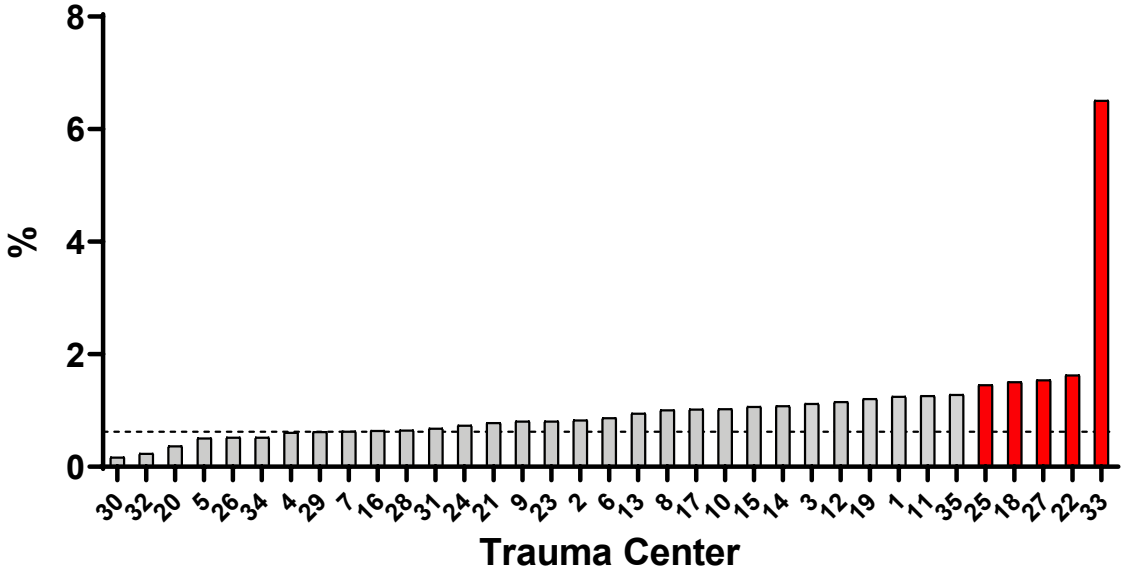
Cardiac Arrest with CPR
Cohort 8 - Isolated Hip Fracture



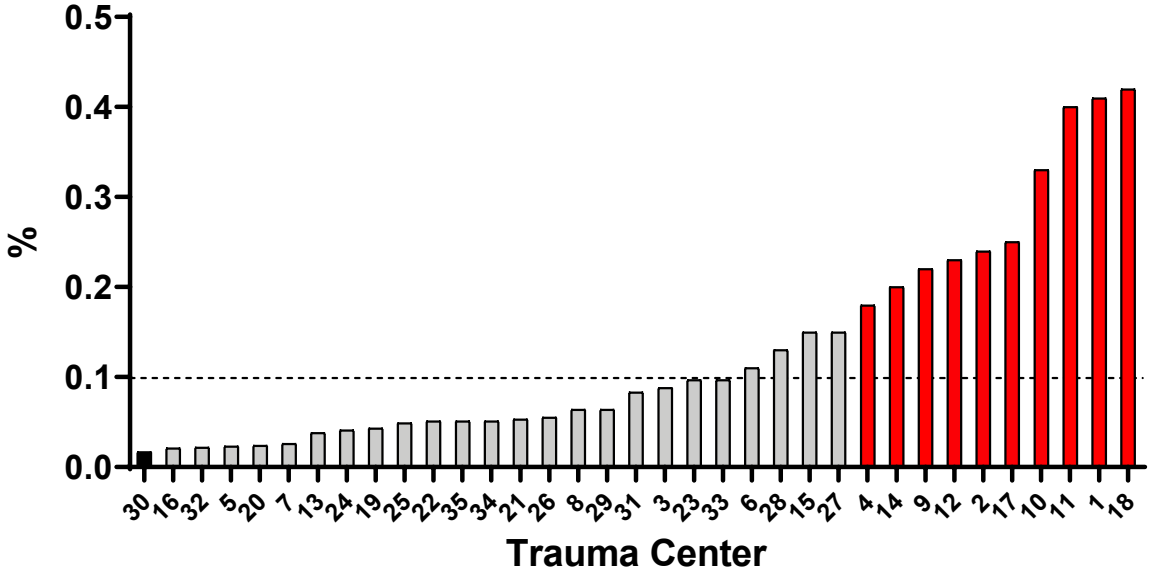
Myocardial Infarction
Cohort 8 - Isolated Hip Fracture



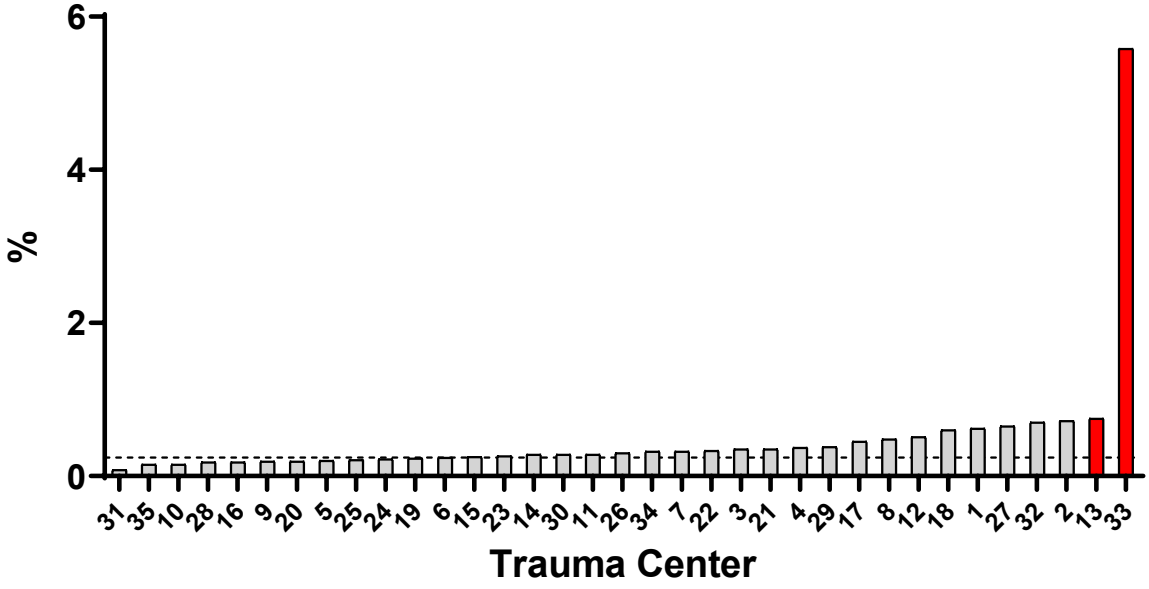
Pneumonia
Cohort 8 - Isolated Hip Fracture



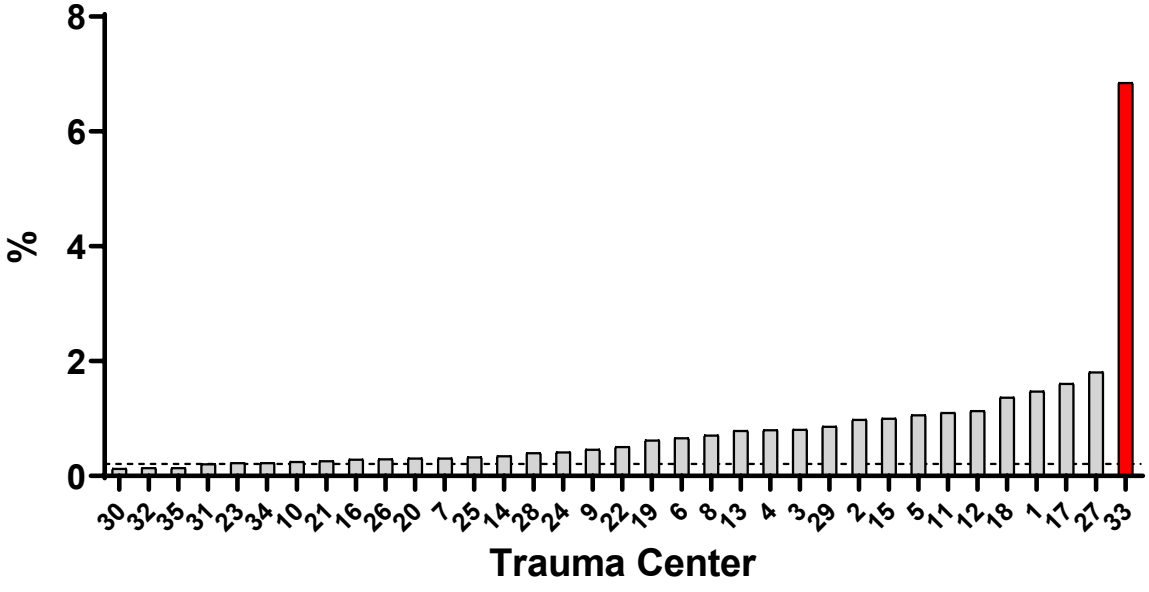
VAP
Cohort 8 - Isolated Hip Fracture



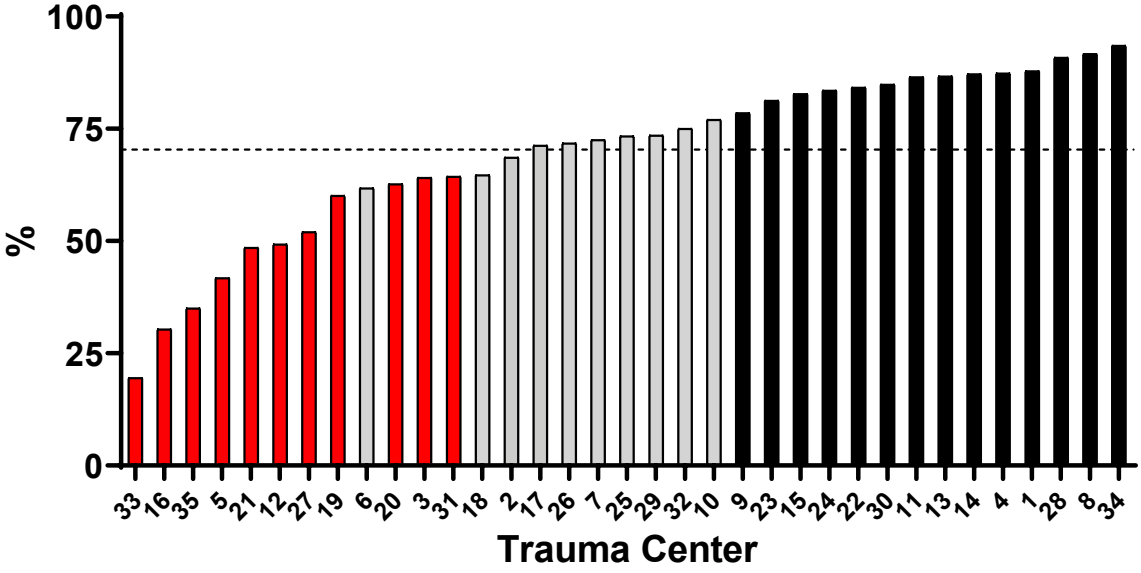
Acute Renal Failure
Cohort 8 - Isolated Hip Frature



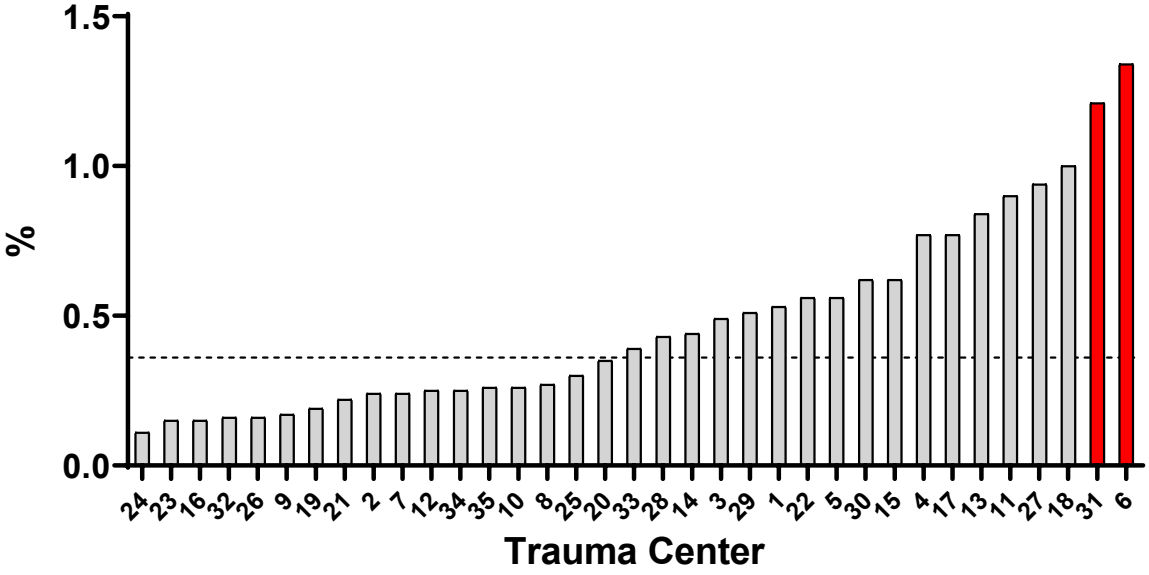
CAUTI
Cohort 8 - Isolated Hip Fracture



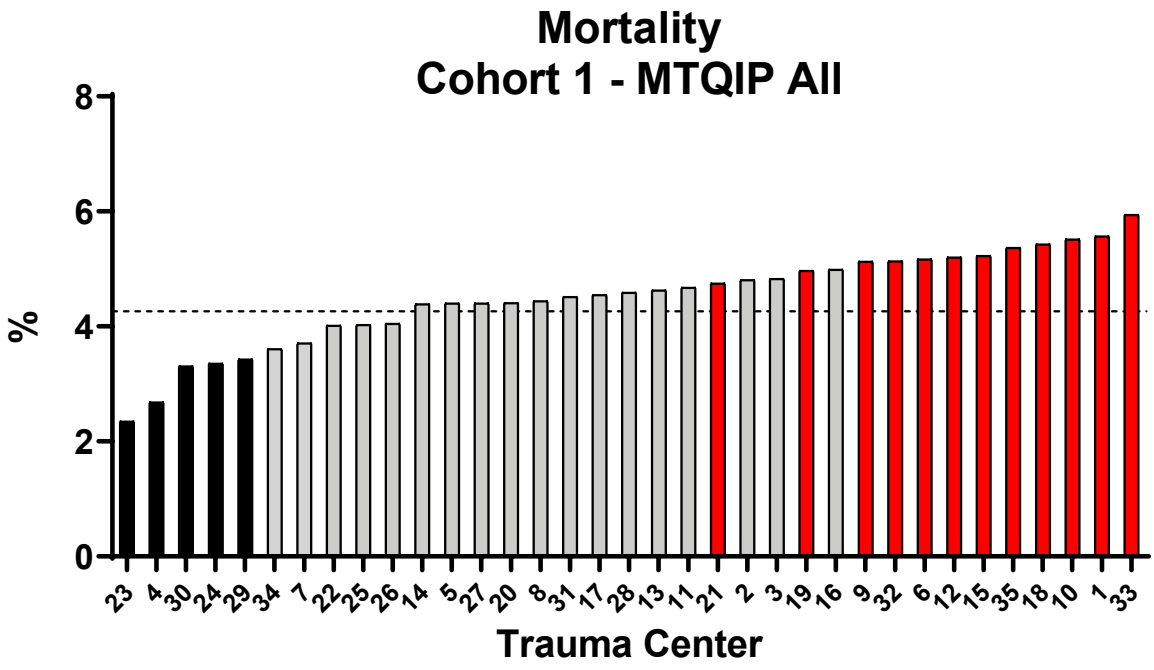
VTE Prophylaxis Heparin, LMWH ≤ 48 hrs
Cohort 8 - Isolated Hip Fracture

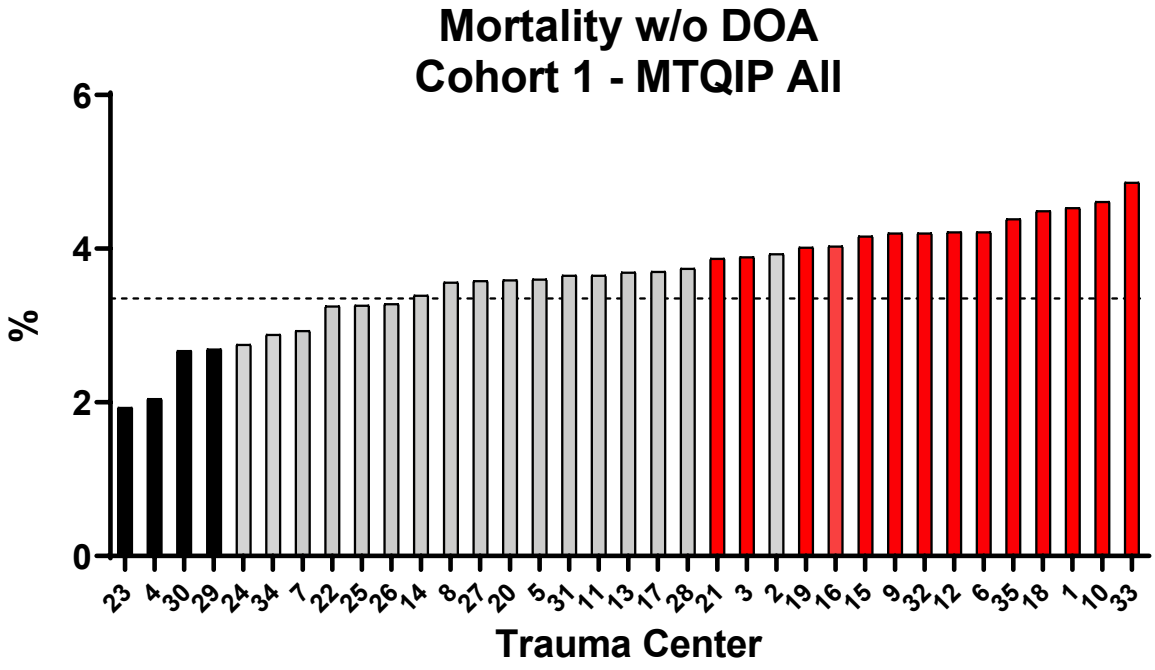


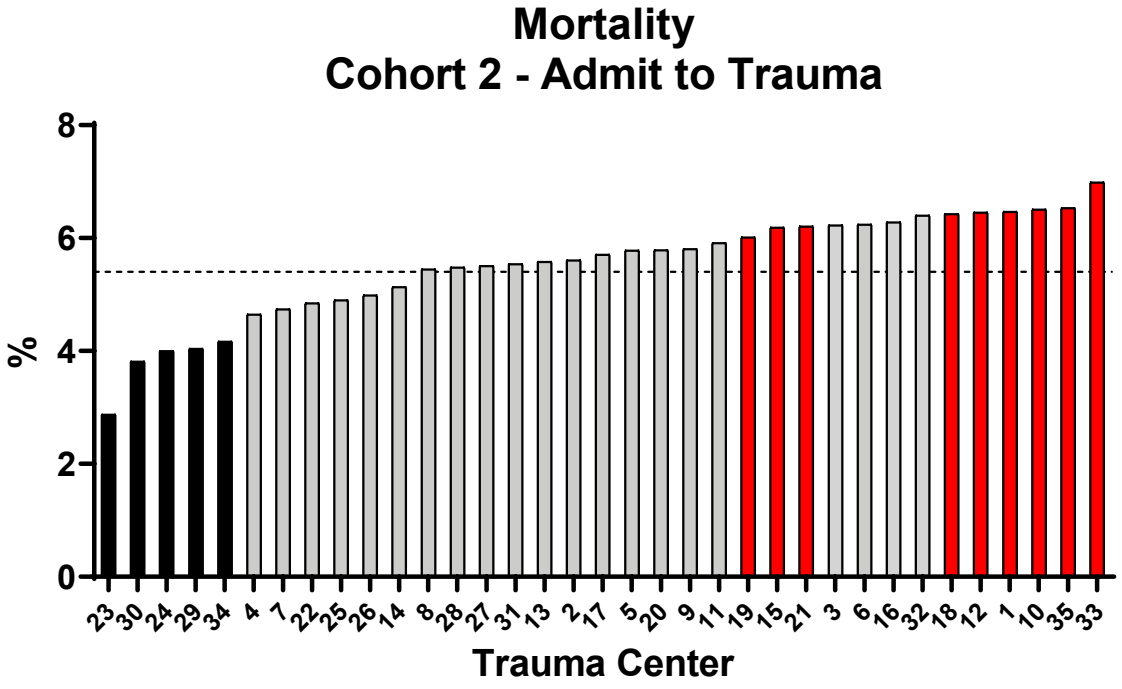
DVT
Cohort 8 - Isolated Hip Fracture

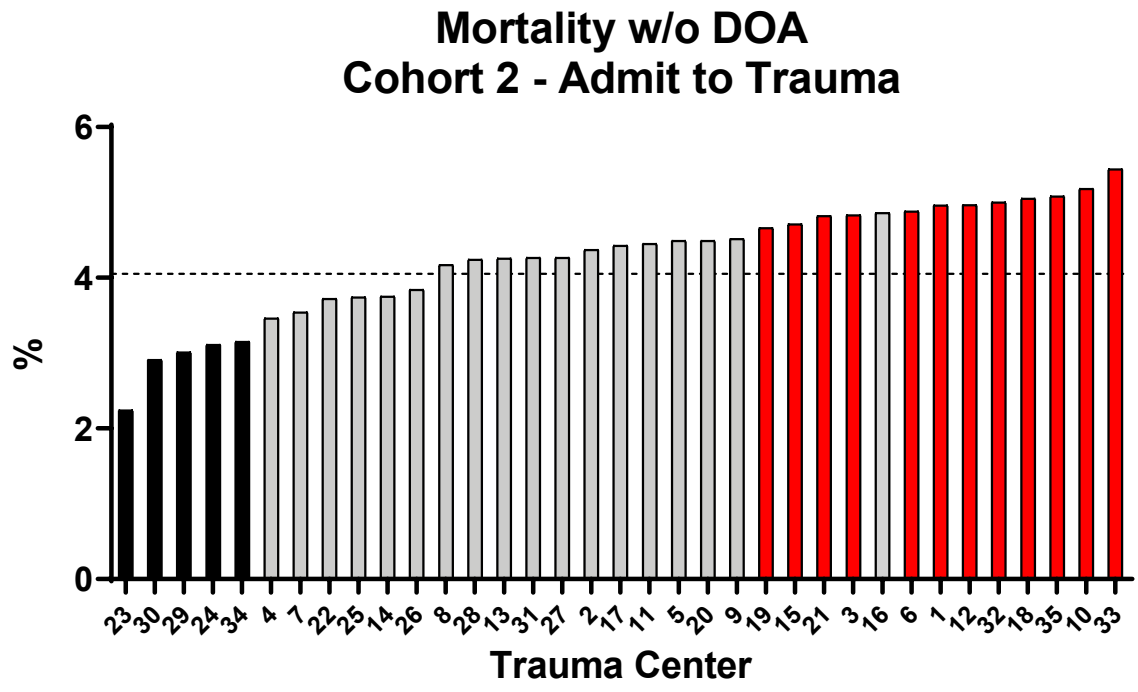


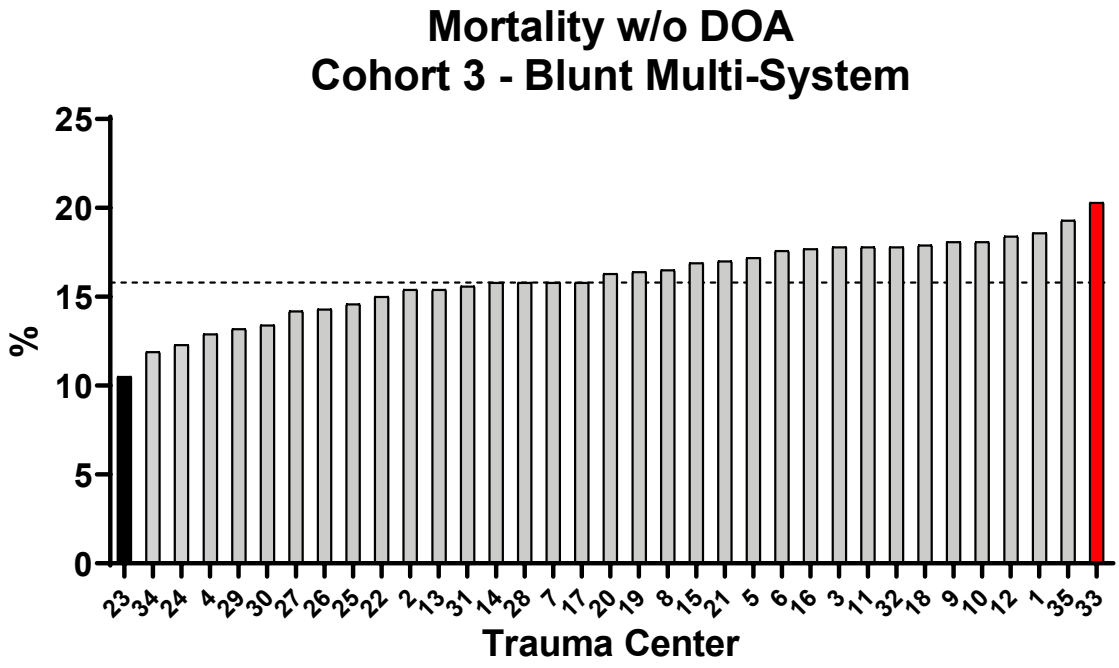
Mortality

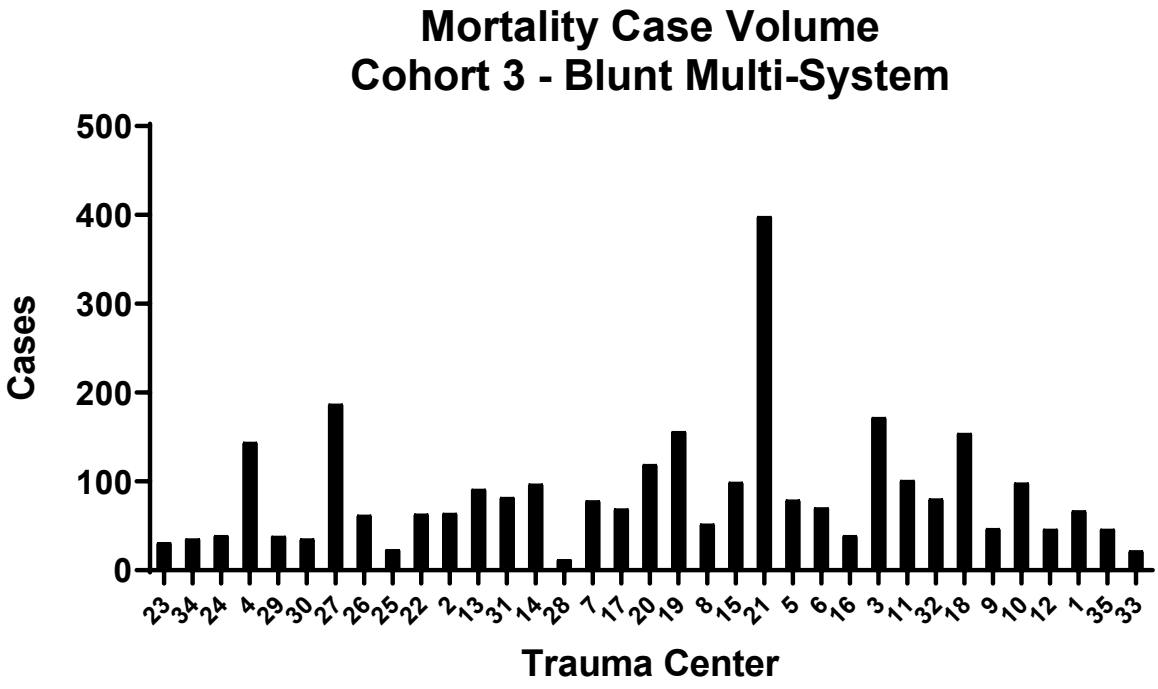

Mortality
Cohort 1 - MTQIP All
%
0
2
4
6
8
23 4 30 24 29 34 7 22 25 26 14 5 27 20 8 31 17 28 13 11 21 2 3 19 16 9 32 6 12 15 35 18 10 1 33
Trauma Center

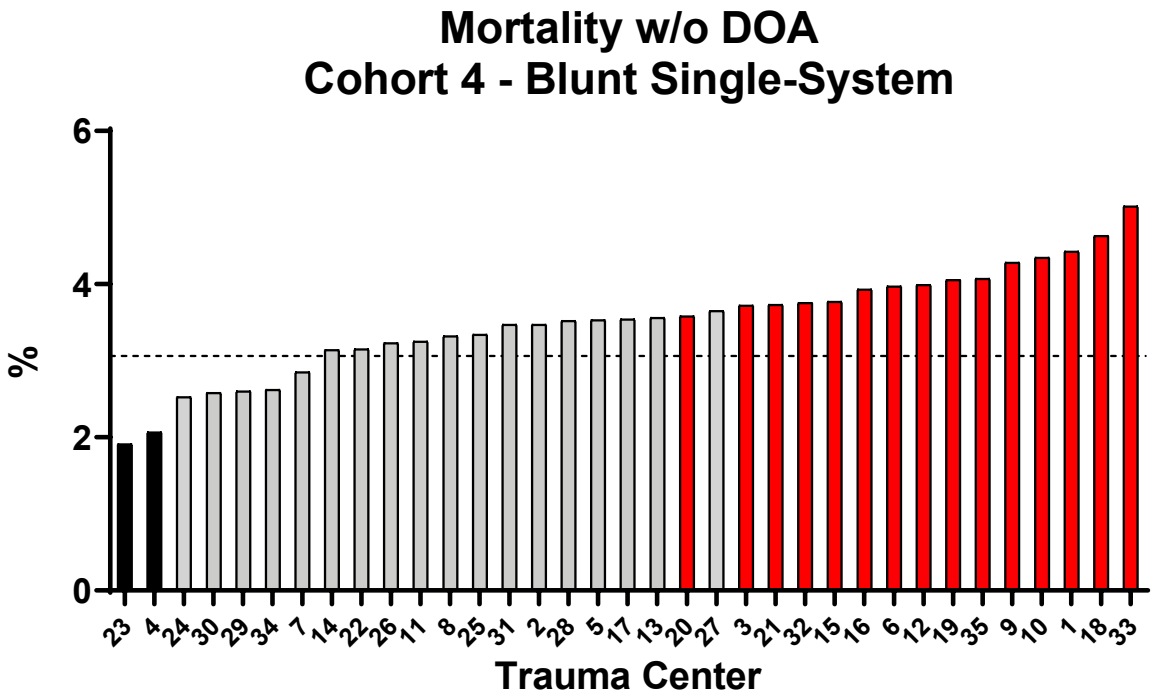

Mortality w/o DOA
Cohort 1 - MTQIP All
%
0
2
4
6
23 4 30 29 24 34 7 22 25 26 14 8 27 20 5 31 11 13 17 28 21 3 2 19 16 15 9 32 12 6 35 18 1 10 33
Trauma Center

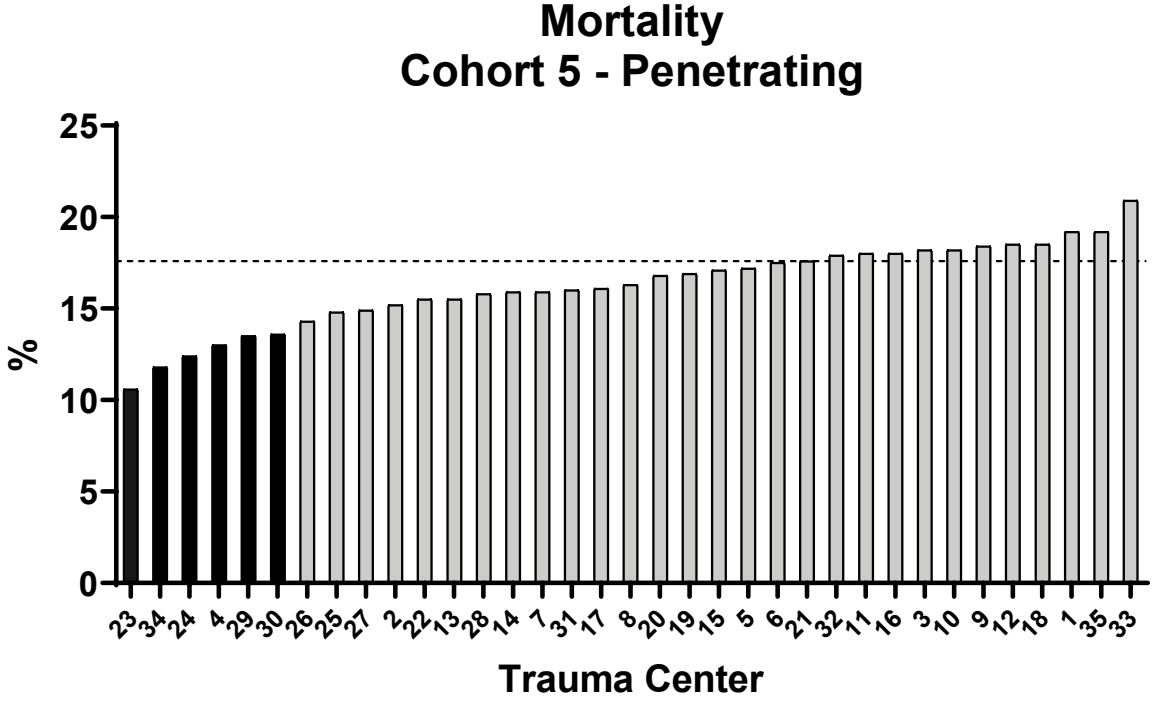

Mortality
Cohort 2 - Admit to Trauma
%
0
2
4
6
8
23 30 24 29 34 4 7 22 25 26 14 8 28 27 31 13 2 17 5 20 9 11 19 15 21 3 6 16 32 18 12 1 10 35 33
Trauma Center

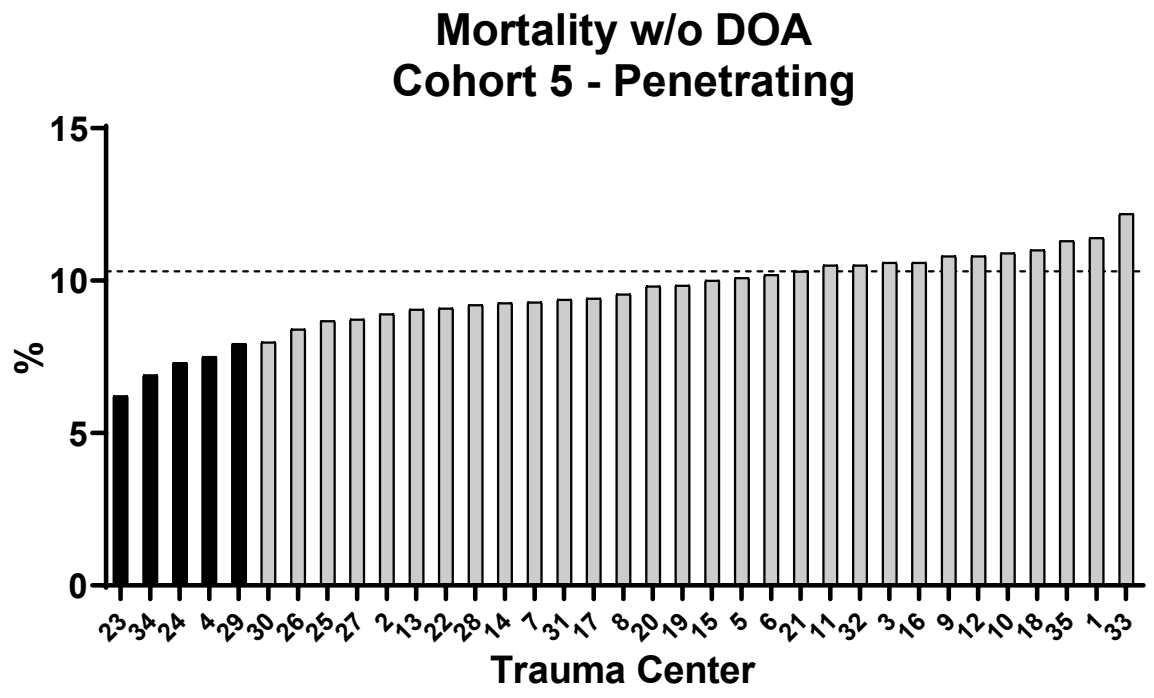

Mortality w/o DOA
Cohort 2 - Admit to Trauma
%
0
2
4
6
23 30 29 24 34 4 7 22 25 14 26 8 28 13 31 27 2 17 11 5 20 9 19 15 21 3 16 6 1 12 32 18 35 10 33
Trauma Center


Mortality w/o DOA
Cohort 3 - Blunt Multi-System
%
25
20
15
10
5
0
23 34 24 4 29 30 27 26 25 22 2 13 31 14 28 7 17 20 19 8 15 21 5 6 16 3 11 32 18 9 10 12 1 35 33
Trauma Center

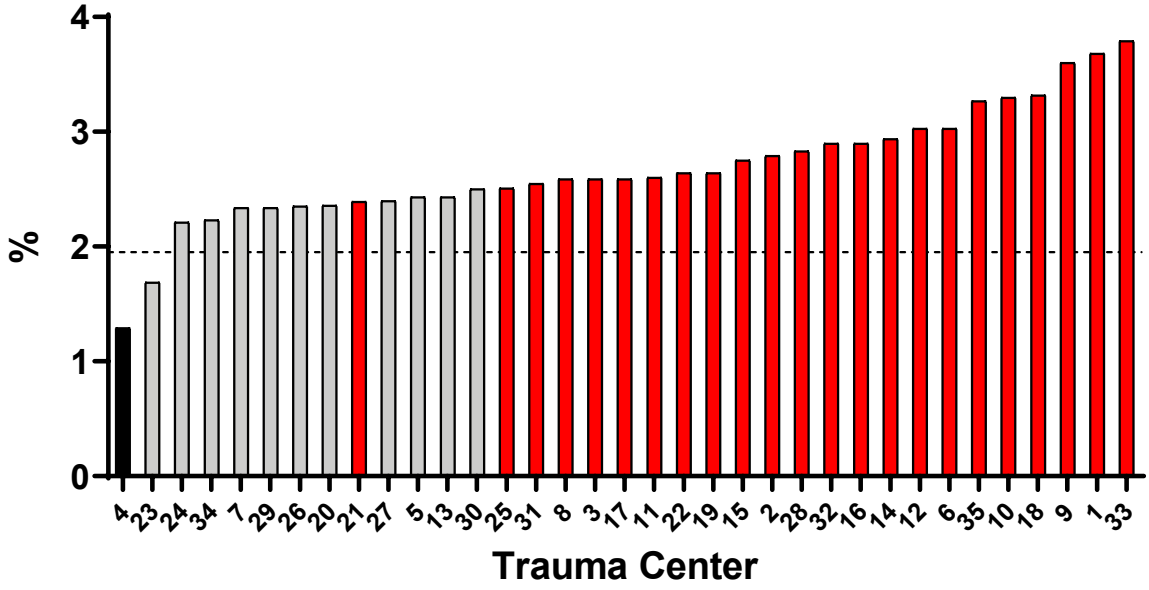

Mortality Case Volume
Cohort 3 - Blunt Multi-System
Cases
500
400
300
200
100
0
23 34 24 4 29 30 27 26 25 22 2 13 31 14 28 7 17 20 19 8 15 21 5 6 16 3 11 32 18 9 10 12 1 35 33
Trauma Center


Mortality w/o DOA
Cohort 4 - Blunt Single-System
%
6
4
2
0
23 4 24 30 29 34 7 14 22 26 11 8 25 31 2 28 5 17 13 20 27 3 21 32 15 16 6 12 19 35 9 10 1 18 33
Trauma Center

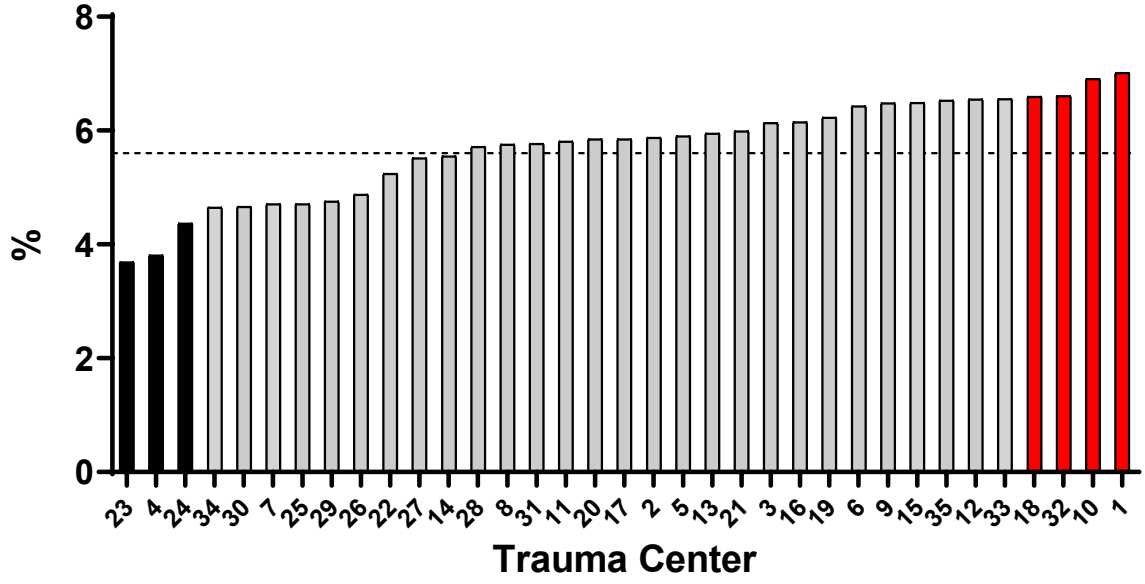

Mortality
Cohort 5 - Penetrating
25
20
15
10
5
0
%
23 34 24 4 29 30 26 25 27 2 22 13 28 14 7 31 17 8 20 19 15 5 6 21 32 11 16 3 10 9 12 18 1 35 33
Trauma Center

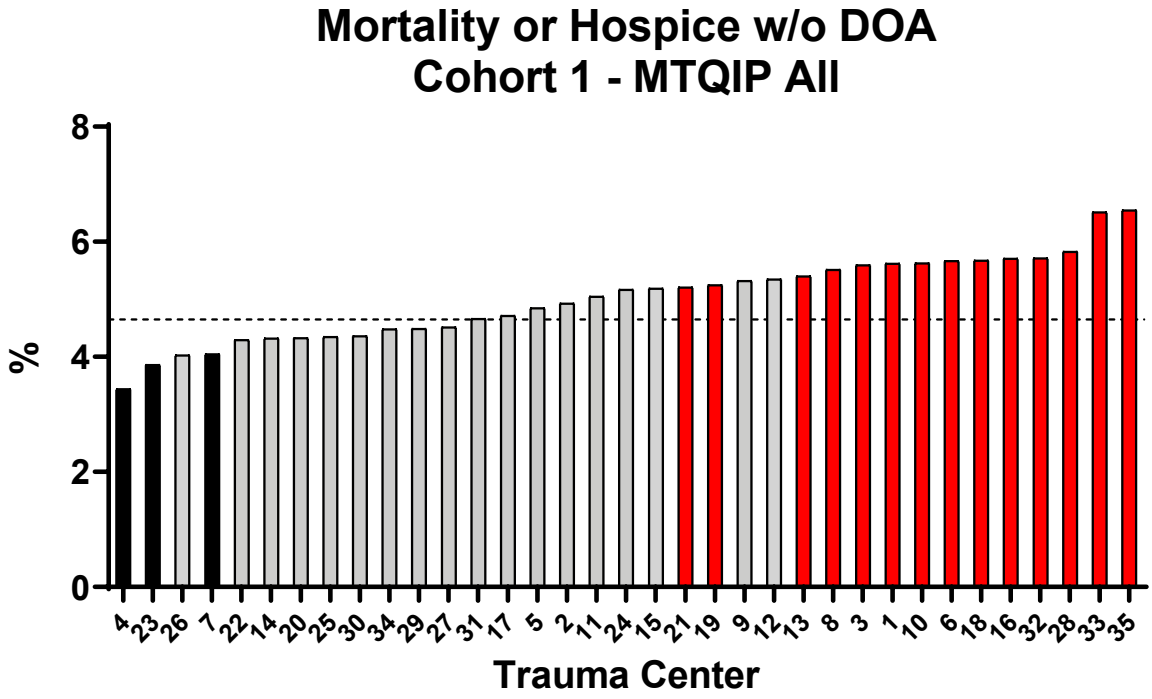

Mortality w/o DOA
Cohort 5 - Penetrating
15
10
5
0
%
23 34 24 4 29 30 26 25 27 2 13 22 28 14 7 31 17 8 20 19 15 5 6 21 11 32 3 16 9 12 10 18 35 1 33
Trauma Center

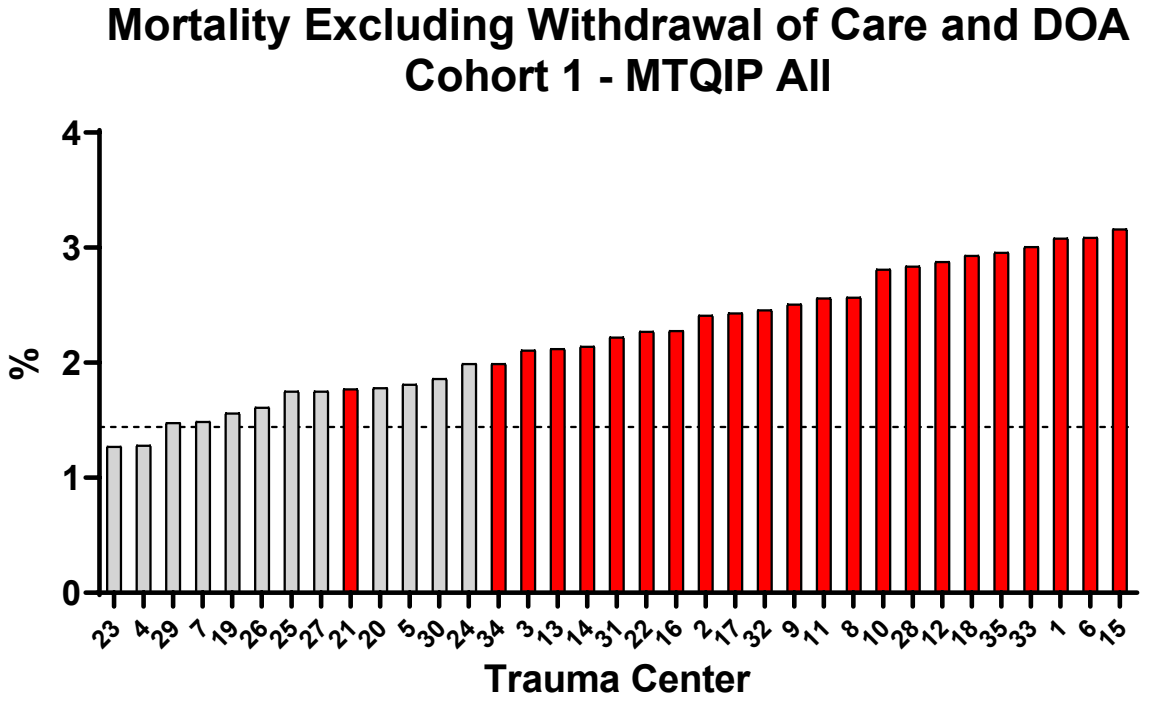
Mortality w/o DOA
Cohort 6 - Admit to Non-Trauma Service

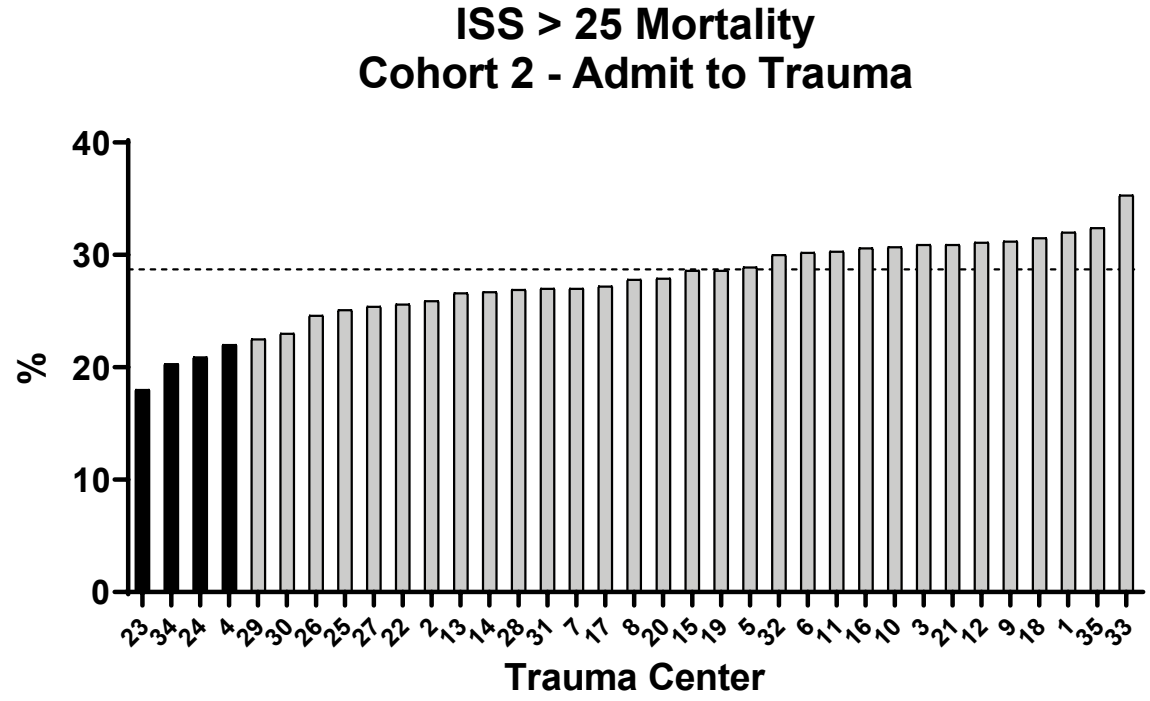


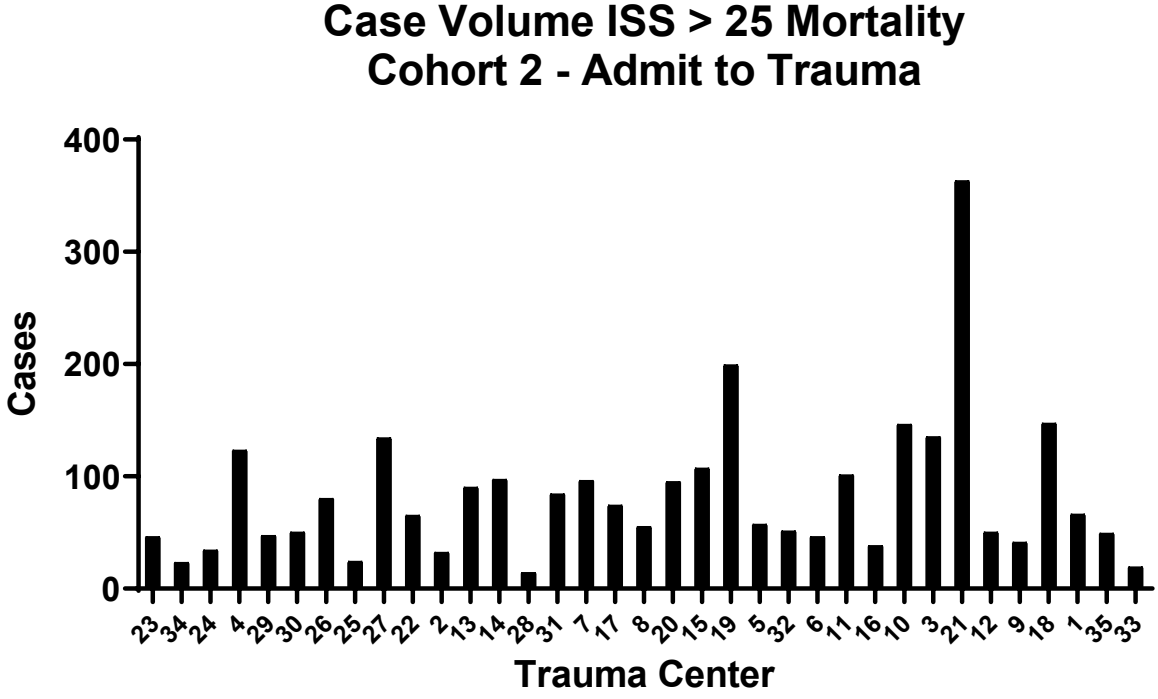
Mortality
Cohort 7 - National Benchmark

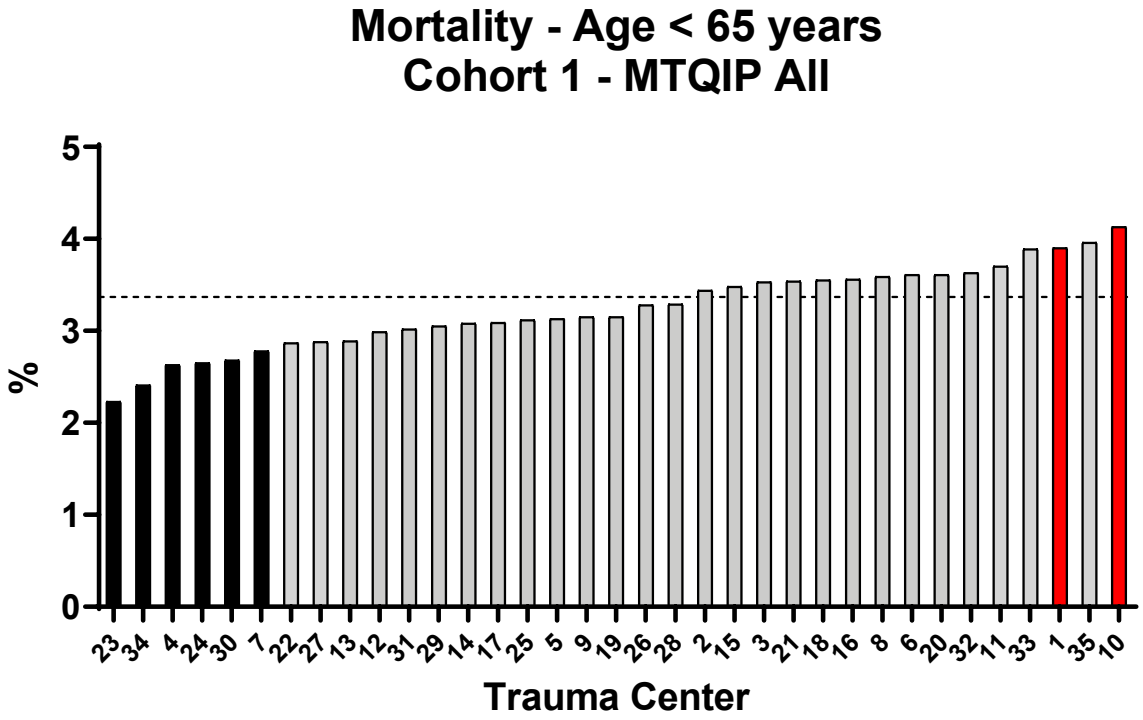


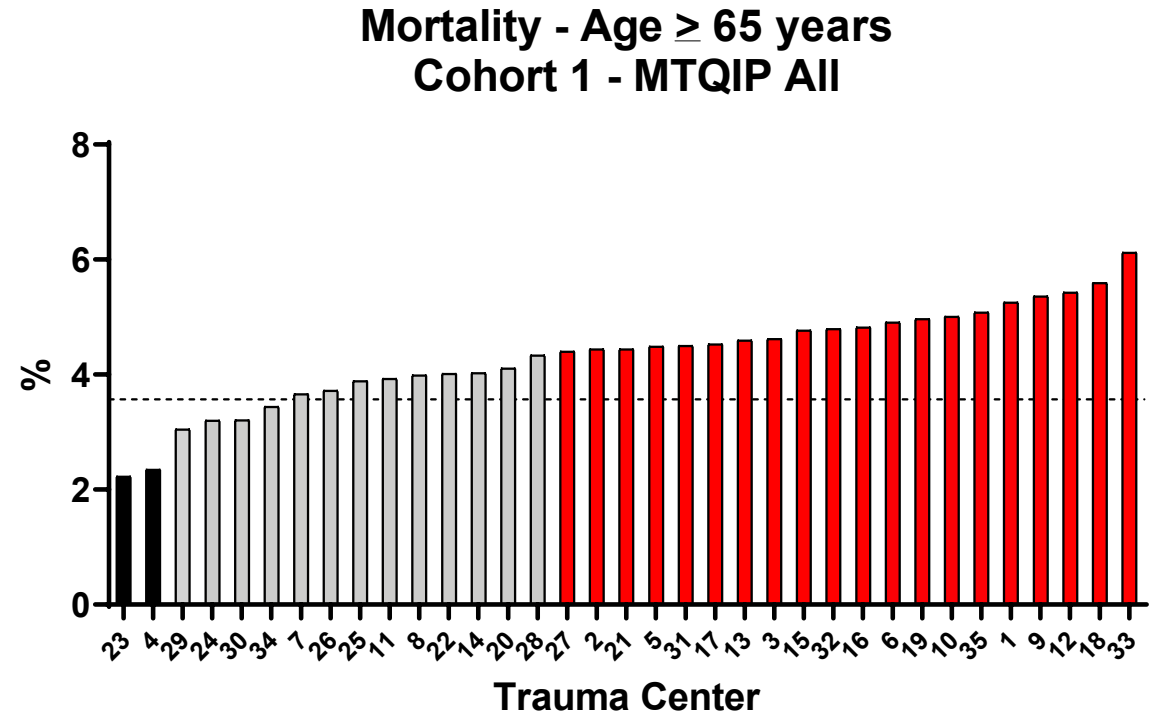

Mortality or Hospice w/o DOA
Cohort 1 - MTQIP All
%
0
2
4
6
8
4 23 26 7 22 14 20 25 30 34 29 27 31 17 5 2 11 24 15 21 19 9 12 13 8 3 1 10 6 18 16 32 28 33 35
Trauma Center

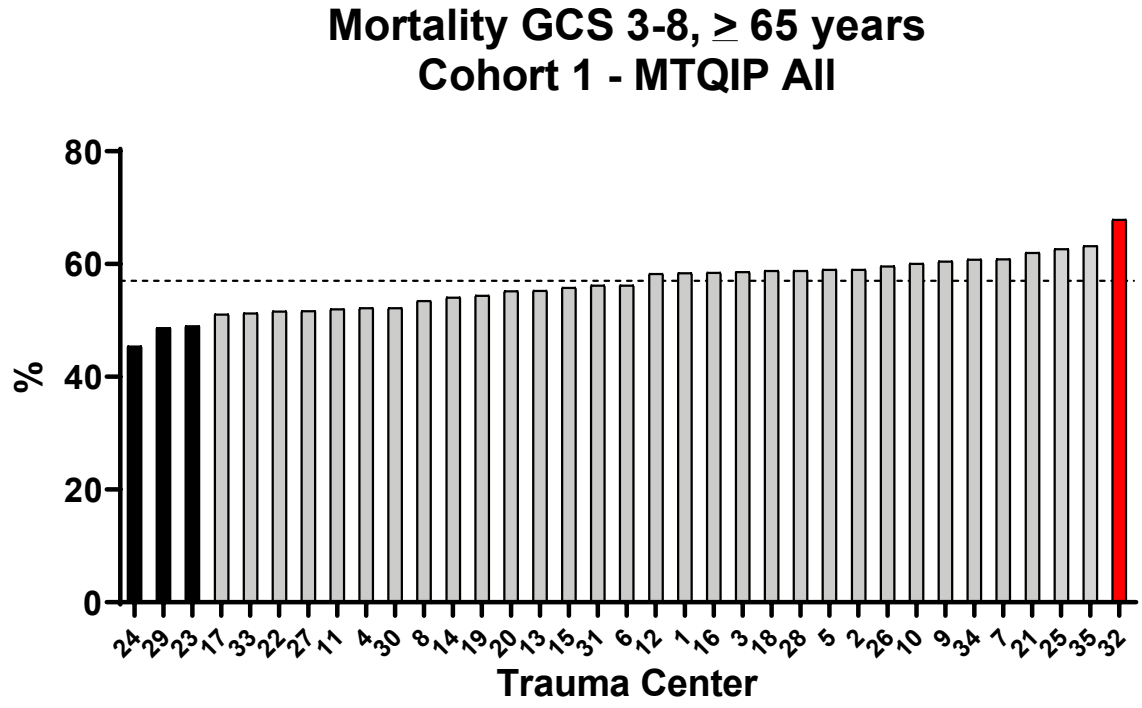

Mortality Excluding Withdrawal of Care and DOA
Cohort 1 - MTQIP All
%
0
1
2
3
4
23 4 29 7 19 26 25 27 21 20 5 30 24 34 3 13 14 31 22 16 2 17 32 9 11 8 10 28 12 18 35 33 1 6 15
Trauma Center

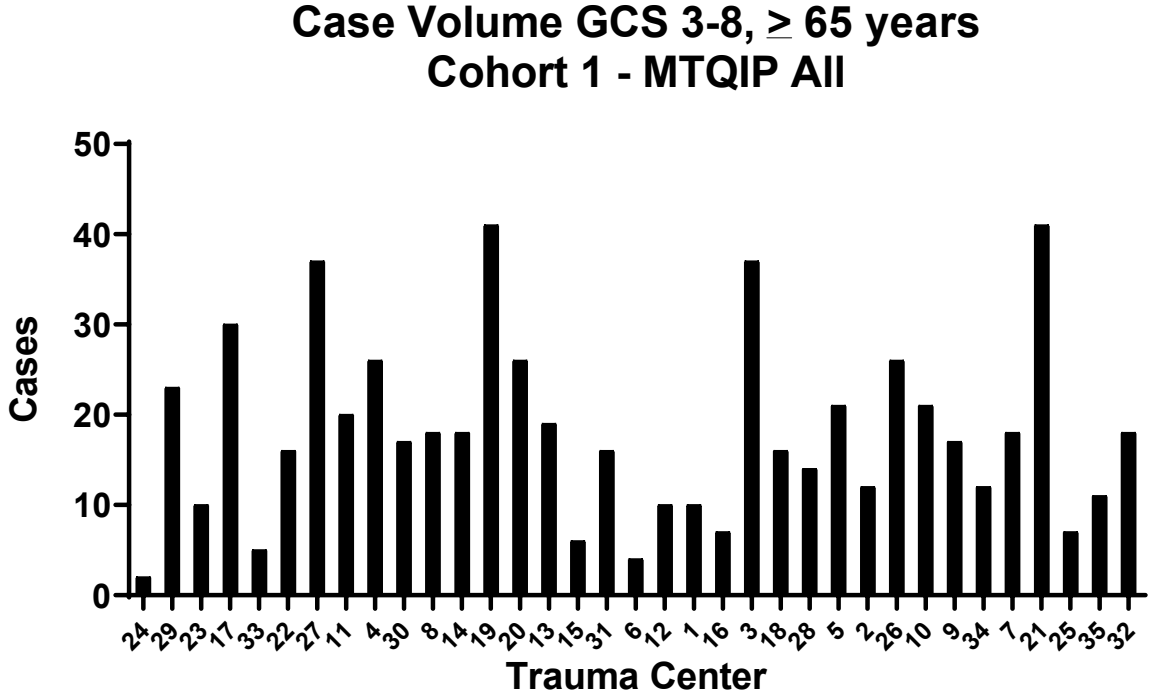

ISS > 25 Mortality
Cohort 2 - Admit to Trauma
%
40
30
20
10
0
23 34 24 4 29 30 26 25 27 22 2 13 14 28 31 7 17 8 20 15 19 5 32 6 11 16 10 3 21 12 9 18 1 35 33
Trauma Center

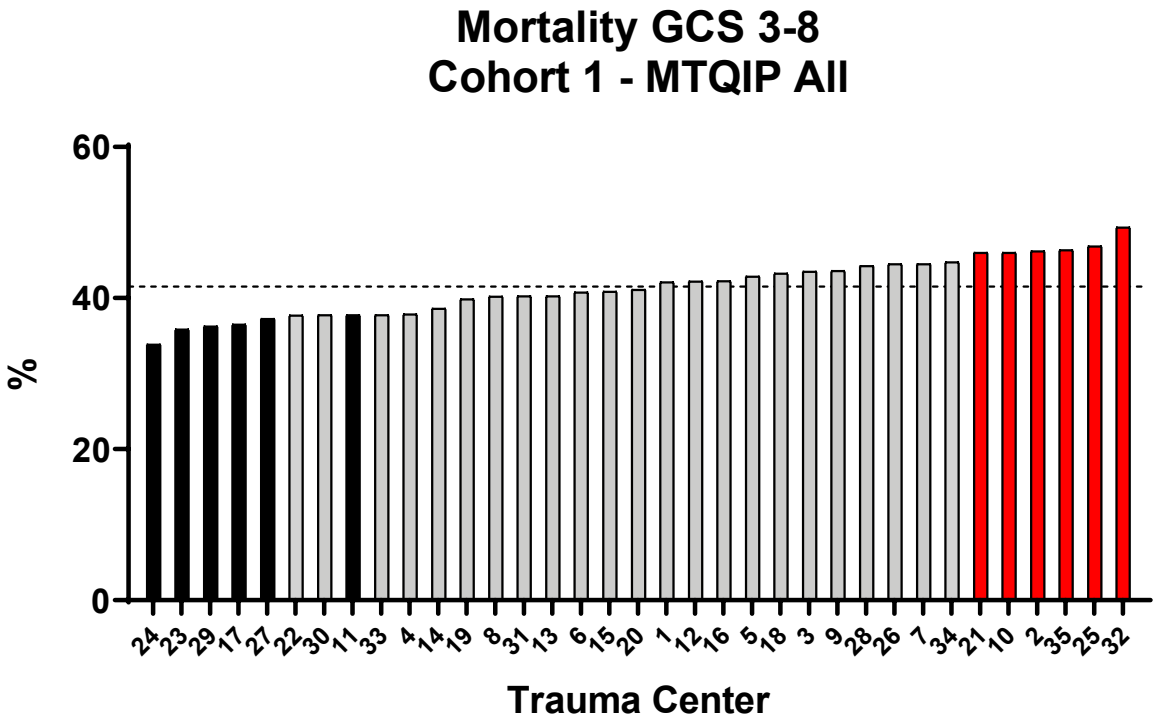

Case Volume ISS > 25 Mortality
Cohort 2 - Admit to Trauma
Cases
400
300
200
100
0
23 34 24 4 29 30 26 25 27 22 2 13 14 28 31 7 17 8 20 15 19 5 32 6 11 16 10 3 21 12 9 18 1 35 33
Trauma Center

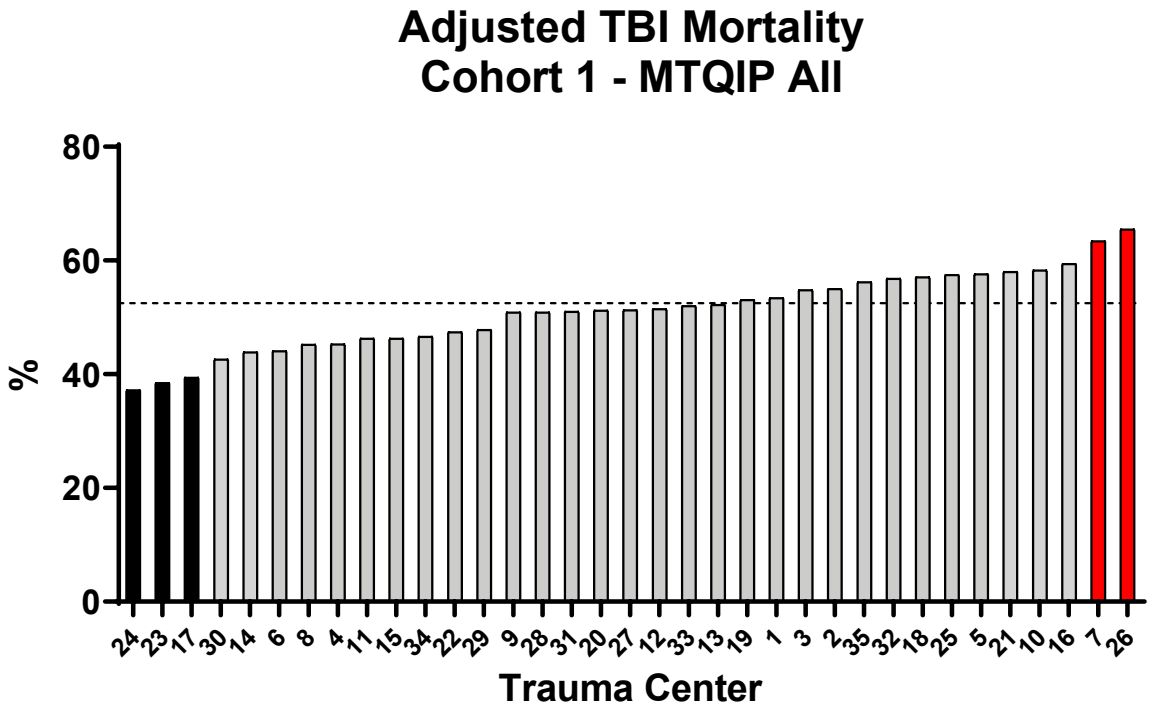

Mortality - Age < 65 years
Cohort 1 - MTQIP All
%
0
1
2
3
4
5
23 34 4 24 30 7 22 27 13 12 31 29 14 17 25 5 9 19 26 28 2 15 3 21 18 16 8 6 20 32 11 33 1 35 10
Trauma Center


Mortality - Age ≥ 65 years
Cohort 1 - MTQIP All
%
0
2
4
6
8
23 4 29 24 30 34 7 26 25 11 8 22 14 20 28 27 2 21 5 31 17 13 3 15 32 16 6 19 10 35 1 9 12 18 33
Trauma Center


Mortality GCS 3-8, ≥ 65 years
Cohort 1 - MTQIP All
%
80
60
40
20
0
24 29 23 17 33 22 27 11 4 30 8 14 19 20 13 15 31 6 12 1 16 3 18 28 5 2 26 10 9 34 7 21 25 35 32
Trauma Center


Case Volume GCS 3-8, ≥ 65 years
Cohort 1 - MTQIP All
Cases
50
40
30
20
10
0
24 29 23 17 33 22 27 11 4 30 8 14 19 20 13 15 31 6 12 1 16 3 18 28 5 2 26 10 9 34 7 21 25 35 32
Trauma Center


Mortality GCS 3-8
Cohort 1 - MTQIP All
60
40
20
0
%
24 23 29 17 27 22 30 11 33 4 14 19 8 31 13 6 15 20 1 12 16 5 18 3 9 28 26 7 34 21 10 2 35 25 32
Trauma Center


Adjusted TBI Mortality
Cohort 1 - MTQIP All
80
60
40
20
0
%
24 23 17 30 14 6 8 4 11 15 34 22 29 9 28 31 20 27 12 33 13 19 1 3 2 35 32 18 25 5 21 10 16 7 26
Trauma Center

Appendix

Description of Cohorts

Cohort 1 (All)

1) Mechanism = Blunt or penetrating
2) Age ≥ 18, Age ≥ 16 starting 1/1/13
3) ISS ≥ 5
4) Hospital LOS ≥ 1 day or dead

Cohort 1 (All) w/o DOA's

1) Mechanism = Blunt or penetrating
2) Age ≥ 18, Age ≥ 16 starting 1/1/13
3) ISS ≥ 5
4) Hospital LOS ≥ 1 day or dead
5) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

Cohort 2 (Admit trauma)

1) Mechanism = Blunt or penetrating
2) Age ≥ 18, Age ≥ 16 starting 1/1/13
3) ISS ≥ 5
4) Hospital LOS ≥ 1 day or dead
5) Admit to trauma service if ED disposition not death

Cohort 2 (Admit trauma) w/o DOA's

1) Mechanism = Blunt or penetrating
2) Age ≥ 18, Age ≥ 16 starting 1/1/13
3) ISS ≥ 5
4) Hospital LOS ≥ 1 day or dead
5) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
6) Admit to trauma service if ED disposition not death

Cohort 3 (Blunt Multi-System)

1) Mechanism = Blunt
2) Age ≥ 18, Age ≥ 16 starting 1/1/13
3) ISS ≥ 5
4) Hospital LOS ≥ 1 day or dead
5) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
6) AIS ≥ 3 in at least two of the following body regions: head/neck, face, chest, abdomen, extremities, or external.

Cohort 4 (Blunt Single-System)

1) Mechanism = Blunt

2) Age ≥ 18, Age ≥ 16 starting 1/1/13
3) ISS ≥ 5
4) Hospital LOS ≥ 1 day or dead
5) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
6) AIS ≥ 3 limited to only one body region with all other body regions having a maximum AIS ≤ 2 in the following body regions: head/neck, face, chest, abdomen, extremities, or external.

Cohort 5 (Penetrating)

1) Mechanism = Penetrating
2) Age ≥ 18, Age ≥ 16 starting 1/1/13
3) ISS ≥ 5
4) Hospital LOS ≥ 1 day or dead
5) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

Cohort 6 (Admit non-trauma Service)

1) Mechanism = Blunt or Penetrating
2) Age ≥ 18, Age ≥ 16 starting 1/1/13
3) ISS ≥ 5
4) Hospital LOS ≥ 1 day or dead
5) Admit to non-trauma service if ED disposition not death
6) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

Cohort 7 (Benchmark)

1) Age $\geq$ 16
2) ISS $\geq$ 9
3) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
4) Exclude patients who were transferred out
5) Exclude patients discharged directly from the ED alive
6) Exclude patients with an advanced directive limiting care present prior to injury
7) Exclude patients who sustain a hip fracture and fall and age $\geq$ 65

Note: this benchmark may not match your national benchmark report exactly. The MTQIP uses AIS 2005. The national benchmark uses ICD-9 with crosswalk to AIS 1998.

Cohort 8 (Isolated Hip Fracture)

1) Mechanism derived from external cause code = Fall
2) Injury codes
    a. AIS code =
        i. 851810 (femur fracture intertrochanteric)
        ii. 851812 (femur fracture neck)
        iii. 851818 (femur fracture subtrochanteric)
        iv. 853111 (proximal femur fracture NFS)
        v. 853112 (proximal femur fracture open NFS)

vi. 853151 (proximal femur fracture trochanteric; intertrochanteric)
vii. 853152 (proximal femur fracture trochanteric; intertrochanteric open)
viii. 853161 (proximal femur fracture femoral neck)
ix. 853162 (proximal femur fracture femoral neck open)
x. 853171 (proximal femur fracture femoral neck)
xi. 853172 (proximal femur fracture femoral neck open)

b. ICD-9 code =
   i. 820.22 (closed fracture of subtrochanteric section of neck of femur)
   ii. 820.32 (open fracture of subtrochanteric section of neck of femur)

c. ICD-10 code =
   i. S72.21XA (Displaced subtrochanteric fracture of right femur, initial encounter for closed fracture)
   ii. S72.21XB (Displaced subtrochanteric fracture of right femur, initial encounter for open fracture type I or II)
   iii. S72.21XC (Displaced subtrochanteric fracture of right femur, initial encounter for open fracture type IIIA, IIIB, or IIIC)
   iv. S72.22XA (Displaced subtrochanteric fracture of left femur, initial encounter for closed fracture)
   v. S72.22XB (Displaced subtrochanteric fracture of left femur, initial encounter for open fracture type I or II)
   vi. S72.22XC (Displaced subtrochanteric fracture of left femur, initial encounter for open fracture type IIIA, IIIB, or IIIC)
   vii. S72.23XA (Displaced subtrochanteric fracture of unspecified femur, initial encounter for closed fracture)
   viii. S72.23XB (Displaced subtrochanteric fracture of unspecified femur, initial encounter for open fracture type I or II)
   ix. S72.23XC (Displaced subtrochanteric fracture of unspecified femur, initial encounter for open fracture type IIIA, IIIB, or IIIC)
   x. S72.24XA (Nondisplaced subtrochanteric fracture of right femur, initial encounter for closed fracture)
   xi. S72.24XB (Nondisplaced subtrochanteric fracture of right femur, initial encounter for open fracture type I or II)
   xii. S72.24XC (Nondisplaced subtrochanteric fracture of right femur, initial encounter for open fracture type IIIA, IIIB, or IIIC)
   xiii. S72.25XA (Nondisplaced subtrochanteric fracture of left femur, initial encounter for closed fracture)
   xiv. S72.25XB (Nondisplaced subtrochanteric fracture of left femur, initial encounter for open fracture type I or II)
   xv. S72.25XC (Nondisplaced subtrochanteric fracture of left femur, initial encounter for open fracture type IIIA, IIIB, or IIIC)
   xvi. S72.26XA (Nondisplaced subtrochanteric fracture of unspecified femur, initial encounter for closed fracture)
   xvii. S72.26XB (Nondisplaced subtrochanteric fracture of unspecified femur, initial encounter for open fracture type I or II)

xviii. S72.26XC (Nondisplaced subtrochanteric fracture of unspecified femur, initial encounter for open fracture type IIIA, IIIB, or IIIC)

3) All other injuries must be in AIS external body region (i.e., bruise, abrasion or laceration)
4) Age $\geq$ 50 unless otherwise specified

Mortality or Hospice

1) Mechanism = Blunt or penetrating
2) Age ≥ 18, Age ≥ 16 starting 1/1/13
3) ISS ≥ 5
4) Hospital LOS ≥ 1 day or dead
5) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
6) Outcome is dead or discharge to hospice

ISS > 35 Mortality

1) Mechanism = Blunt or penetrating
2) Age ≥ 18, Age ≥ 16 starting 1/1/13
3) ISS > 35
4) Hospital LOS ≥ 1 day or dead
5) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

Age < 65 Mortality

1) Mechanism = Blunt or penetrating
2) Age ≥ 18, Age ≥ 16 starting 1/1/13 and Age < 65
3) ISS ≥ 5
4) Hospital LOS ≥ 1 day or dead
5) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

Age ≥ 65 Mortality

1) Mechanism = Blunt or penetrating
2) Age ≥ 65
3) ISS ≥ 5
4) Hospital LOS ≥ 1 day or dead
5) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

Mortality Trend

1) Cohort 2
2) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

Complications Trend

1) Cohort 2
2) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)

Complications

1) Cohort 2 w/o DOA's

2) Complication severity grade 1
    a. Definition: Non-life-threatening complications
    b. Complications: superficial SSI, wound disruption, deep SSI, catheter-related bloodstream infection, catheter-associated urinary tract infection, organ/space SSI, drug or alcohol withdrawal syndrome, osteomyelitis
3) Complication severity grade 2
    a. Definition: Potentially life-threatening complications
    b. Complications: admission to ICU, pneumonia, unplanned return to OR, DVT, decubitus ulcer, C. difficile colitis, pulmonary embolism, enterocutaneous fistula, extremity compartment syndrome
4) Complication severity grade 3
    a. Definition: Life-threatening complications with residual or lasting disability
    b. Complications: cardiac arrest with CPR, acute kidney injury, ARDS, myocardial infarction, unplanned intubation, stroke/CVA, severe sepsis, acute renal insufficiency, mortality
5) Specific complication groups
    a. Any complication = Grade 1 + Grade 2 + Grade 3 (excluding death)
    b. Serious = Grade 2 + Grade 3 (excluding death)
    c. Cardiac/Stroke = stroke/CVA, cardiac arrest requiring CPR, myocardial infarction
    d. Pneumonia = pneumonia
    e. DVT/Pulmonary Embolus = DVT lower extremity, DVT upper extremity, pulmonary embolism
    f. UTI = urinary tract infection
    g. Renal Failure = acute kidney injury
    h. Sepsis = sepsis
    i. C. Difficile Colitis = C. diff

Failure to Rescue

1) Mechanism = Blunt or penetrating
2) Age ≥ 18, Age ≥ 16 starting 1/1/13
3) ISS ≥ 5
4) Hospital LOS ≥ 1 day or dead
5) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
6) Admit to trauma service if ED disposition not death
7) Exclude patients who did not have a severity grade 2 or 3 complication
8) Failure to rescue = n dead with complication / n with complication

Note: A patient can have four possible combinations: dead/no complication, dead/complication, alive/no complication, or alive/complication. Failure to rescue is the percent of patients with an identified complication who go on to die.

Unplanned Return to OR

1) Cohort 2

2) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
3) Unplanned return to OR = Y

Unplanned Return to ICU

1) Cohort 2
2) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
3) Unplanned return to ICU = Y

Hospital Length of Stay

1) Cohort 2
2) Exclude all deaths

Intensive Care Unit Length of Stay

1) Cohort 2
2) Exclude all deaths
3) Exclude all patients with ICU LOS < 1

Patients Admitted to ICU

1) Cohort 1
2) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
3) ICU days > 0

Mechanical Ventilator Days

1) Cohort 2
2) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
3) Exclude all patients with Mechanical Ventilator Days < 1

VAP

1) Cohort 2
2) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
3) Exclude patients with Mechanical Ventilator Days < 1

Patients on Ventilator

1) Cohort 1
2) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
3) Mechanical Ventilator days > 0

IVC Filter

1) Cohort 1
2) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
3) Op Code 38.7, 06H00DZ, 06H03DZ, 06H04DZ, 06V03DZ, or 06V03ZZ

ICP Monitor and/or Brain Operation

1) Cohort 1
2) Mechanism = Blunt
3) AIS Head ≥1, excluding vascular, scalp, and bony injuries

4) Exclude if TBI GCS>8
5) Exclude patients who had no signs of life (ED HR 0, BP 0, GCS 3)
6) Exclude patients who were transferred late (Direct admit)

Blood

1) Cohort 1
2) PRBC 4 hours ≥ 5 units

Hemorrhage Control Angiography/Operation

1) Cohort 1
2) Lowest systolic BP ≤ 90 in ED
3) Exclude if first angiography/operation < 0 or > 24 hours

No Signs of Life

1) Patients will be designated as having arrived at the ED with "no signs of life" if they meet one of the following criteria and die in the ED
2) ED SBP 0, HR 0, and GCS 3
3) ED SBP 0, HR 0, and mGCS 1
4) ED SBP = NK/NR, HR 0, and mGCS 1
5) ED SBP 0, HR 0, and mGCS = NK/NR
6) ED SBP 0, HR = NK/NR, and mGCS 1
7) ED SBP = NK/NR, HR 0, and mGCS = NK/NR

Legend

Low-outlier status (better performance)

Non-outlier status (average performance)

High-outlier status (worse performance)

Statistical Methods

We performed risk and reliability adjustment using a two-stage approach. Multivariate logistic regression modeling was used to account for differences in baseline characteristics and injury severity, thereby allowing for risk-adjustment at the patient level. Potential predictors of for the outcome of interest were entered into the model. A logit equation was derived based on the significant co-variates using forward selection. Separate models for each outcome were constructed and the order of variable entry was determined by the c-index which measures the ability of a parameter to discriminate outcome. Reliability adjustment used a Bayesian random effects model to account for sample size differences between hospitals. Logit equations resulting from second stage models were used to calculate expected outcome risk. Adjusted rates for each hospital were calculated by multiplying the rate ratio of observed to expected events by the overall collaborative rate

In some instances, specific incidents had missing values for potentially important co-variates (Glasgow Coma Scale (GCS) motor score, systolic blood pressure, and pulse rate). These attributes were identified and managed via the creation an indicator variable where applicable. The final model and analysis included all the incidents that met MTQIP entry criteria for the cohort being examined.

Continuous data exhibiting a right-skewed distribution such as hospital length of stay was natural log-transformed. Multivariate analysis of hospital length of stay, intensive care unit length of stay, and mechanical ventilator days was performed using multiple linear regression and adjusting for significant co-variates. After the regression analysis was conducted the generated coefficient from the regression model was exponentiated to determine the percent increase or decrease in length of stay relative to the risk adjusted mean. Only patients who survived were considered in the hospital and ICU length of stay analysis to simplify this approach. To be included in the ICU length of stay or mechanical ventilator days' analysis, a patient had to have at least one day of use for the resource being investigated.

Eligible = N - Alive w/o intervention - Dead and monitor withheld for reason

Eligible and no intervention = N - Alive w/o intervention - Alive with intervention - Dead with intervention - Dead and monitor withheld for reason

Timely = Monitor placement or operation ≤ 8 hours after ED arrival

Performance Index

Michigan Trauma Quality Improvement Program (MTQIP) 2020 Performance Index January 1, 2020 to December 31, 2020				
Measure	Weight	Measure Description	Points	
#1	10	**Data Submission** On time and complete 3 of 3 times On time and complete 2 of 3 times On time and complete 1 of 3 times	 10 5 0	PARTICIPATION (30%)
#2	10	**Meeting Participation** Surgeon and (TPM or MCR) participate in 3 of 3 Collaborative meetings (9 pt) Surgeon and (TPM or MCR) participate in 2 of 3 Collaborative meetings (6 pt) Surgeon and (TPM or MCR) participate in 0-1 of 3 Collaborative meetings (0 pt) Registrar or MCR participate in the Annual June Data Abstractor meeting (1 pt)	0-10	
#3	10	**Data Validation Error Rate** 0-4.0% 4.1-5.0% 5.1-6.0% 6.1-7.0% > 7.0%	 10 8 5 3 0	
#4	10	**Timely LMWH VTE Prophylaxis in Trauma Service Admits** (18 mo: 1/1/19-6/30/20) ≥ 50% of patients (≤ 48 hr) ≥ 45% of patients (≤ 48 hr) ≥ 40% of patients (≤ 48 hr) < 40% of patients (≤ 48 hr)	 10 8 5 0	PERFORMANCE (70%)
#5	10	**Timely Surgical Repair in Geriatric (Age ≥ 65) Isolated Hip Fxs** (12 mo: 7/1/19-6/30/20) ≥ 90% of patients (≤ 48 hr) ≥ 85% of patients (≤ 48 hr) ≥ 80% of patients (≤ 48 hr) < 80% of patients (≤ 48 hr)	 10 8 5 0	
#6	10	**RBC to Plasma Ratio in Massive Transfusion** (18 mo: 1/1/19-6/30/20) Weighted Mean Points in Patients Transfused ≥ 5 Units 1st 4 hr	0-10	
#7	10	**Serious Complication Z-Score Trend in Trauma Service Admits** (3 yr: 7/1/17-6/30/20) < -1 (major improvement) -1 to 1 or serious complications low-outlier (average or better rate) > 1 (rates of serious complications increased)	 10 7 5	
#8	10	**Mortality Z-Score Trend in Trauma Service Admits** (3 yr: 7/1/17-6/30/20) < -1 (major improvement) -1 to 1 or mortality low-outlier (average or better) > 1 (rates of mortality increased)	 10 7 5	
#9	10	**Timely Head CT in TBI Patients on Anticoagulation Pre-Injury** (12 mo: 7/1/19-6/30/20) ≥ 90% patients (≤ 120 min) ≥ 80% patients (≤ 120 min) ≥ 70% patients (≤ 120 min) < 70% patients (≤ 120 min)	 10 7 5 0	
#10	10	**Timely Antibiotic in Femur/Tibia Open Fractures - Collaborative Wide Measure** (12 mo: 7/1/19-6/30/20) ≥ 85% patients (≤ 120 min) < 85% patients (≤ 120 min)	 10 0	
		Total (Max Points) =	100	

Additional Information

Measure 1: Data Submission: Partial/incomplete submissions receive no points

Measure 2: Meeting Participation: Surgeon represents 1 center only, Alternate must be equivalent attending level

Measure 3: Data Validation Error Rate: Centers not selected for validation this year will receive full points. Center's that are selected, but do not schedule a visit will receive 0 points for the validation measure.

Measure 6: RBC to Plasma Ratio in Massive Transfusion

Step 1: Assign (weight) to each individual patient's 4 hr PRBC/FPP ratio to designated tier/points using chart below

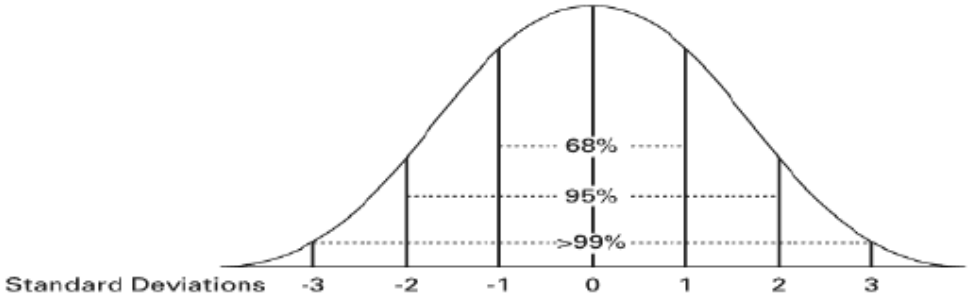
Step 2: Add the points and divide by number of patients (weighted average) See example below:

Step One		
PRBC to Plasma Ratio	Tier	Points
≤1.5	1	10
1.6 – 2.0	2	10
2.1 – 2.5	3	5
>2.5	4	0

Step Two (Example)					
Patient	PRBC	FFP	PRBC/FFP	Tier	Points
1	10	10	1.0	1	10
2	5	2	2.5	3	5
3	9	2	4.5	4	0
					Total 15
Total Points/Total #Patients = 15/3 = 5 points earned					

Measure 7 & 8: Z-Score Trend Calculation

The z-score is a measure of a hospital's trend in [serious complications, mortality] over the three-year time period. For each hospital, we fit a linear regression model with [serious complications, mortality] as the outcome, and time period and patient characteristics as the explanatory variables. The z-score is an estimate of the slope of a hospital's own linear trend line over time, standardized by the error estimate. The score indicates whether the hospital's performance is flat or trending upwards or downwards. If the z-score is one standard deviation away (either >1 or <-1), there is more evidence that the hospital's performance has a linear trend in one of these directions (as opposed to being flat). Scores >1 are worsening, scores between 1 to -1 are staying the same, and scores < -1 are improving.



Measure 7: Serious Complication is Any Complication with Severity Grade of 2 or 3 (Defined Below)

Complication Severity Grade 2

Definition: Potentially life-threatening complications

Complications: C. difficile colitis, decubitus ulcer, DVT, enterocutaneous fistula, extremity compartment syndrome, pneumonia (including VAP), pulmonary embolism, unplanned admission to ICU, unplanned return to OR

Complication Severity Grade 3

Definition: Life-threatening complications with residual or lasting disability

Complications: ARDS, acute renal failure, cardiac arrest, myocardial infarction, renal insufficiency, stroke/CVA, systemic sepsis, unplanned intubation

Collaborative Wide Measure:

Points awarded based on total collaborative result, not individual hospital result

Scoring When Center Has No Patients Meeting Measure Criteria

When a center has no patients to score for a measure, that measure will be excluded from their performance index denominator. Example: A center with no massive transfusion patients will have the measure (worth 10 points) excluded and their maximum total numerator will be 90 points, the denominator will be 90 points and a new % (points) calculated by dividing the numerator by the denominator.

Filters

#4: Timely LMWH VTE Prophylaxis in Trauma Service Admits
Practices > VTE Prophylaxis Metric
LMWH ≤ 48 hr
Cohort: 2 (Admit to Trauma Service) > 2 day LOS
No Signs of Life: Exclude DOAs
Transfers Out: Exclude Transfers Out
Default Period: Custom (1/1/19 to 6/30/20)

#5: Timely Surgical Repair in Geriatric (Age ≥ 65) Isolated Hip Fracture
Cohort: 8 (Isolated hip fracture)
Age: ≥ 65
No Signs of Life: Exclude DOAs
Transfers out: Exclude Transfers Out
Default Period: Custom (7/1/19 to 6/30/20)

#6: Red Blood Cell to Plasma Ratio in Massive Transfusion
Hemorrhage
Cohort: 1 (All)
No Signs of Life: Include DOAs
Transfers Out: Include Transfers Out
Default Period: Custom (1/1/19 to 6/30/20)

#7: Serious Complication
Cohort: 2 (Admit to Trauma Service)
No Signs of Life: Exclude DOA
Transfers Out: Exclude Transfers Out
Default Period: Custom (7/1/17 to 6/30/20)

#8: Mortality
Cohort: 2 (Admit to Trauma Service)
No Signs of Life: Exclude DOA
Transfers Out: Exclude Transfers Out
Default Period: Custom (7/1/17 to 6/30/20)

#9: Timely Head CT in Anticoagulated TBI
First Head CT performed: date, time from procedures data
Eligible: Presence of prehospital anticoagulant use. One or more of the following variables captured as yes: Warfarin, direct thrombin inhibitor, factor Xa inhibitor.
Presence of a head injury with blunt mechanism based on AIS codes (list available on request)
Cohort: 1 (All)
Exclude: Direct admissions and Transfers in
No Signs of Life: Exclude DOAs
Transfers Out: Include Transfers Out
Default Period: Custom (7/1/19 to 6/30/20)

#10: Timely Antibiotic in Femur/Tibia Open Fractures - Collaborative Wide Measure
Points awarded based on total collaborative result, not individual hospital result.
Type of antibiotic administered along with date and time for open fracture of femur or tibia.
Eligible: Presence of acute open femur or tibia fracture based on AIS or ICD10 codes (available on MTQIP.org)
Exclude: Direct admissions, Transfers in, and Death in ED
Cohort: 1 (All)
No Signs of Life: Exclude DOAs
Transfers Out: Include Transfers Out
Default Period: Custom (7/1/19 to 6/30/20)

Filter Index

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