The Michigan Trauma Quality Improvement Program

Grand Rapids, MI
May 13, 2015

Disclosures

- Salary Support for MTQIP from BCBSM
  - Mark Hemmila
  - Judy Mikhail
  - Jill Jakubus

Welcome/Introductions

- Guest Speaker
  - Amir Ghaferi, MD, University of Michigan
  - Donald Jenkins MD, Mayo Clinic (postponed)
- ASPIRE
  - Victoria (Tory) Lacca

ACS-TQIP

- Center Report
- Michigan Report
  - Executing contract for 2015 and 2016
  - Frequency
    - Two center outcome reports per year
    - One state report per year
- No Invoices
  - 2015
  - 2016

Data Submission

- DI
  - XML written
  - Server configuration and software install
  - Test data
  - V5 Report Writer Files, MTQIP tab Installs
- June Submission
  - 11/1/2013 to 2/28/2014 (minimum)
- ArborMetrix Website
  - Aim for 1 month turnaround
  - Data submitted 2/15 available April

Future Meetings

- Spring (Registrars)
  - Wednesday June 2, 2015
  - Ann Arbor, NCRC
- Fall
  - Tuesday October 13, 2015
  - Ypsilanti, EMU Marriott Conference Center
- Neurosurgery
  - Present MTQIP info at MANS – May 31st
  - Meeting ?

Dashboards
Web-Based Reporting Updates
Online PRQ
Validation

Jill Jakubus, PA-C, MHSA

Complications Dashboard
7/1/13 - 1/31/15

M·TQIP

Complication	Center 52	MTQIP	Status
Dead	4.40	4.48	
Failure to Rescue	21.64	17.48	
Superficial SSI	0.45	0.26	
Deep SSI	0.37	0.17	
Organ/Space SSI	0.82	0.22	
Wound Disruption	0.21	0.06	
Abd. Fascia Left Open	0.25	0.24	
Acute Lung Injury/ARDS	1.04	0.90	
Pneumonia	6.21	3.39	
Unplanned Intubation	1.20	1.14	

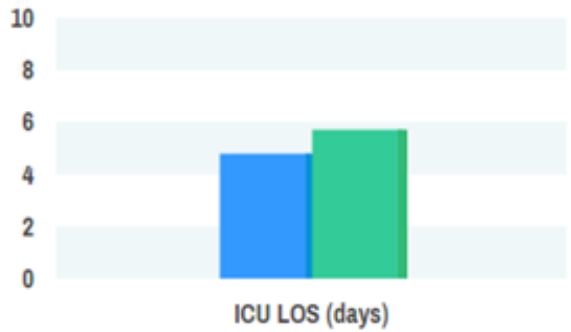
Low Outlier
Average
High Outlier

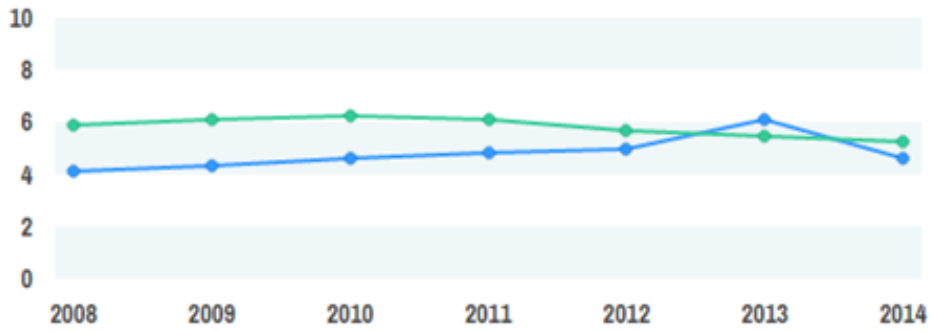
Increasing value to bridge analytics and clinical care

Utilization // Drill-Down

Cohort 2 (Admit to Trauma Service), ICU LOS (days)

LEGEND MTQIP - All Other Hospitals MTQIP - All 95% Confidence Interval





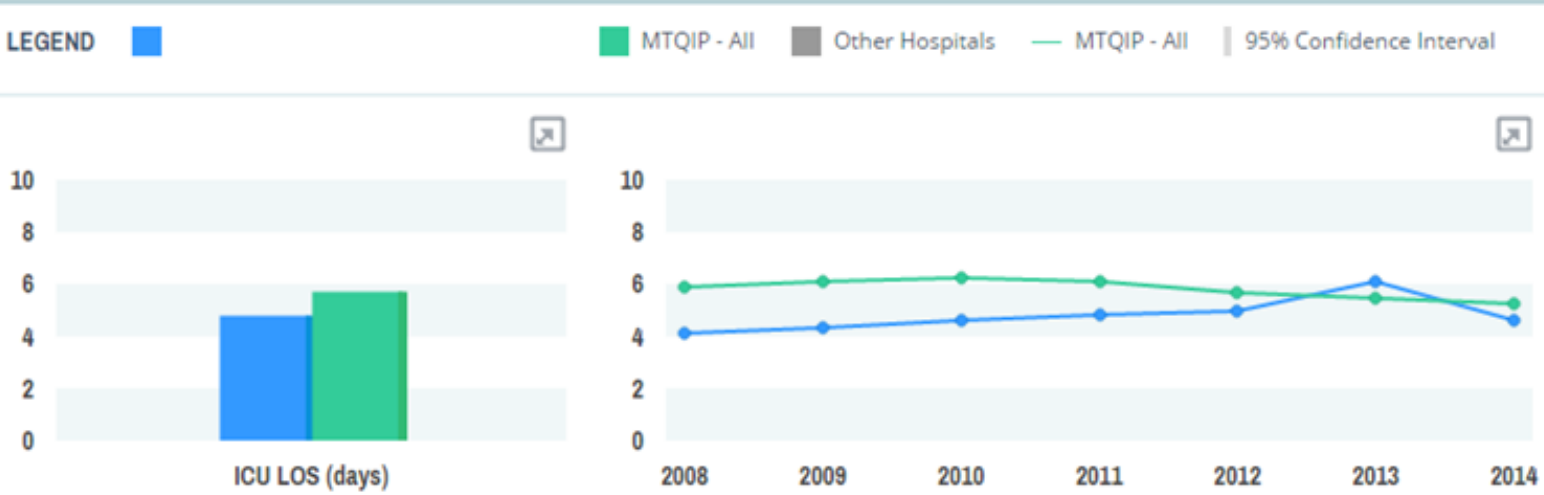
Utilization Drill-Down	Cases	
LOS (days)	3284	7.33
Extended LOS (%)	3284	13.3
ICU LOS (days)	1553	5.69
Patients Admitted to ICU (%)	3284	47.3
Ventilator Days	710	7.06
Patients on Ventilator (%)	3385	21

POWERED BY

Ver. 2.0.8

Utilization // Drill-Down

Cohort 2 (Admit to Trauma Service), ICU LOS (days)



Utilization Drill-Down	Cases	
LOS (days)	3284	7.33
Extended LOS (%)	3284	13.3
ICU LOS (days)	1553	5.69
Patients Admitted to ICU (%)	3284	47.3
Ventilator Days	710	7.06
Patients on Ventilator (%)	3385	21

POWERED BY
Ver. 2.0.8

Utilization // Drill-Down

Cohort 2 (Admit to Trauma Service), ICU LOS (days)

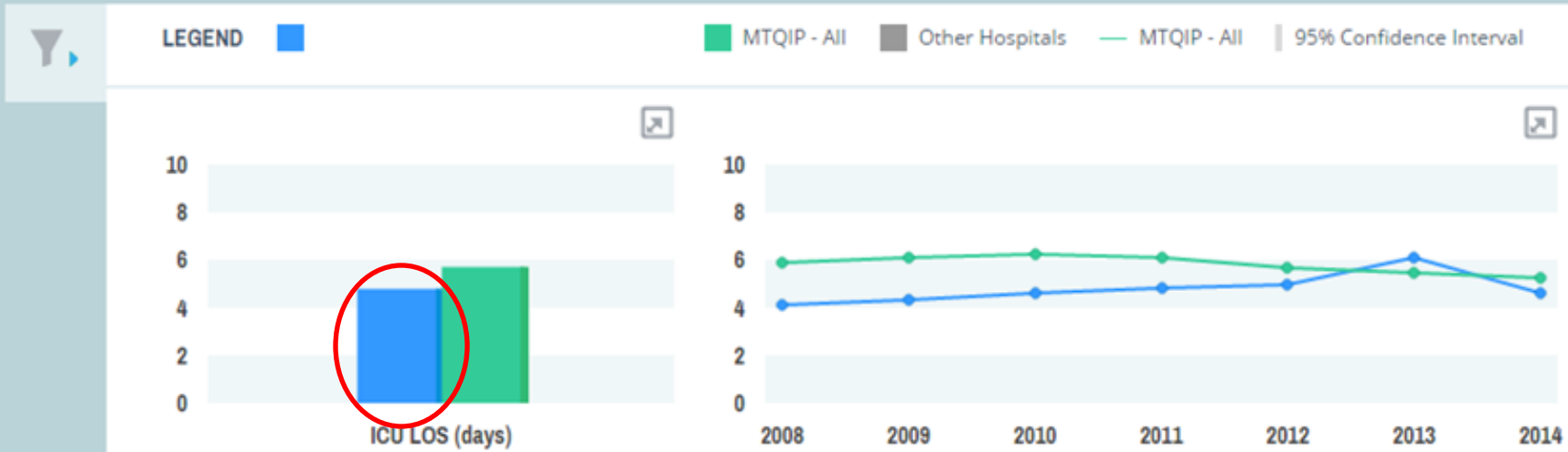
Utilization Drill-Down	Cases	
LOS (days)	3284	7.33
Extended LOS (%)	3284	13.3
ICU LOS (days)	1553	5.69
Patients Admitted to ICU (%)	3284	47.3
Ventilator Days	710	7.06
Patients on Ventilator (%)	3385	21

POWERED BY

Ver. 2.0.8

Utilization // Drill-Down

Cohort 2 (Admit to Trauma Service), ICU LOS (days)



Utilization Drill-Down	Cases	
LOS (days)	3284	7.33
Extended LOS (%)	3284	13.3
ICU LOS (days)	1553	5.69
Patients Admitted to ICU (%)	3284	47.3
Ventilator Days	710	7.06
Patients on Ventilator (%)	3385	21

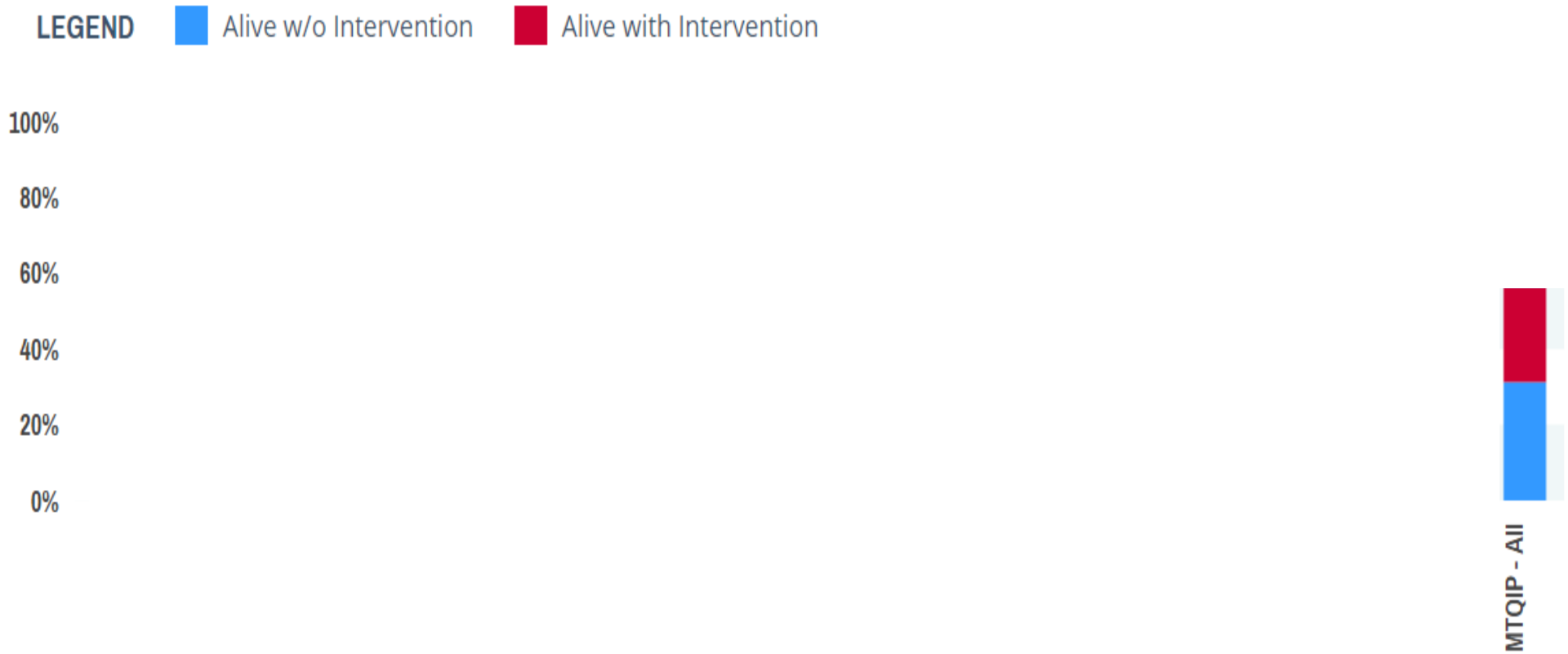
POWERED BY
Ver. 2.0.8

Monitor or Operation for Head Injury (7/1/2013 to 12/31/14)

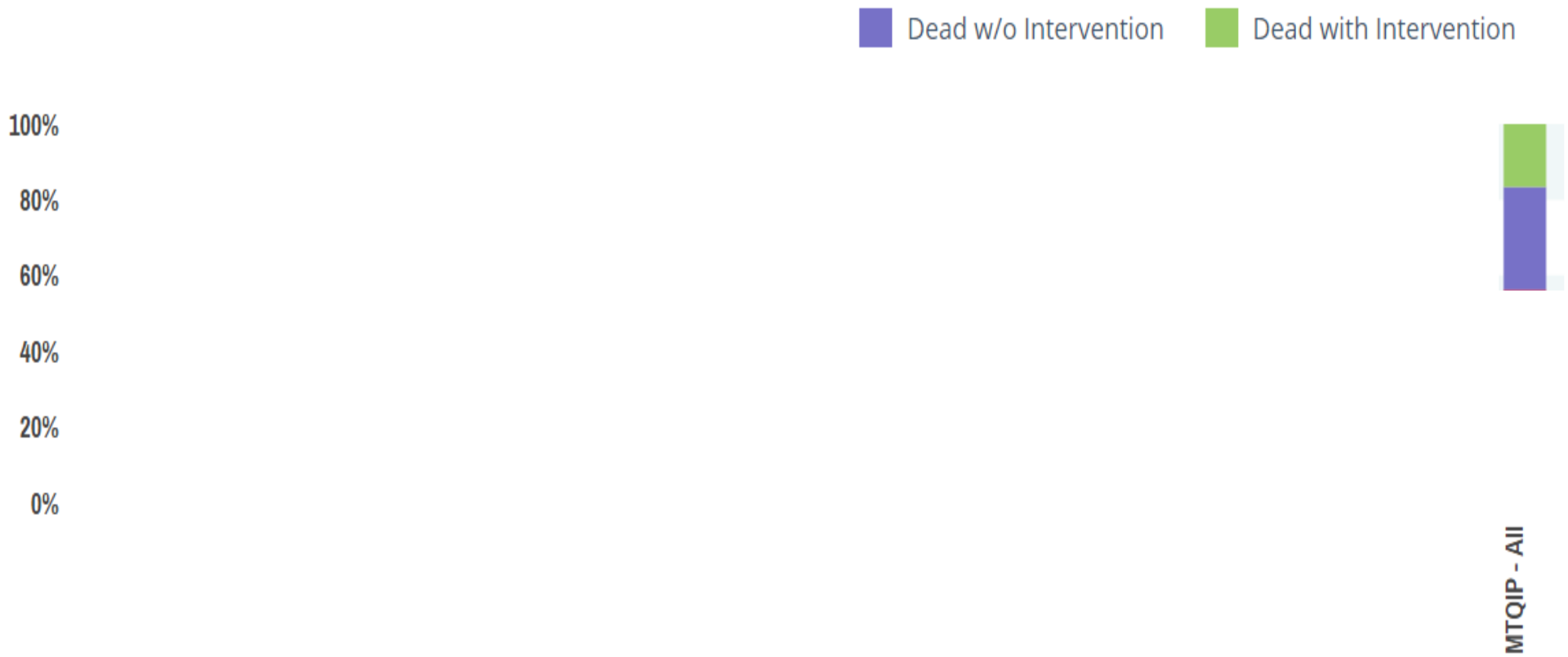
Inclusion:	Exclusion:	
AIS Head > 0	Penetrating Mechanism	No signs of life
	Direct Admit Transfer	Max GCS > 8 & TBI GCS > 8

Trauma Cente	N	Dead	Alive w/o Intervent	Alive with Intervent	Dead w/o Intervent	Dead with Intervent	Dead and Intervent Withheld	Eligible & no Intervent	Eligible	% Eligible w/no Interven	% Dead / N
21	96	49	22	25	30	19	24	6	50	12%	51%
27	62	23	24	15	13	10	0	13	38	34%	37%
19	53	26	19	8	15	11	11	4	23	17%	49%
18	52	29	7	16	18	11	11	7	34	21%	56%
1	49	20	13	16	10	10	0	10	36	28%	41%
4	46	13	13	20	6	7	6	0	27	0%	28%
3	42	27	5	10	14	13	8	6	29	21%	64%
10	39	20	9	10	14	6	0	14	30	47%	51%
11	33	20	5	8	15	5	7	8	21	38%	61%
17	30	13	10	7	6	7	1	5	19	26%	43%
5	23	10	8	5	8	2	2	6	13	46%	43%
20	22	10	7	5	7	3	3	4	12	33%	45%
13	21	10	9	2	6	4	3	3	9	33%	48%
12	20	16	2	2	13	3	5	8	13	62%	80%
14	20	7	7	6	5	2	0	5	13	38%	35%
6	20	11	6	3	6	5	0	6	14	43%	55%
22	19	9	3	7	5	4	1	4	15	27%	47%
9	17	8	5	4	7	1	7	0	5	0%	47%
15	17	5	2	10	4	1	2	2	13	15%	29%
8	14	7	3	4	3	4	1	2	10	20%	50%
7	14	13	1	0	8	5	7	1	6	17%	93%
23	13	7	4	2	4	3	3	1	6	17%	54%
24	13	5	6	2	3	2	0	3	7	43%	38%
2	11	5	3	3	2	3	1	1	7	14%	45%
26	9	4	3	2	1	3	0	1	6	17%	44%
16	9	5	1	3	0	5	0	0	8	0%	56%
25	8	6	1	1	6	0	4	2	3	67%	75%
Total	772	378	198	196	229	149	107	122	467	26%	49%

TBI Intervention > excluding DOA, program to date



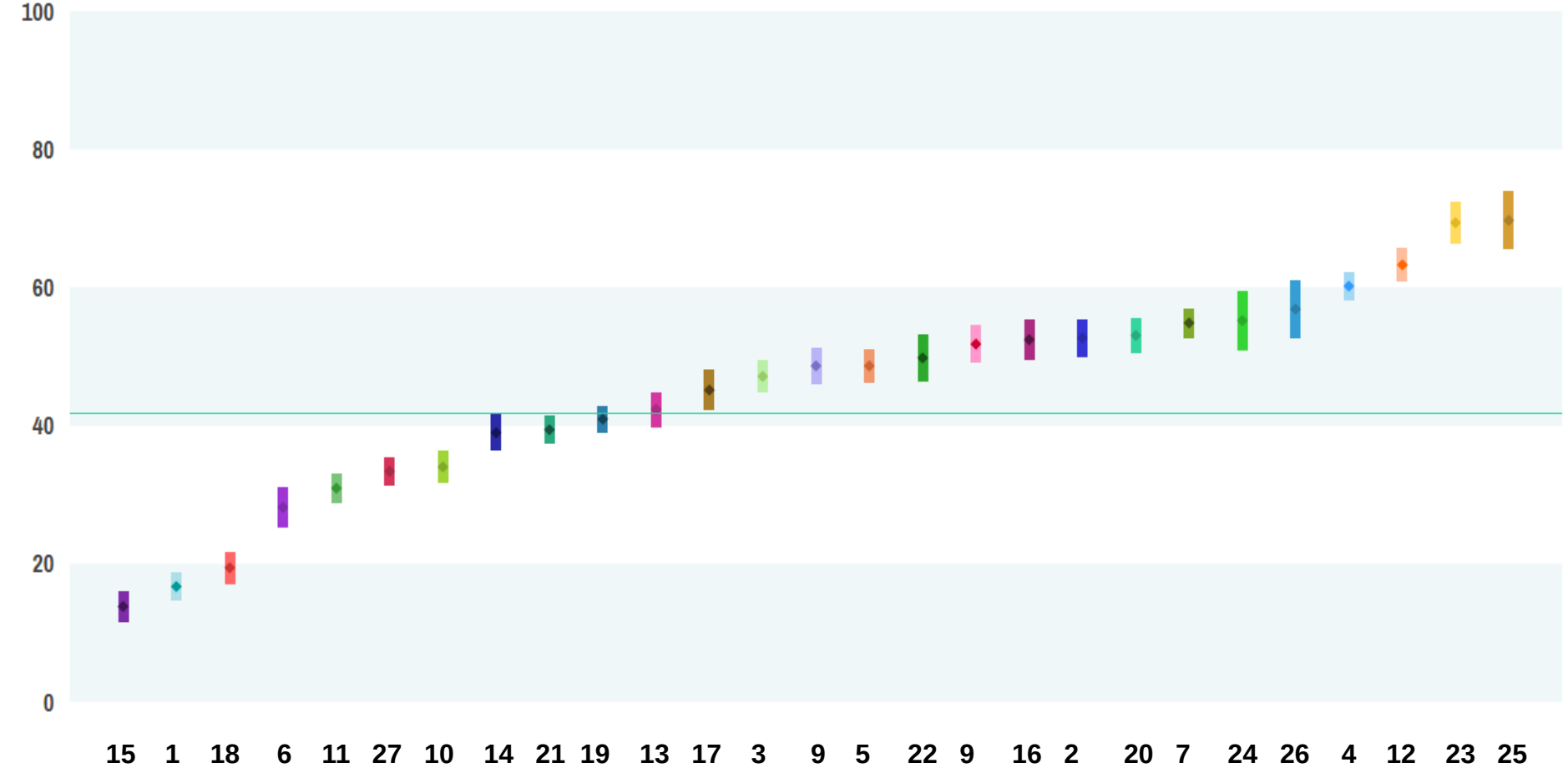
TBI – excluding DOA, program to date



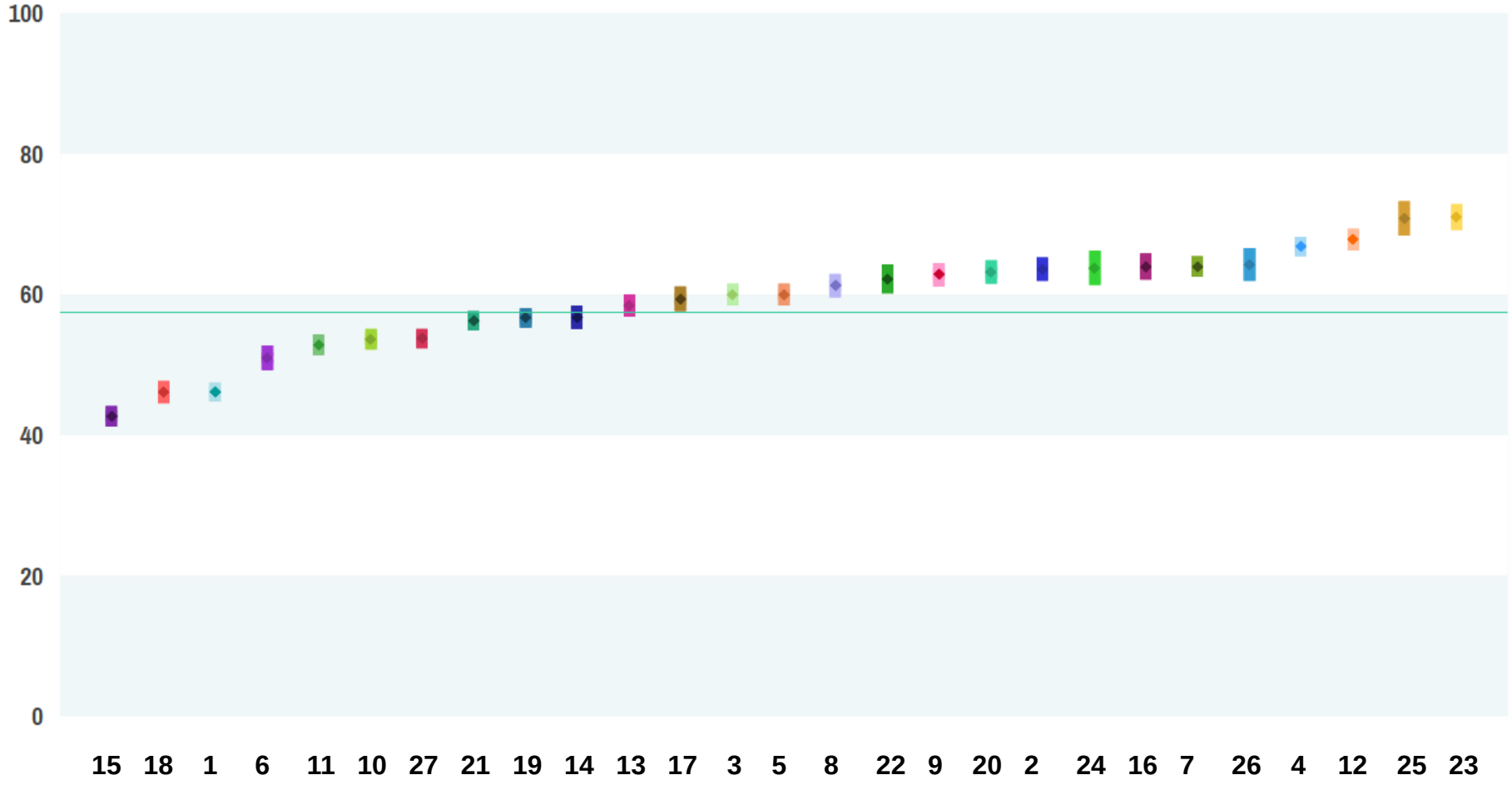
TBI – excluding DOA, program to date

TBI – excluding DOA, program to date, age ≥ 65

Risk Factors > Rankings > Demographics > % Age ≥ 65 – Excluding DOA



Risk Factors > Rankings > Demographics > Age (mean) – Excluding DOA



Over/Under Triage

Triage Drill-Down	Cases	Unadjusted	Adjusted	MTQIP - All - Adj	P Value
Overtriage	5091	6.85	6.34	5.81	<0.001
Undertriage	5091	10.4	7.93	6.43	<0.001

Over/Under Triage

Triage Drill-Down	Cases	Unadjusted	Adjusted	MTQIP - All - Adj	P Value
Overtriage	5091	6.85	6.34	5.81	<0.001
Undertriage	5091	10.4	7.93	6.43	<0.001

Coming summer 2015

Matrix Method

	Not Major Trauma	Major Trauma	Total
Highest Level TTA	A	B	C
Midlevel TTA	D	E	F
No TTA	G	H	I

Overtriage	A/C x 100	25-35%
Undertriage	(E+H)/(F+I) x 100	$\leq$ 5%

Over/Under Triage Matrix

Triage Matrix Drill-Down	Cases	Unadjusted	Adjusted	MTQIP - All - Adj	P Value
Highest Level TTA + Not Major Trauma	5091	6.85	6.34	5.81	<0.001
Highest Level TTA + Major Trauma	5091	10.4	7.93	6.43	<0.001

Coming summer 2015

Online PRQ

3. Statistics for Level of Response to Activations (p.23)

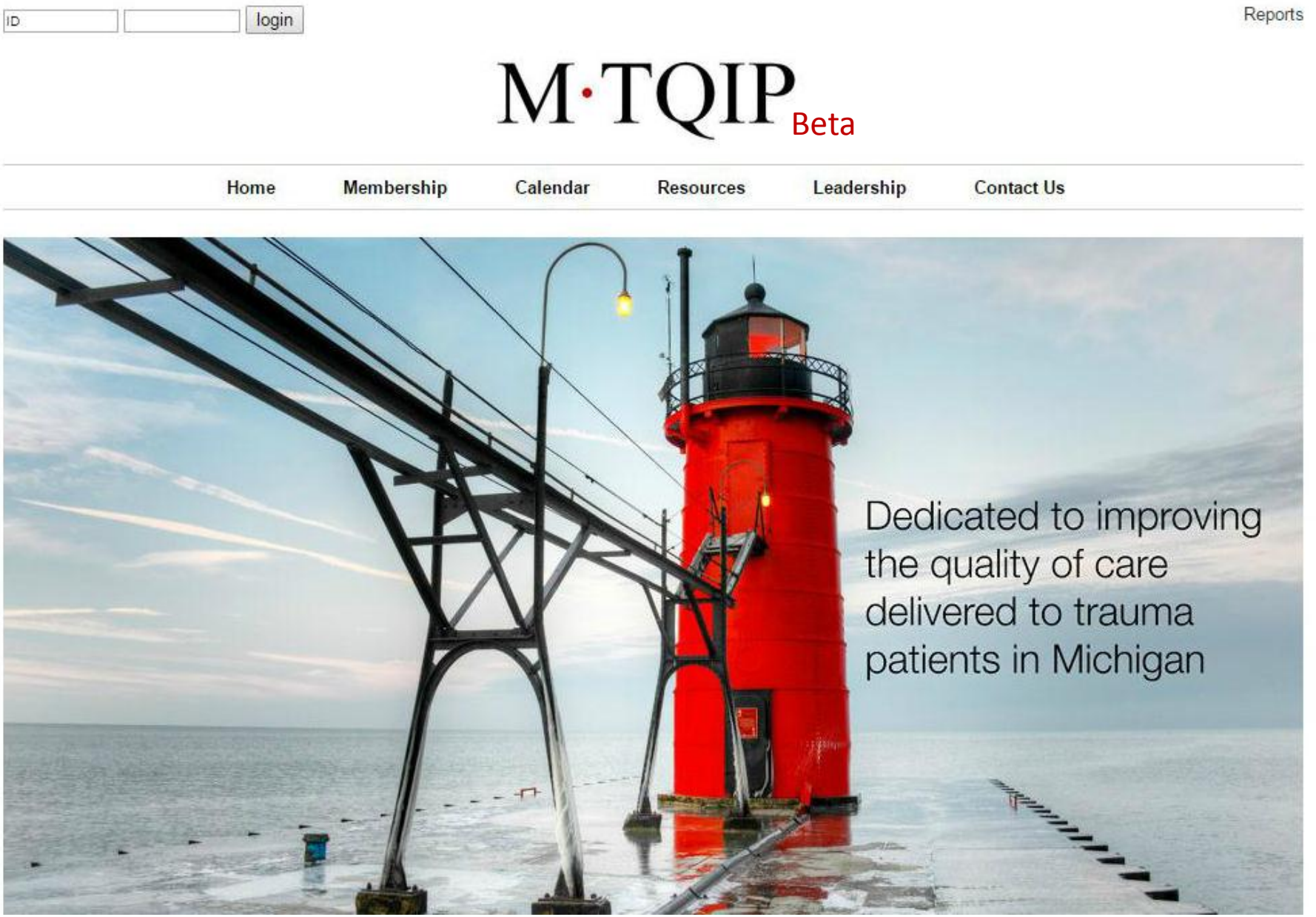
Level	Number of activations	Percent of total activations
Highest (Class I)	Count # cases ED_TTA_TYPE = 1 (Full)	N: Cases ED_TTA_TYPE = 1 (Full) D: Cases ED_TTA_TYPE = 1, 2 or 3
Intermediate (Class II)	Count # cases ED_TTA_TYPE = 2 (Partial)	N: Cases ED_TTA_TYPE = 2 (Partial) D: Cases ED_TTA_TYPE = 1, 2 or 3
Lowest (Class III)	Count # cases ED_TTA_TYPE = 3 (Consult)	N: Cases ED_TTA_TYPE = 3 (Consult) D: Cases ED_TTA_TYPE = 1, 2 or 3
Total	Count # cases ED_TTA_TYPE = 1, 2 or 3	N: Cases ED_TTA_TYPE = 1, 2 or 3 D: Cases ED_TTA_TYPE = 1, 2 or 3
Direct Admits	Count # cases DIR_ADMIT = Y	

Coming Fall 2015

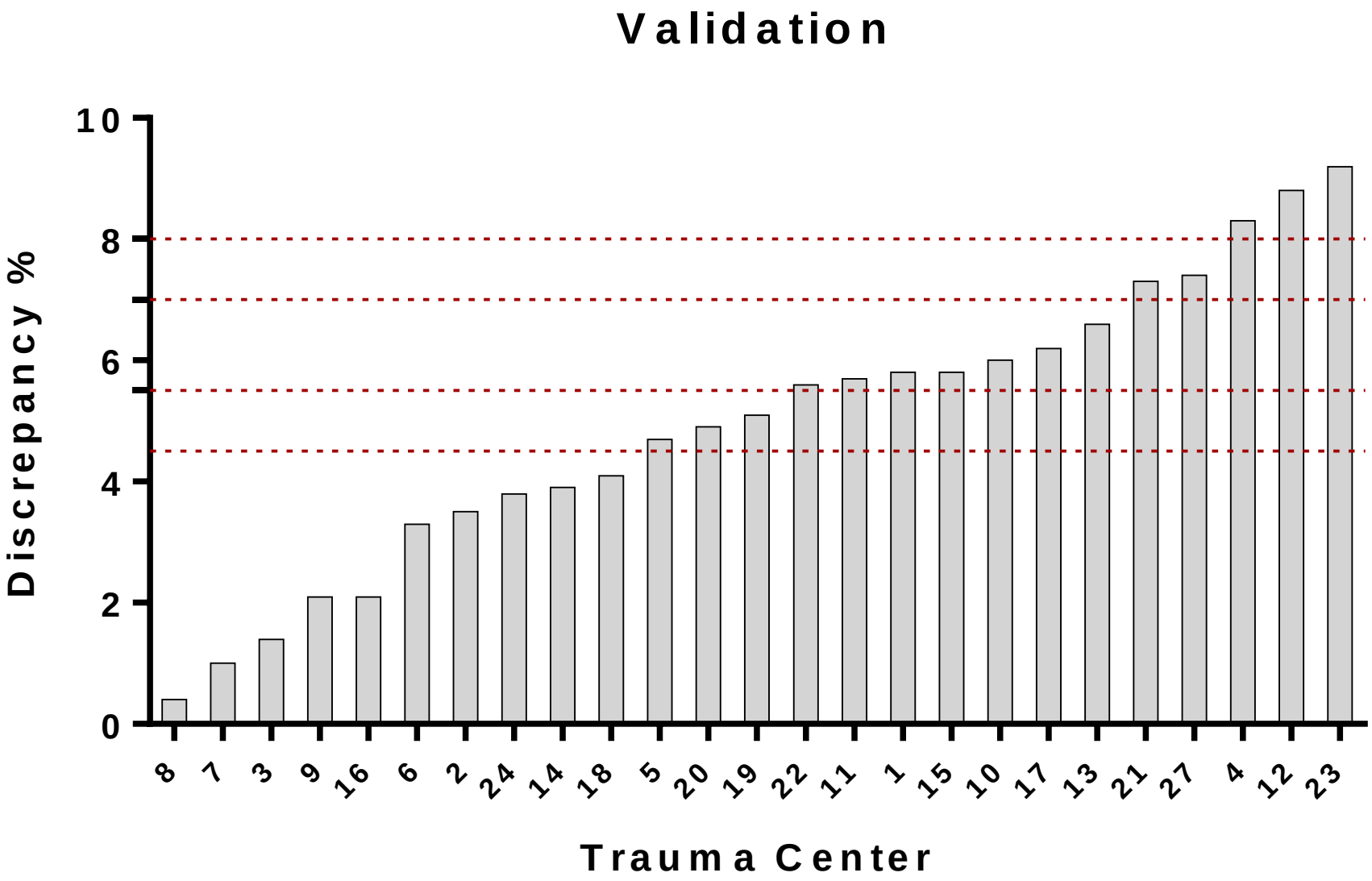
Online PRQ

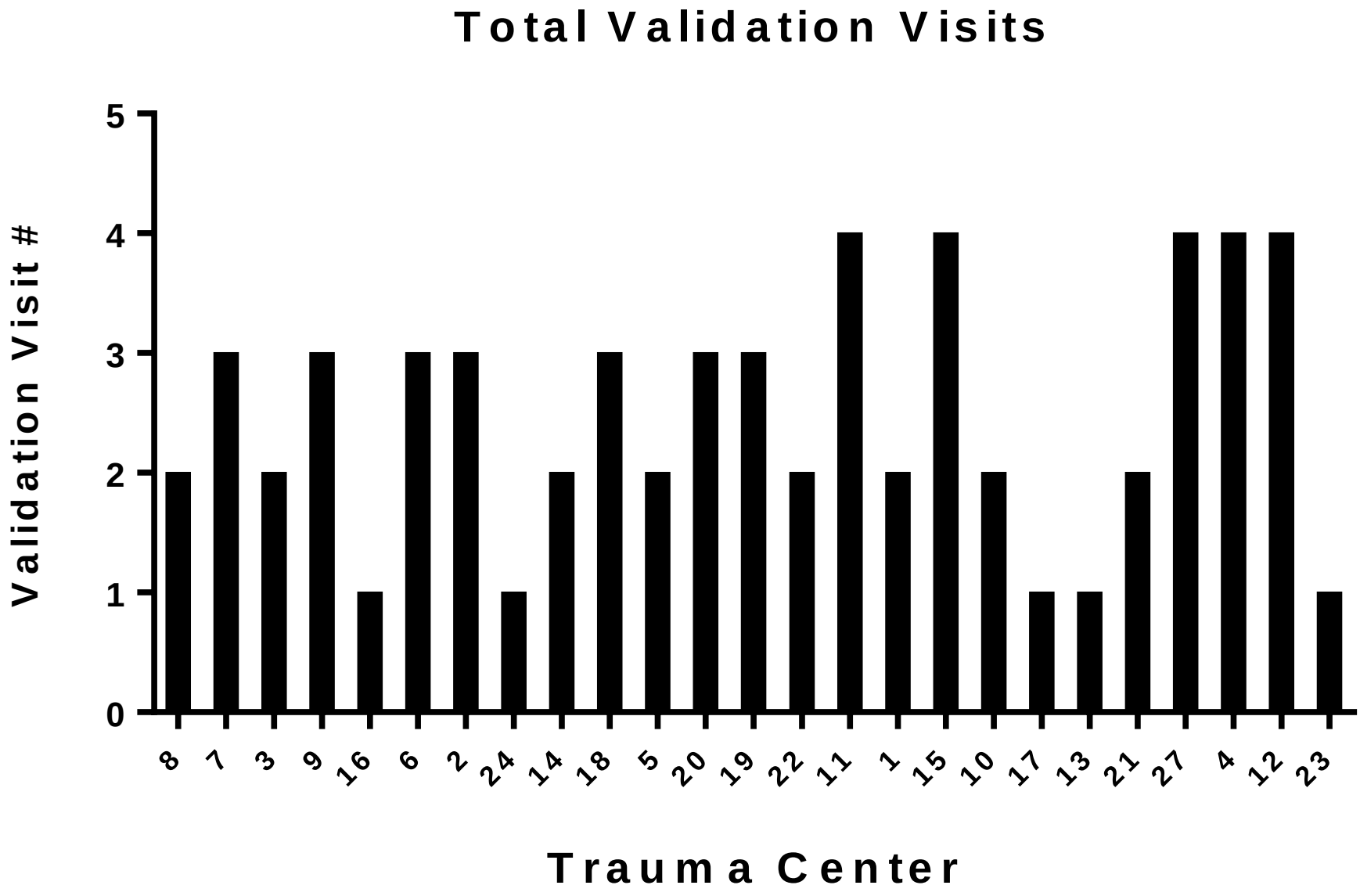
- Serial rollout
- Additional variables
- Historic capture
- PM/MCR participation

https://mtqip.org/new/



Coming June 2015


Validation
Discrepancy %
10
8
6
4
2
0
8
7
3
9
16
6
2
24
14
18
5
20
19
22
11
1
15
10
17
13
21
27
4
12
23
Trauma Center


Total Validation Visits
Validation Visit #
0
1
2
3
4
5
8
7
3
9
16
6
2
24
14
18
5
20
19
22
11
1
15
10
17
13
21
27
4
12
23
Trauma Center

Validation – Case Selection

ID	SELECTION CRITERIA
1	ISS < 16 and mortality
2	ISS > 24 and no complications and hospital days > 1
3	Length of stay > 14 days and no complication or mortality
4	Age > 64 and no co-morbidities
5	Mechanical ventilator days > 7 and no pneumonia
6	Motor GCS = 1 and no complications and hospital days > 1

Validation – Case Selection

ID	SELECTION CRITERIA
1	ISS < 16 and mortality
2	ISS > 24 and no complications and hospital days > 1
3	Length of stay > 14 days and no complication or mortality
4	Age > 64 and no co-morbidities
5	Mechanical ventilator days > 7 and no pneumonia
6	Motor GCS = 1 and no complications and hospital days > 1

ID	NEW SELECTION CRITERIA
7	Hematocrit < 22.0 and no PRBC 4 or IVF captured
8	ISS > 24 and no complications and ICU days > 7
9	ISS > 9 and no injury in AIS head and no VTE prophylaxis and LOS > 2
10	ED BP < 90 and Lowest SBP < 90 and PBRC 4 = 0
11	ABX days > 6 and no complications

Complication > Cardiac Arrest with CPR

CARDIAC ARREST WITH CPR

Cardiac arrest is the sudden cessation of cardiac activity after hospital arrival. The patient becomes unresponsive with no normal breathing and no signs of circulation. If corrective measures are not taken rapidly, this condition progresses to sudden death. Enter date and location of CPR or similar advanced measures e.g. open cardiac massage (in the procedures section.

INCLUDE patients who have had an episode of cardiac arrest evaluated by hospital personnel and either:

Received compressions or defibrillation or cardioversion or cardiac pacing to restore circulation.
OR
Were pulseless but did not receive defibrillation attempts or CPR by hospital personnel.

Complication > Cardiac Arrest with CPR

Were pulseless but did not receive defibrillation attempts or CPR by hospital personnel.

Complication > Cardiac Arrest with CPR

- Verbiage removed 4/3/15
- Procedures capture source
- Superior capture consistency
- Drill-down capabilities

Failure to Rescue

Amir Ghaferi, MD

Understanding Failure to Rescue

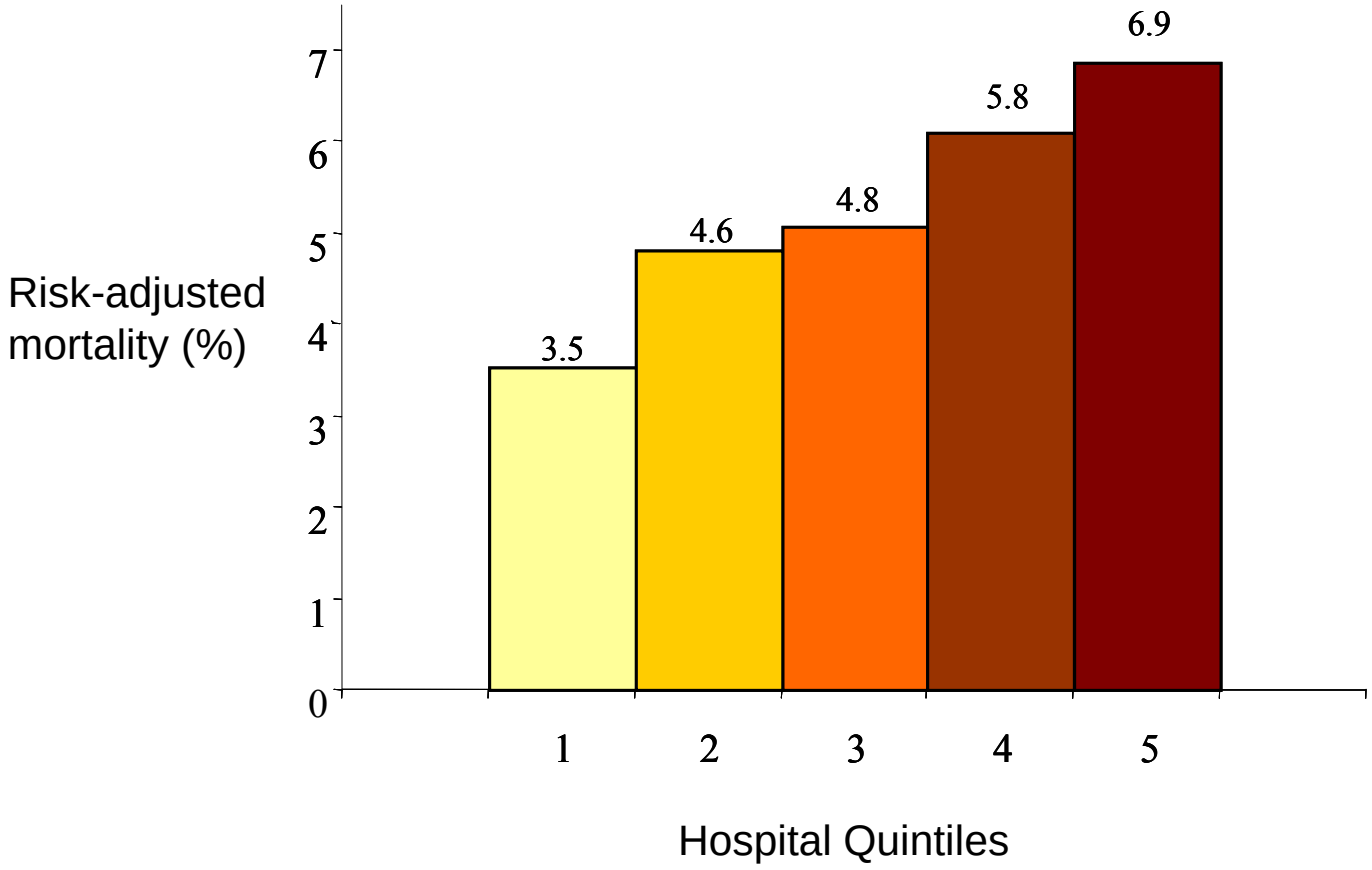
Amir A. Ghaferi, MD, MS

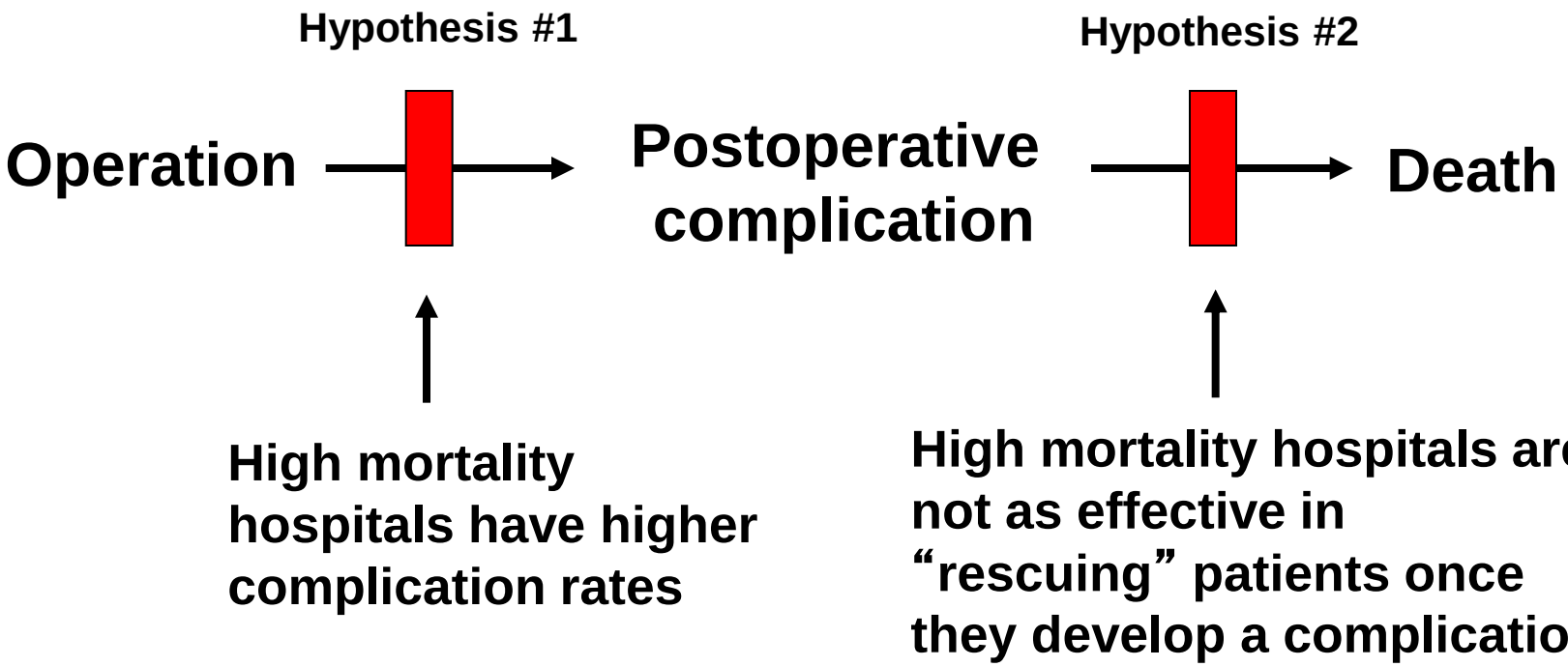
May 13, 2015

MTQIP Quarterly Meeting

109,901

Variations in Mortality



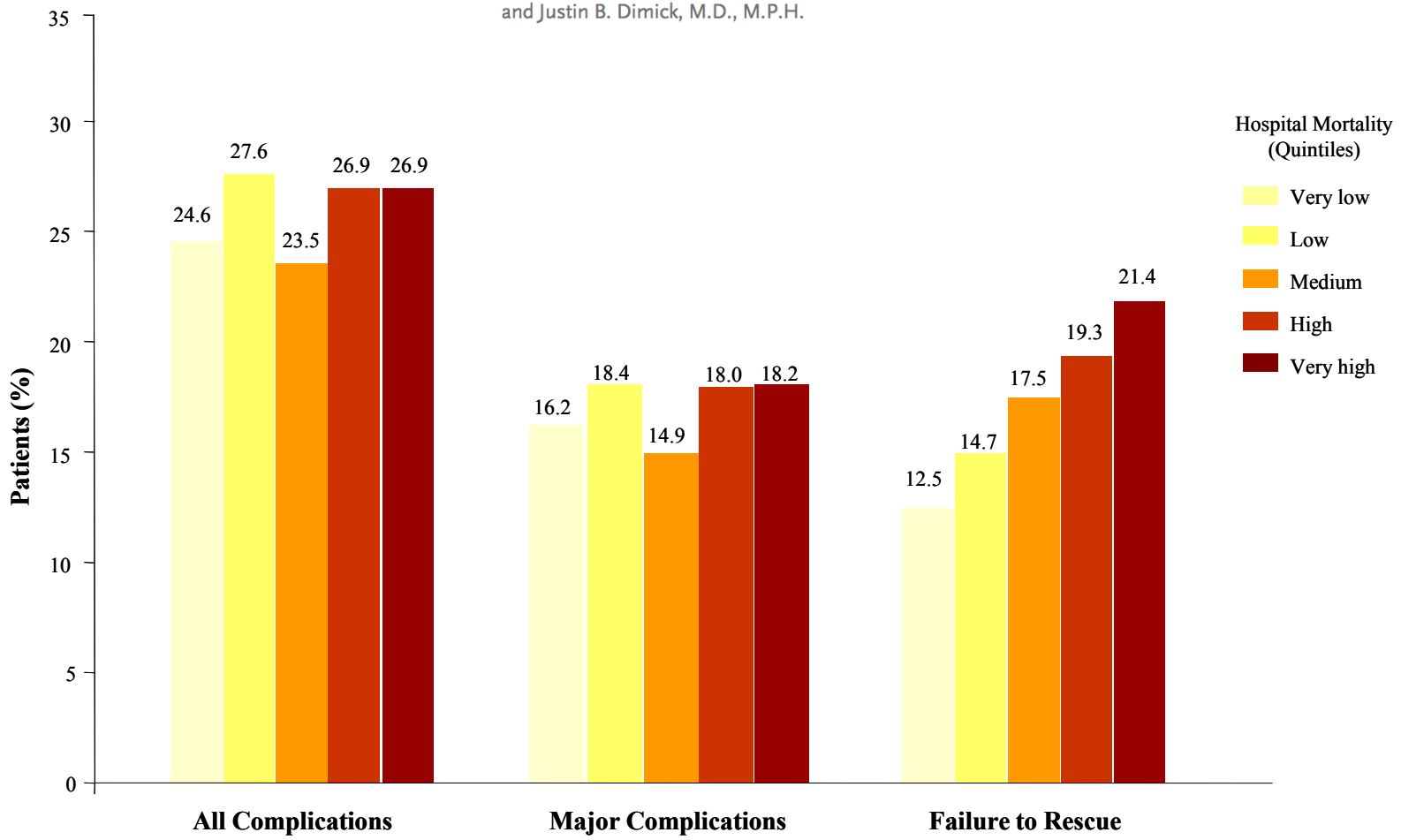

Hypothesis #1
Hypothesis #2
Operation
Postoperative complication
Death
High mortality hospitals have higher complication rates
High mortality hospitals are not as effective in “rescuing” patients once they develop a complication

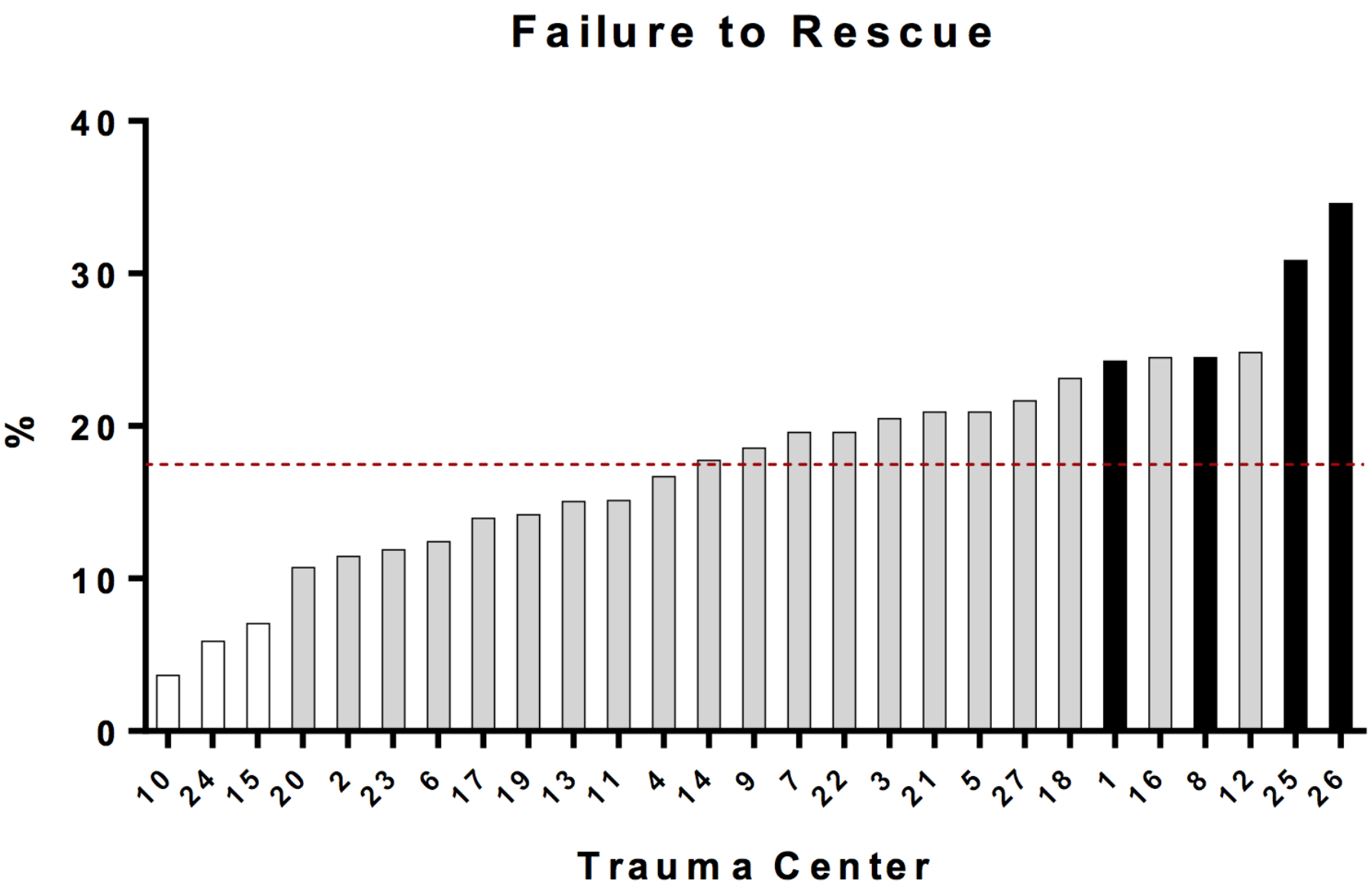
The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

Variation in Hospital Mortality Associated with Inpatient Surgery

Amir A. Ghaferi, M.D., John D. Birkmeyer, M.D., and Justin B. Dimick, M.D., M.P.H.




Failure to Rescue
40
30
20
10
0
%
10 24 15 20 2 23 6 17 19 13 11 4 14 9 7 22 3 21 5 27 18 1 16 8 12 25 26
Trauma Center

Complications, Failure to Rescue, and Mortality With Major Inpatient Surgery in Medicare Patients

Amir A. Ghaferi, MD, John D. Birkmeyer, MD, and Justin B. Dimick, MD, MPH

Hospital Characteristics Associated with Failure to Rescue from Complications after Pancreatectomy

Amir A Ghaferi, MD, MS, Nicholas H Osborne, MD, MS, John D Birkmeyer, MD, FACS, Justin B Dimick, MD, MPH, FACS

Original Investigation | SURGICAL CARE OF THE AGING POPULATION

Socioeconomic Disparities in Mortality After Cancer Surgery
Failure to Rescue

Bradley N. Reames, MD, MS; Nancy J. O. Birkmeyer, PhD; Justin B. Dimick, MD, MPH; Amir A. Ghaferi, MD, MS

Improving Mortality Following Emergent Surgery in Older Patients Requires Focus on Complication Rescue

Kyle H. Sheetz, BS, Seth A. Waits, MD, Robert W. Krell, MD, Darrell A. Campbell, Jr, MD, Michael J. Englesbe, MD, and Amir A. Ghaferi, MD, MS

Hospital Volume and Failure to Rescue With High-risk Surgery

Amir A. Ghaferi, MD, MS, John D. Birkmeyer, MD, and Justin B. Dimick, MD, MPH

Understanding Failure to Rescue and Improving Safety Culture

Amir A. Ghaferi, MD, MS,† and Justin B. Dimick, MD, MPH**

Original Investigation

Understanding the Volume-Outcome Effect in Cardiovascular Surgery
The Role of Failure to Rescue

Andrew A. Gonzalez, MD, JD, MPH; Justin B. Dimick, MD, MPH; John D. Birkmeyer, MD; Amir A. Ghaferi, MD, MS

Hospital Characteristics Associated with Failure to Rescue from Complications after Pancreatectomy

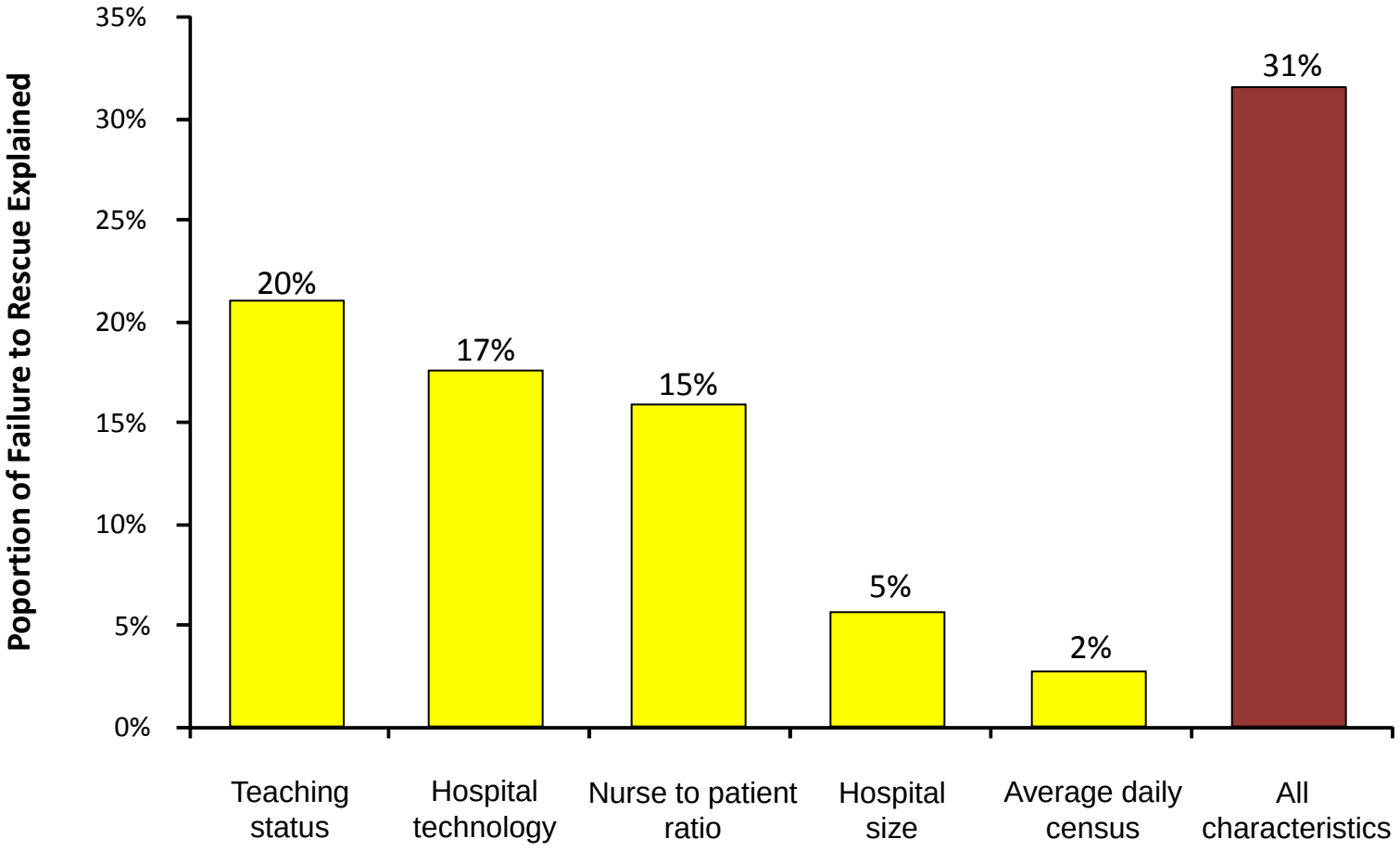
Amir A Ghaferi, MD, MS, Nicholas H Osborne, MD, MS, John D Birkmeyer, MD, FACS, Justin B Dimick, MD, MPH, FACS

J Am Coll Surg Vol. 211, No. 3, September 2010

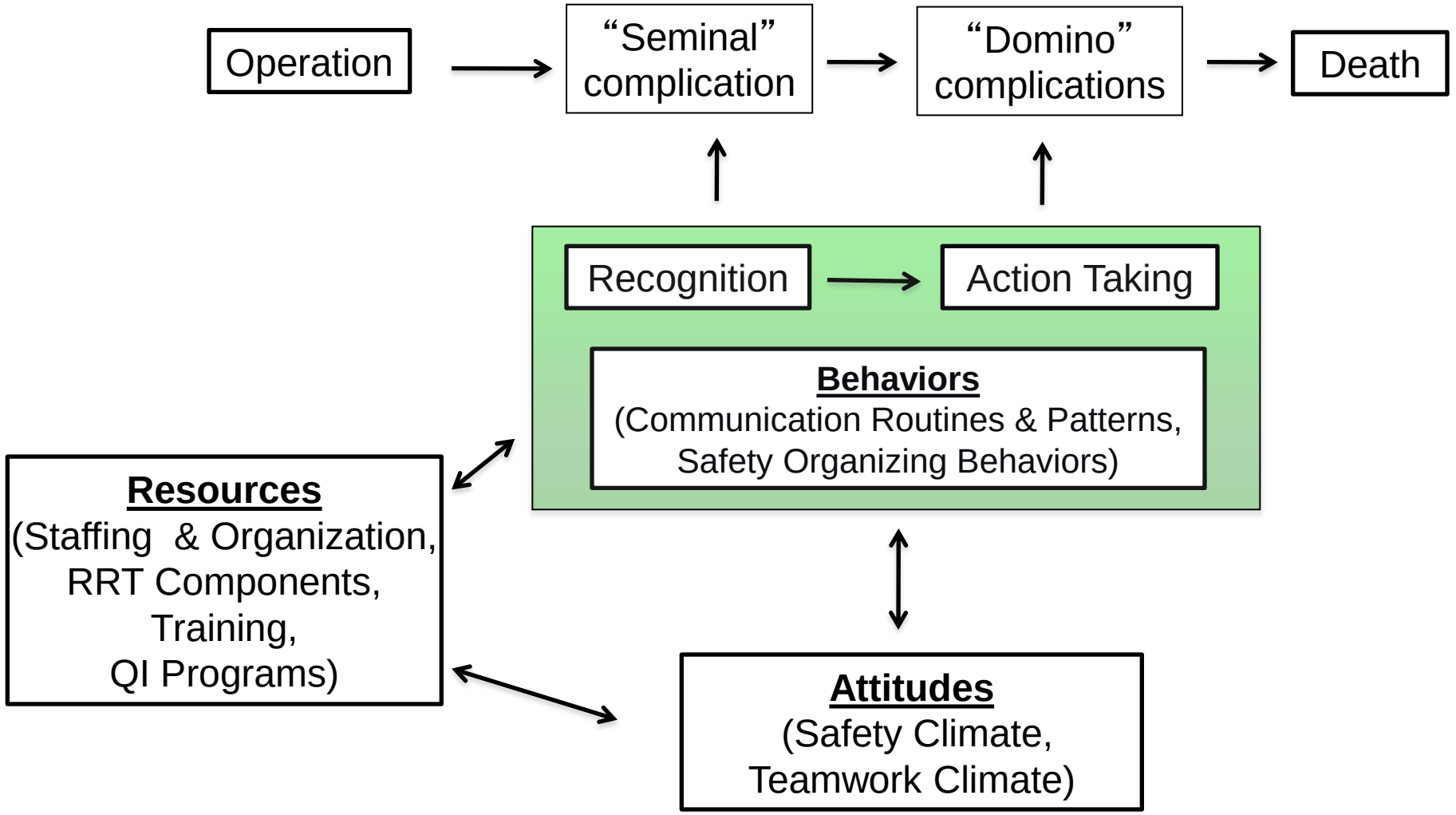
Hospital Characteristic	(% of hospitals) Very low mortality	Very high mortality
High hospital technology	80.7	28.6*
Teaching hospital	84.3	42.1*
Increased nurse-to-patient ratio [median ratio]	[9.4]	[7.3]*
Hospital size > 200 beds	97.1	87.2*
Average daily census > 50% capacity	98.2	96.6*

*p<0.01

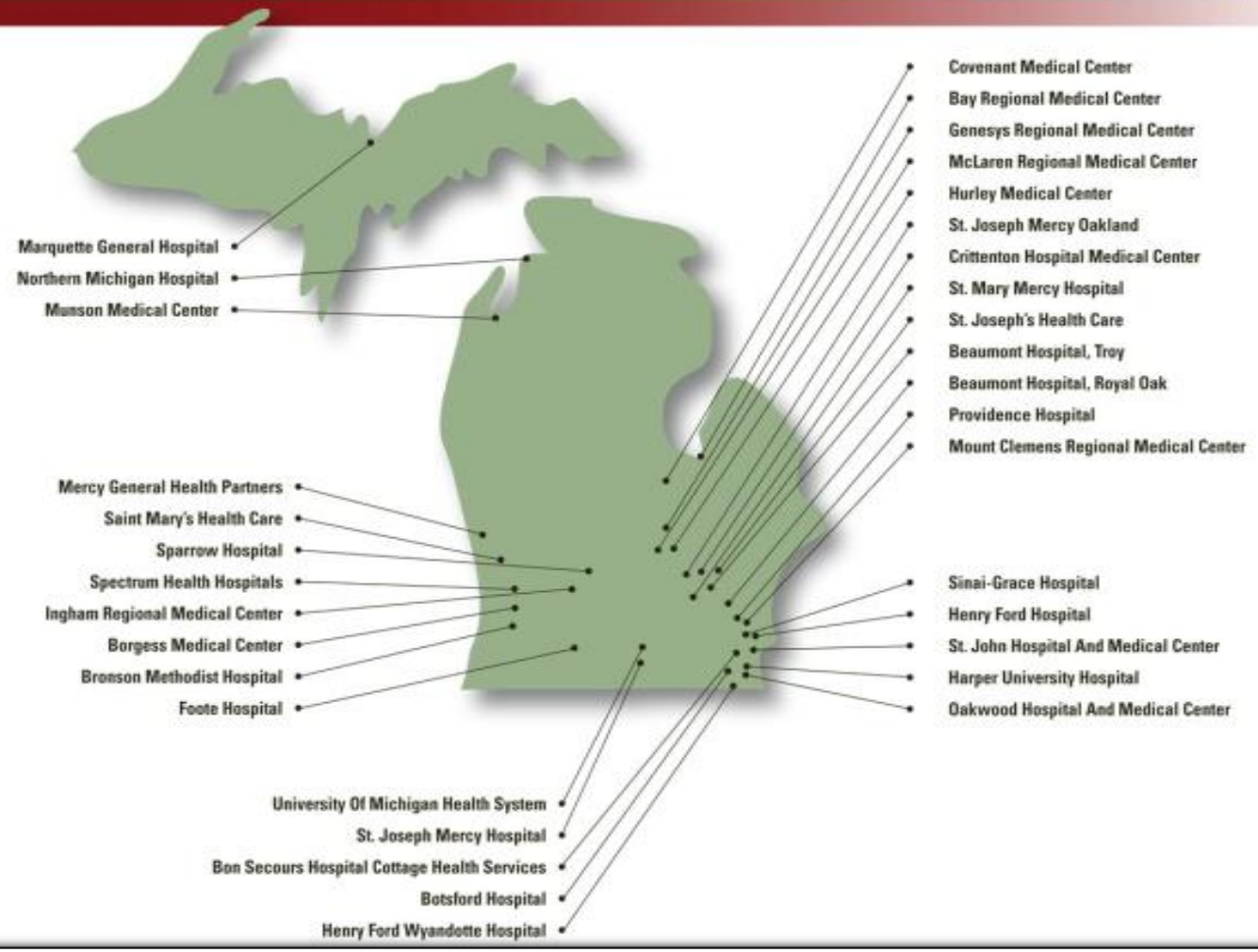
Hospital Characteristics and Failure to Rescue



SO WHAT?


Operation
"Seminal" complication
"Domino" complications
Death
Recognition
Action Taking
Behaviors
(Communication Routines & Patterns, Safety Organizing Behaviors)
Resources
(Staffing & Organization, RRT Components, Training, QI Programs)
Attitudes
(Safety Climate, Teamwork Climate)

Michigan Surgical Quality Collaborative (MSQC)



Resources
(Staffing & Organization,
RRT Components,
Training,
QI Programs)

Failure to Rescue Resources Questionnaire

We seek to better understand participant hospitals' capacity to manage postoperative complications. The following questions will help us identify focal areas for quality improvement across MSQC hospitals.

Please complete the following series of questions. Feel free to obtain information from relevant colleagues in managerial and clinical roles.

Answer all the questions by marking an "X" in the box for your answer or writing in the information requested. Your answers will be kept confidential.

A. Staffing and Organizational Structure

1. Please report the average hours of registered nursing care per patient day (RNHPPD):

   _____ Intensive Care Units _____ Postoperative Surgical Units

2. Please report the proportion of direct care registered nurses who hold a BSN degree or higher:

   _____ percent in ICUs _____ percent in Postoperative Surgical Units

3. Please describe the physician staffing model for the intensive care unit that receives surgical patients.

Please choose ONE.

   [1]☐ Open model (credentialed attending physicians may admit to the unit)
   [2]☐ Closed model (ICU medical director or designee arbitrates admissions)
   [3]☐ Other (please specify): _____

4. Does a board-certified intensivist physician direct your intensive care unit?

   [1]☐ Yes [2]☐ No

5. Does your hospital have surgical residents in-house 24/7?

   [1]☐ Yes [2]☐ No

6. Does your hospital employ hospitalists, PAs or NPs to manage post-surgical patients?

   [1]☐ Yes (proceed to question 7) [2]☐ No (skip to question 8)

7. Do these caregivers provide in-house coverage overnight?

   [1]☐ Yes [2]☐ No

8. For the past year, what was your capacity and average daily occupancy for

Critical Care Beds	_____ beds	_____ percent occupancy
Step-Down Beds	_____ beds	_____ percent occupancy
General Care (Medical/Surgical Beds)	_____ beds	_____ percent occupancy

9. Please describe your hospital's approach to nurse staffing challenges (choose all that apply):

   [1]☐ Hospital-based float pool available to meet staffing needs
   [2]☐ Local agency provides nurses on an "as-needed' basis
   [3]☐ Travel nursing contracts

Attitudes
(Safety Climate,
Teamwork Climate)

The Safety Attitudes Questionnaire

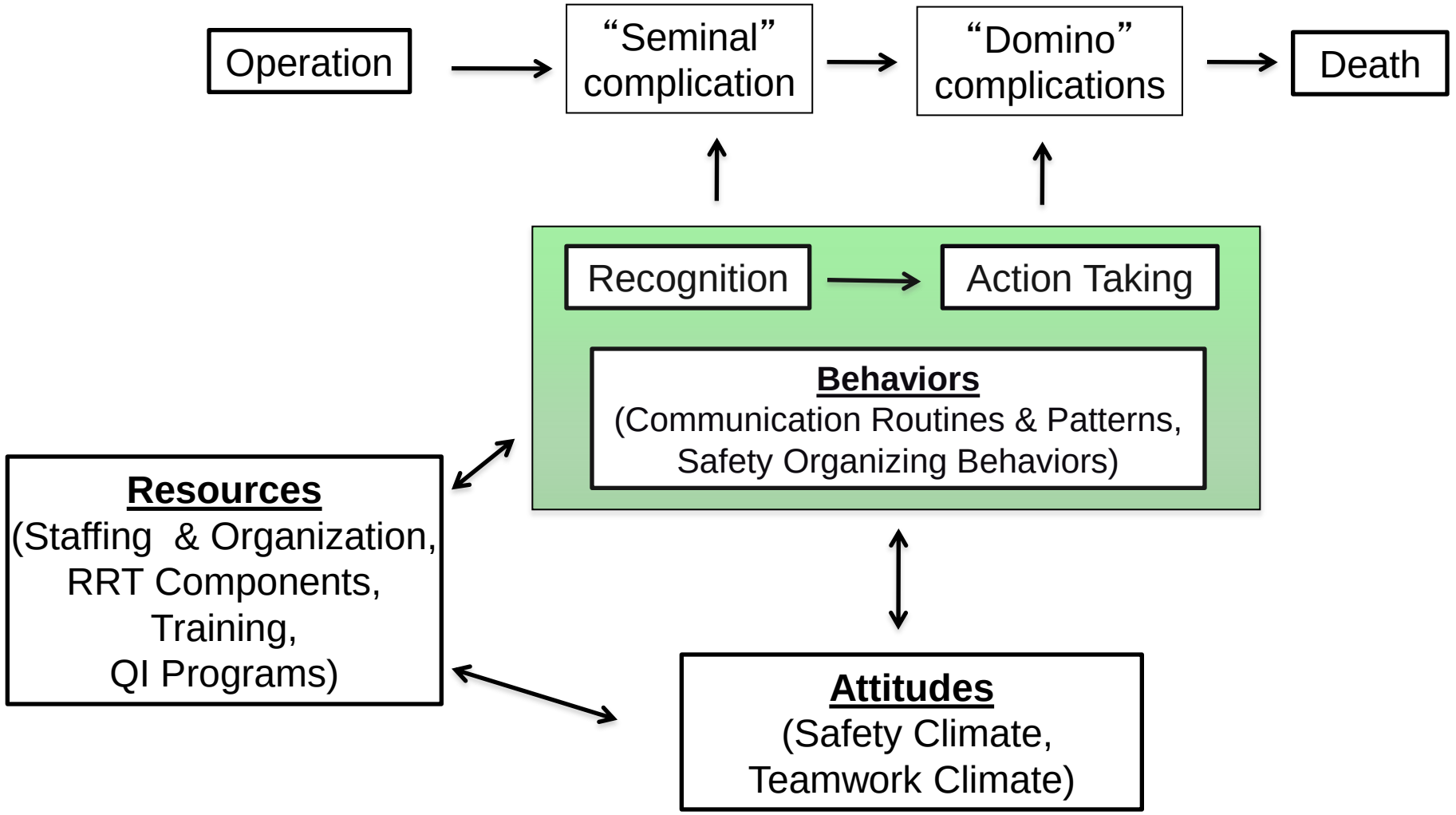
Channeling the Wisdom of Frontline Caregivers

Dimensions of the SAQ	Sample Item
Teamwork Climate: The perceived quality of teamwork and collaboration within a given unit.	Disagreements in this clinical area are appropriately resolved (i.e., what is best for the patient).
Safety Climate: The perceived level of commitment to and focus on patient safety within a given unit.	I would feel safe being treated in this clinical area.
Morale: Employees' general feelings of positivity regarding their work experience.	I like my job.
Stress Recognition: Employees' recognition of how stressors impact their performance.	I am less effective at work when fatigued.
Perceptions of Hospital Management: Employees' perceptions of the support and competence of hospital-level management.	Hospital management supports my daily efforts.
Perceptions of Unit Management: Employees' perceptions of the support and competence of unit-level management.	Unit management supports my daily efforts.
Working Conditions: Employees' perceptions of the quality of their work environment.	Trainees in my discipline are adequately supervised.

Behaviors
(Communication Routines & Patterns,
Safety Organizing Behaviors)

Safety Organizing Scale

1.	We have a good "map" of each other's talents and skills.	1	2	3	4	5	6	7
2.	We talk about mistakes and ways to learn from them.	1	2	3	4	5	6	7
3.	We discuss our unique skills with each other so we know who on the unit has relevant specialized skills and knowledge.	1	2	3	4	5	6	7
4.	We discuss alternatives as to how we go about our normal work activities.	1	2	3	4	5	6	7
5.	When giving report to an oncoming nurse or physician, we usually discuss what to look out for.	1	2	3	4	5	6	7
6.	When attempting to resolve a problem, we take advantage of the unique skills of our colleagues.	1	2	3	4	5	6	7
7.	We spend time identifying activities we do not want to go wrong.	1	2	3	4	5	6	7
8.	When errors happen, we discuss how we could have prevented them.	1	2	3	4	5	6	7
9.	When a patient crisis occurs, we rapidly pool our collective expertise to attempt to resolve it.	1	2	3	4	5	6	7


Operation
"Seminal" complication
"Domino" complications
Death
Recognition
Action Taking
Behaviors
(Communication Routines & Patterns, Safety Organizing Behaviors)
Resources
(Staffing & Organization, RRT Components, Training, QI Programs)
Attitudes
(Safety Climate, Teamwork Climate)

Potential Barriers to Rescue

- Lack of psychological safety/ineffective communication
- Imbalance of shared ownership
- Staffing discontinuity
- Lack of appropriate training & education
- Lack of meaningful metrics

Potential solutions

- Rapid response teams
- Flatten the hierarchy
- Institute strategies for escalation of care
- Use health information technology
- Structured communication tools
- Constant team structures
- Standardized care pathways
- Institute organizational learning

Thank you!

aghaferi@umich.edu

@AmirGhaferi

Program Manager

Judy Mikhail, RN, MBA, PhD

2015 Site Specific Projects

#	Project
1	Any complication
1	Severe sepsis
1	UTI
2	C Diff
3	Pneumonia
1	ICP monitor use
3	LMWH use
1	ICU admits
3	Unplanned intubation
2	Unplanned return to ICU
1	Ventilator days
1	VTE rate after Heparin
4	VTE prophylaxis none
3	VTE rate

Call for Data *Now Open*:
5/13/15 to 5/20/15

Most recent 12 or 24 months

MTQIP Clinical Reviewer (MCR) Position

- You will receive BCBSM funds - end of June
- Email confirmation from me re: money transfer
- July 1 position goes into effect

Potential 2016 Group Project Ideas

	Meaningful	Measurable	Target
IVC Filter Use	X	X	X
Over & Under Triage	X	X	?
Non Surgical Admits	X	?	?
ICU Readmissions	X	X	X
Anticoagulant Reversal	X	?	X
Surgeon activation response	done	X	X
ED LOS Highest activations	?	X	X
Time to ORIF Femur Fx	X	X	X
Elderly Trauma	X	X	X
Open Long Bone Fx's -Time to OR, antibiotics	X	?	X

MTP CQI Scoring

Wendy Wahl, MD

MTQIP

Proposal for monitoring site performance for massive transfusions (MT)

Amy Koestner, RN, Jonathon Saxe, MD,
Judy Mikhail, RN, and Wendy Wahl, MD

Current State

- “MTP” for patients 4+ PRBC in first 4 hours
- Patients who receive no FFP are not counted
- Extremely bad PRBC:FFP ratios skew results
- Some centers perform few, if any, MT’s
- MTQIP scoring tied to these results

Questions for our group

- What ratio is supported by the literature?
- Which patients should be included?
  - 4 units PRBC or some other number?
- What should be done with patients who receive no FFP and data is not included?
- How should we handle centers with few MT's (should there be a minimum of 5/year)?

Literature review

- No consensus on 1:1 versus 1:2
- Ratios >1:2 are associated with poorer outcomes
- MTP is poorly defined, in general, but most would focus on the first 4 hours rather than total blood products at 24 hours (outcomes improve with earlier correction)
    - PROPPR Trial JB Holcomb, et al. *JAMA* 2015, 313:471-482.
    - Rowell, et al. *J Trauma* 2011 Aug;71(2 Suppl 3):S353-7.

At what point should we trigger MTP?

- <4 units PRBC
- 4 units PRBC
- >4 units PRBC

Based on patterns in starting FFP for MTP at many centers

“Four-tier” proposal for reporting the PRBC:FFP ratio

Four tiers, of which the top two receive full credit:

- Tier 1: Ratio 1-1.5
- Tier 2: Ratio 1.6-2
- Tier 3: Ratio 2.1-2.5
- Tier 4: Ratio >2.5 (includes patients with no FFP!)

MTQIP would report the % of MT resuscitations in each category for each site. 100% points in top two tiers, 50% in tier 3, 0% in tier 4)

Example-not so perfect anymore!

- 20 MT's of which 5 were excluded for no FFP
- Previous overall ratio of 1.8
- New report (now includes all 20 patients):

Tier 1 Ratio 1-1.5	25%
Tier 2 Ratio 1.6-2	25%
Tier 3 Ratio 2.1-2.5	25%
Tier 4 Ratio >2.5	25% (includes no FFP)
	= 50% compliant

Points=(% Tiers 1+2)*0.1 + (% Tier 3)*0.05 = 6.25

Example-outlier less of an issue

- 20 MT's of which two were extreme outliers
  - (2 patients with 6uPRBC:1FFP)
- Previous overall ratio of 2.25:1
- New report:

Tier 1 Ratio 1-1.5	25%
Tier 2 Ratio 1.6-2	40%
Tier 3 Ratio 2.1-2.5	25%
Tier 4 Ratio >2.5	10%
	= 65 % compliant

Points=(% Tiers 1+2)*0.1 + (% Tier 3)*0.05 = 6.75

How will this change results?

Definition Units/4 hours	# Centers Less points	# Centers More points	# Centers No change	Mean Number Points PRE	Mean Number Points POST
4 PRBC	19	4	3	6.1	4.9
5 PRBC	17	6	3	6.0	5.3

Additional questions?

- At what number of MT's should a center be excluded for this metric?
  - Currently one center with no MT
- If no MT's for time period total points will not include those available for MT (10 less points in the denominator)

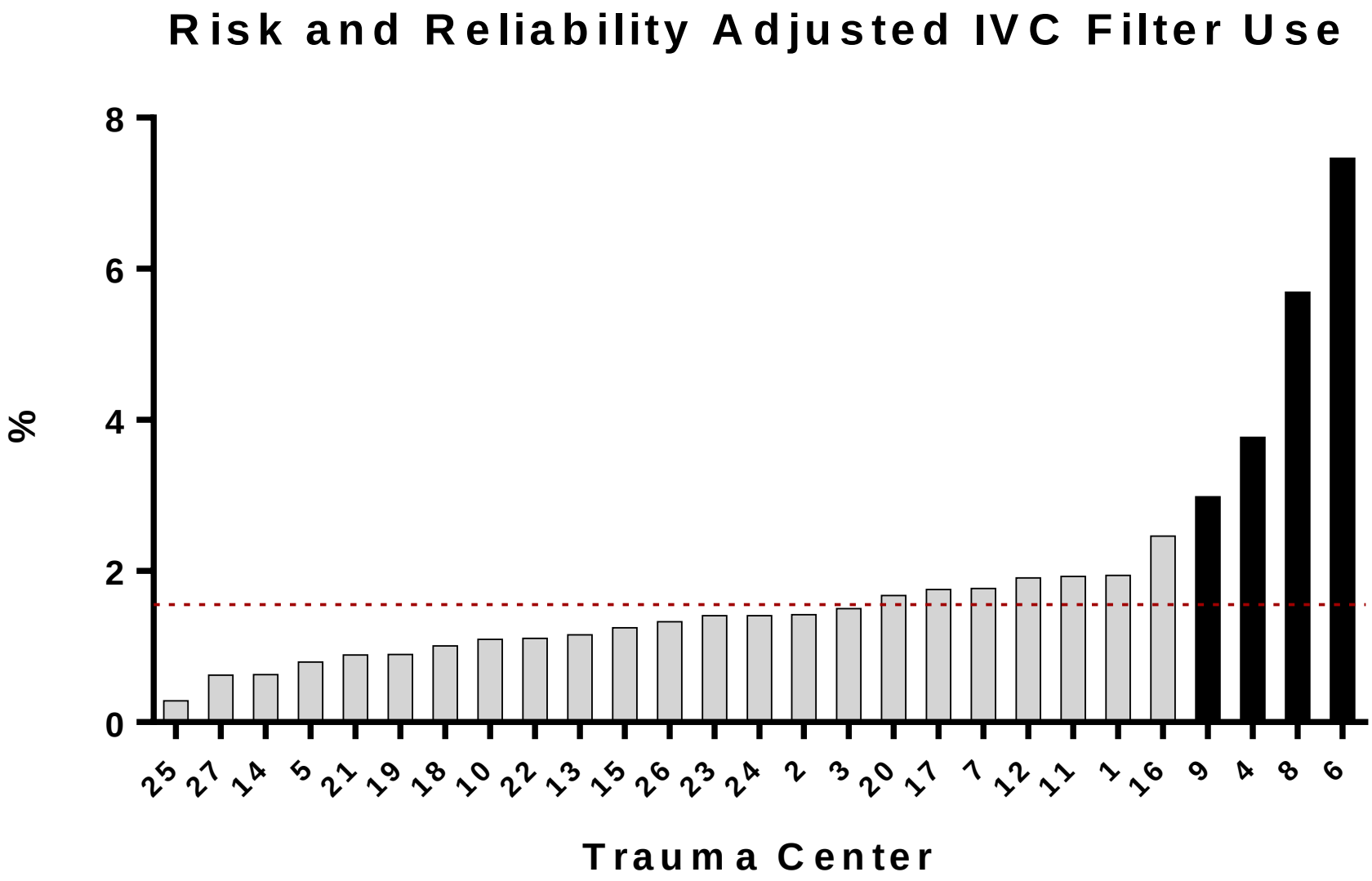
Questions?

Break

Back at 3:30p

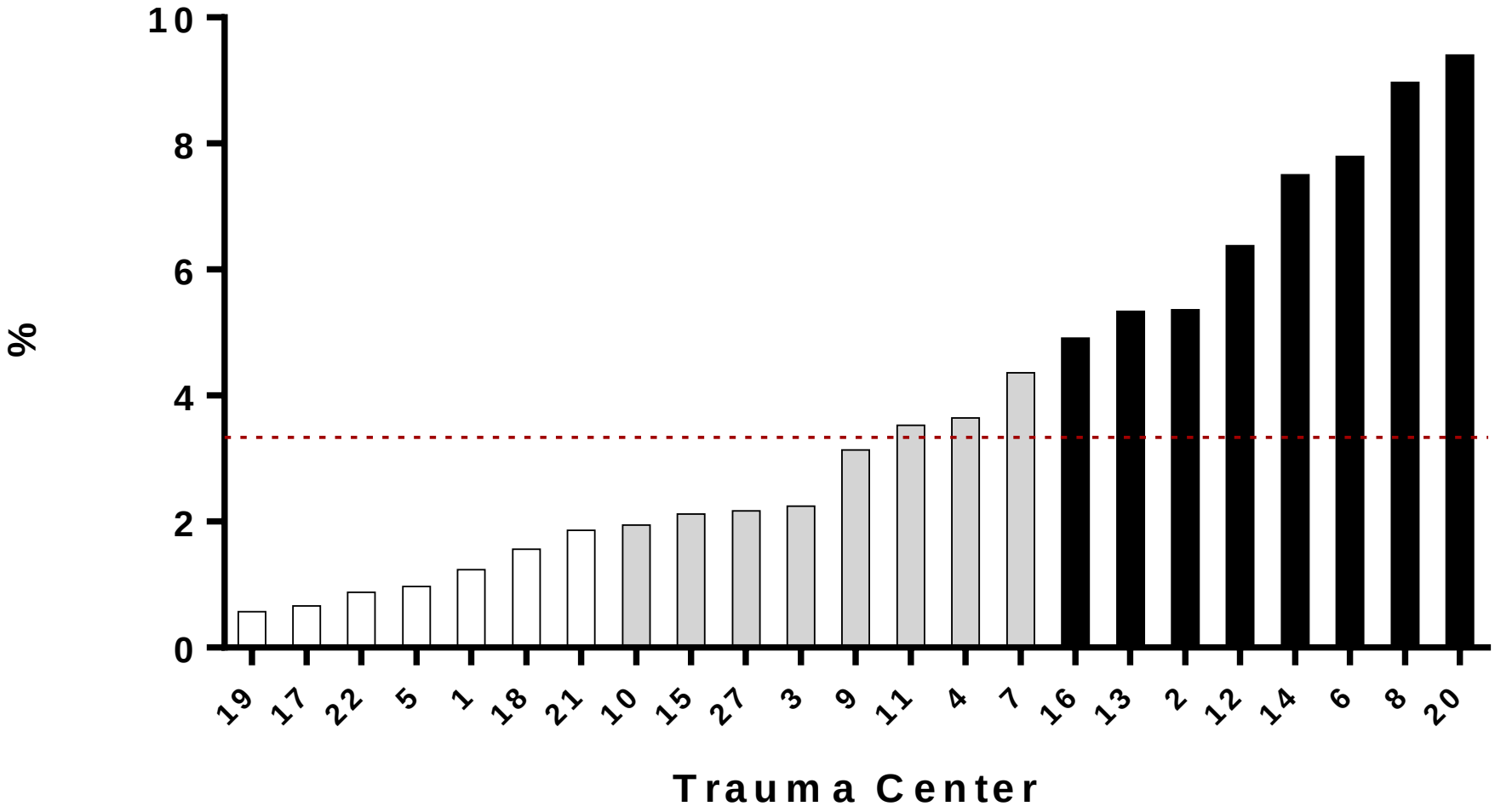
IVC Filters

Mark Hemmila, MD

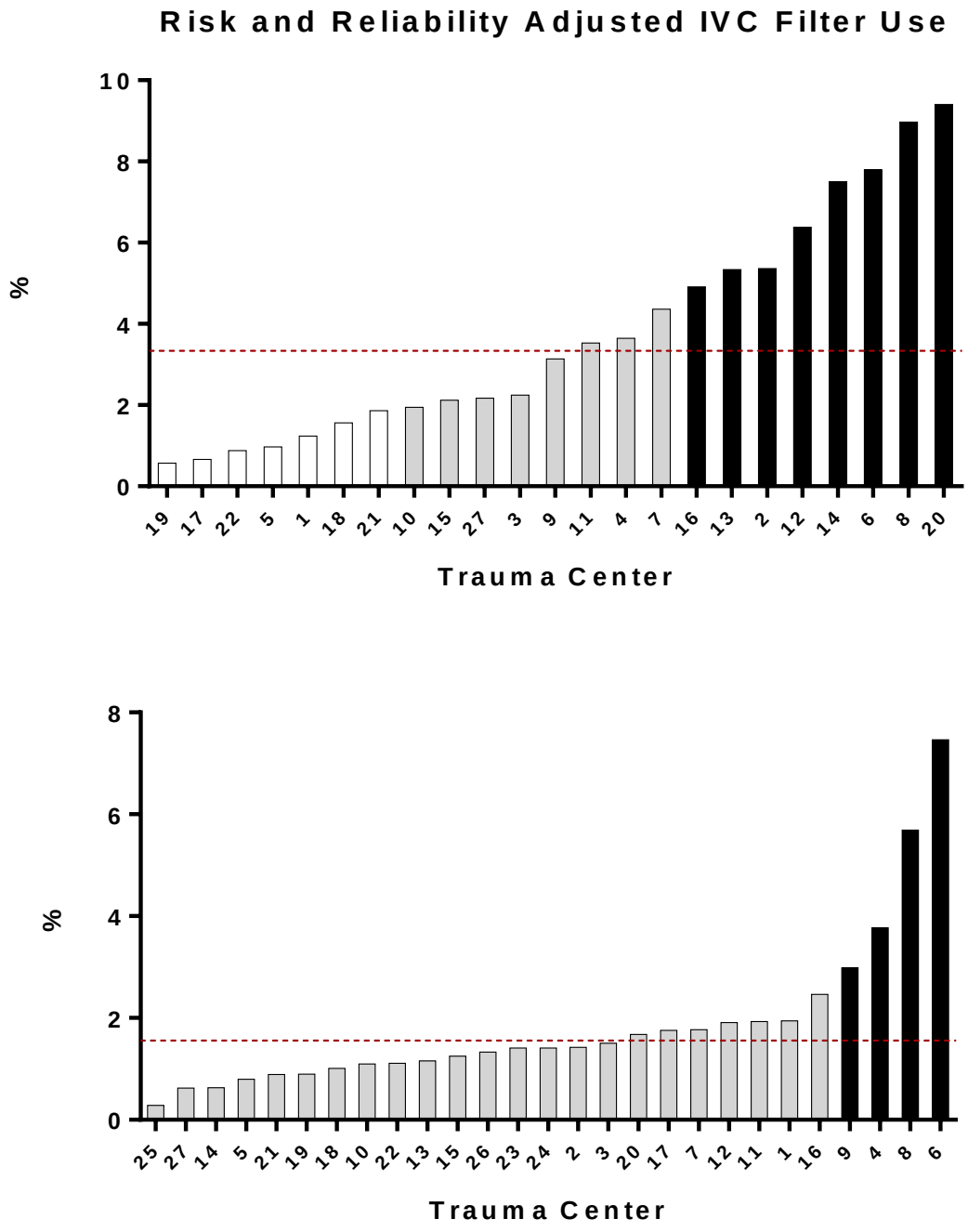


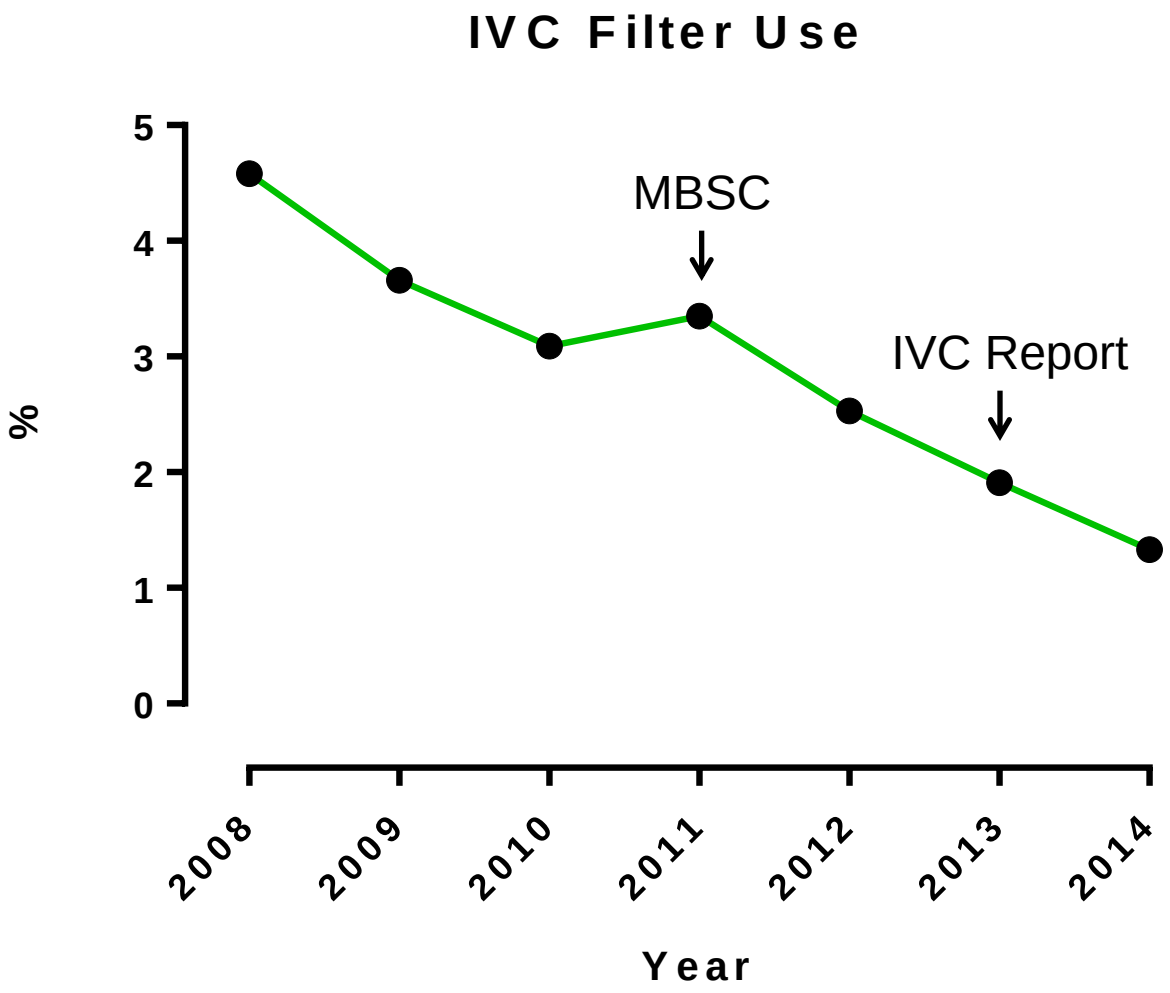
7/1/13 to 12/31/14

Risk and Reliability Adjusted IVC Filter Use



1/1/10 to 12/31/11


Risk and Reliability Adjusted IVC Filter Use
%
10
8
6
4
2
0
19 17 22 5 1 18 21 10 15 27 3 9 11 4 7 16 13 2 12 14 6 8 20
Trauma Center
%
8
6
4
2
0
25 27 14 5 21 19 18 10 22 13 15 26 23 24 2 3 20 17 7 12 11 1 16 9 4 8 6
Trauma Center


IVC Filter Use
5
4
3
2
1
0
%
MBSC
IVC Report
2008
2009
2010
2011
2012
2013
2014
Year

Next Steps

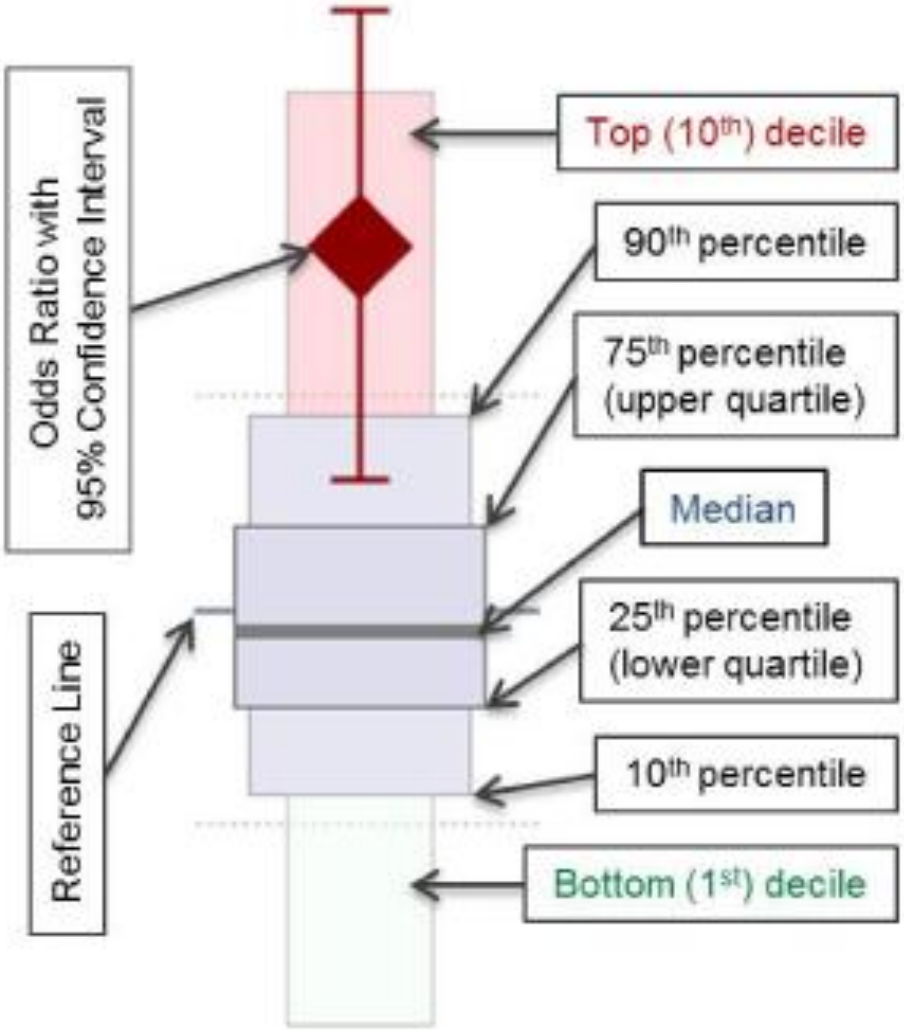
- Criteria for VTE prophylaxis?
- Criteria for IVC filter insertion?
- Appropriateness?
- Is this a group project?

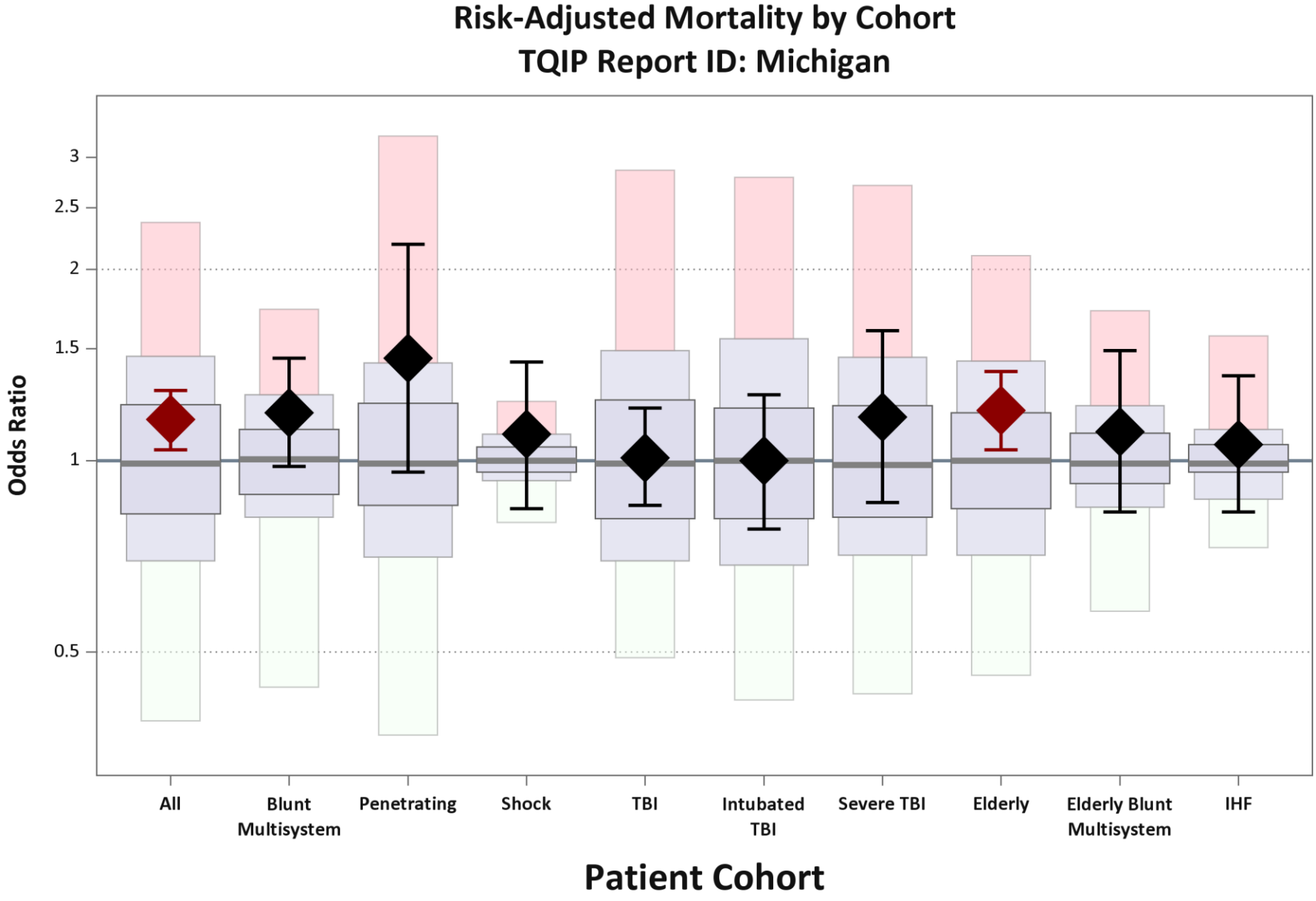
ACS-TQIP Reports

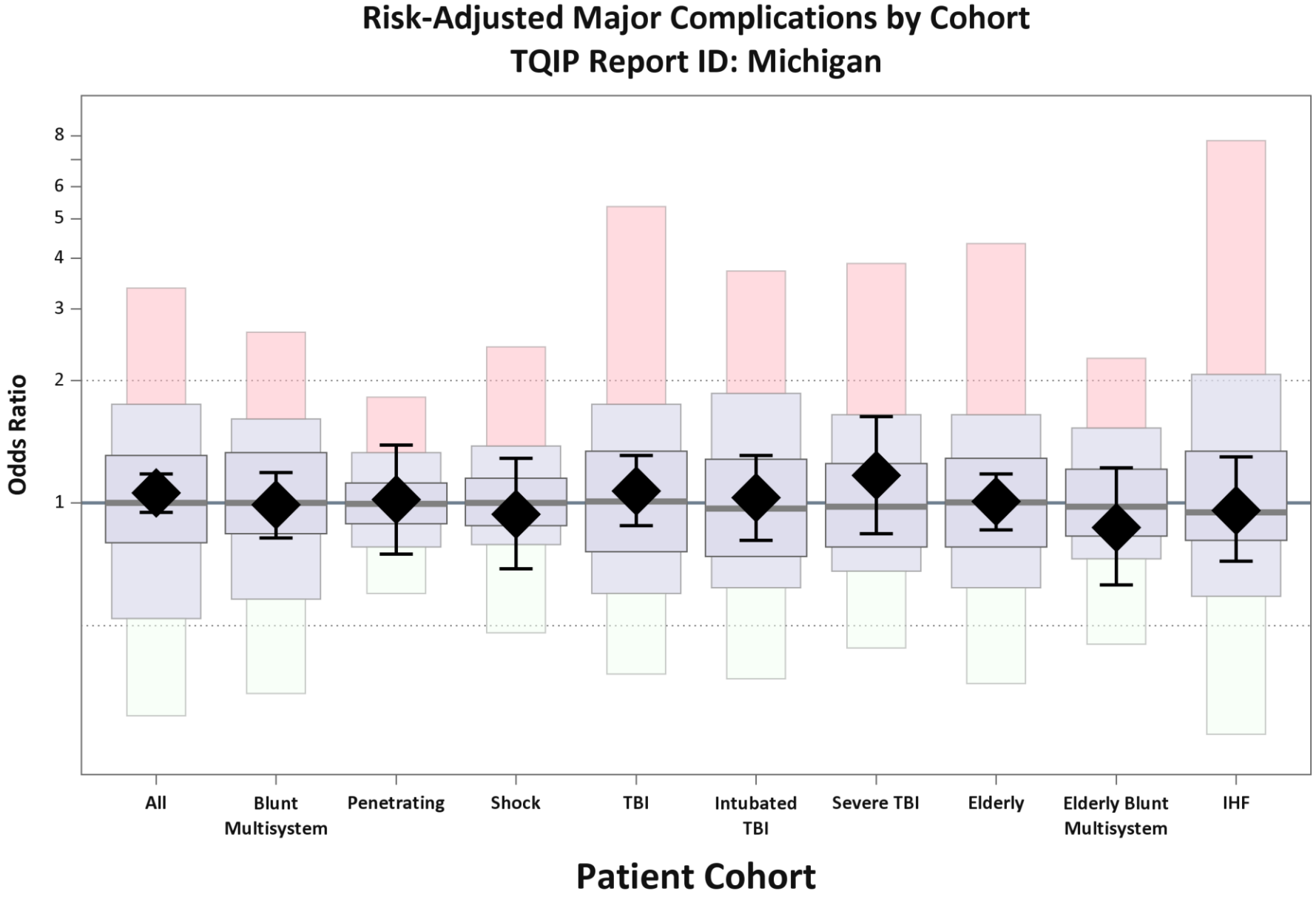
Mark Hemmila, MD

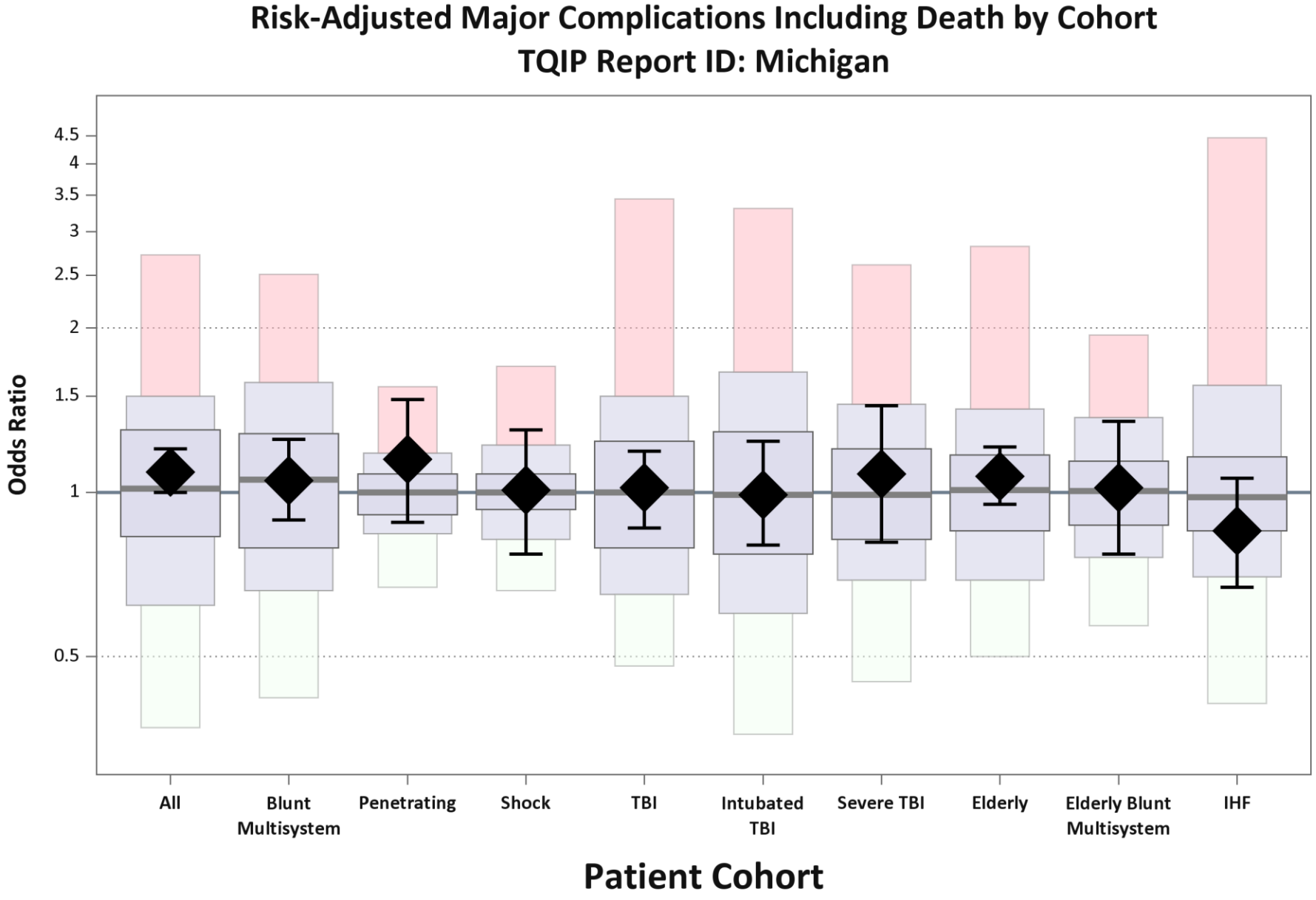
ACS-TQIP Report for Michigan

- Read pages 1-4
  - One AIS≥3
  - Exclude ED disposition transfer to another hospital
  - Exclude pre-existing advanced directive
- AIS 90,95,05 and ICD9 crosswalked to AIS 98
- Mortality includes hospice
- Large n results in small CI and very little shrinkage to mean
- Odds ratio rather than O/E
- Two centers excluded from complications for submitting >10% data unknown


Odds Ratio with
95% Confidence Interval
Reference Line
Top (10th) decile
90th percentile
75th percentile
(upper quartile)
Median
25th percentile
(lower quartile)
10th percentile
Bottom (1st) decile


Risk-Adjusted Mortality by Cohort
TQIP Report ID: Michigan
Odds Ratio
3
2.5
2
1.5
1
0.5
All
Blunt Multisystem
Penetrating
Shock
TBI
Intubated TBI
Severe TBI
Elderly
Elderly Blunt Multisystem
IHF
Patient Cohort


Risk-Adjusted Major Complications by Cohort
TQIP Report ID: Michigan
Odds Ratio
8
6
5
4
3
2
1
All
Blunt Multisystem
Penetrating
Shock
TBI
Intubated TBI
Severe TBI
Elderly
Elderly Blunt Multisystem
IHF
Patient Cohort


Risk-Adjusted Major Complications Including Death by Cohort
TQIP Report ID: Michigan
Odds Ratio
4.5
4
3.5
3
2.5
2
1.5
1
0.5
All
Blunt Multisystem
Penetrating
Shock
TBI
Intubated TBI
Severe TBI
Elderly
Elderly Blunt Multisystem
IHF
Patient Cohort

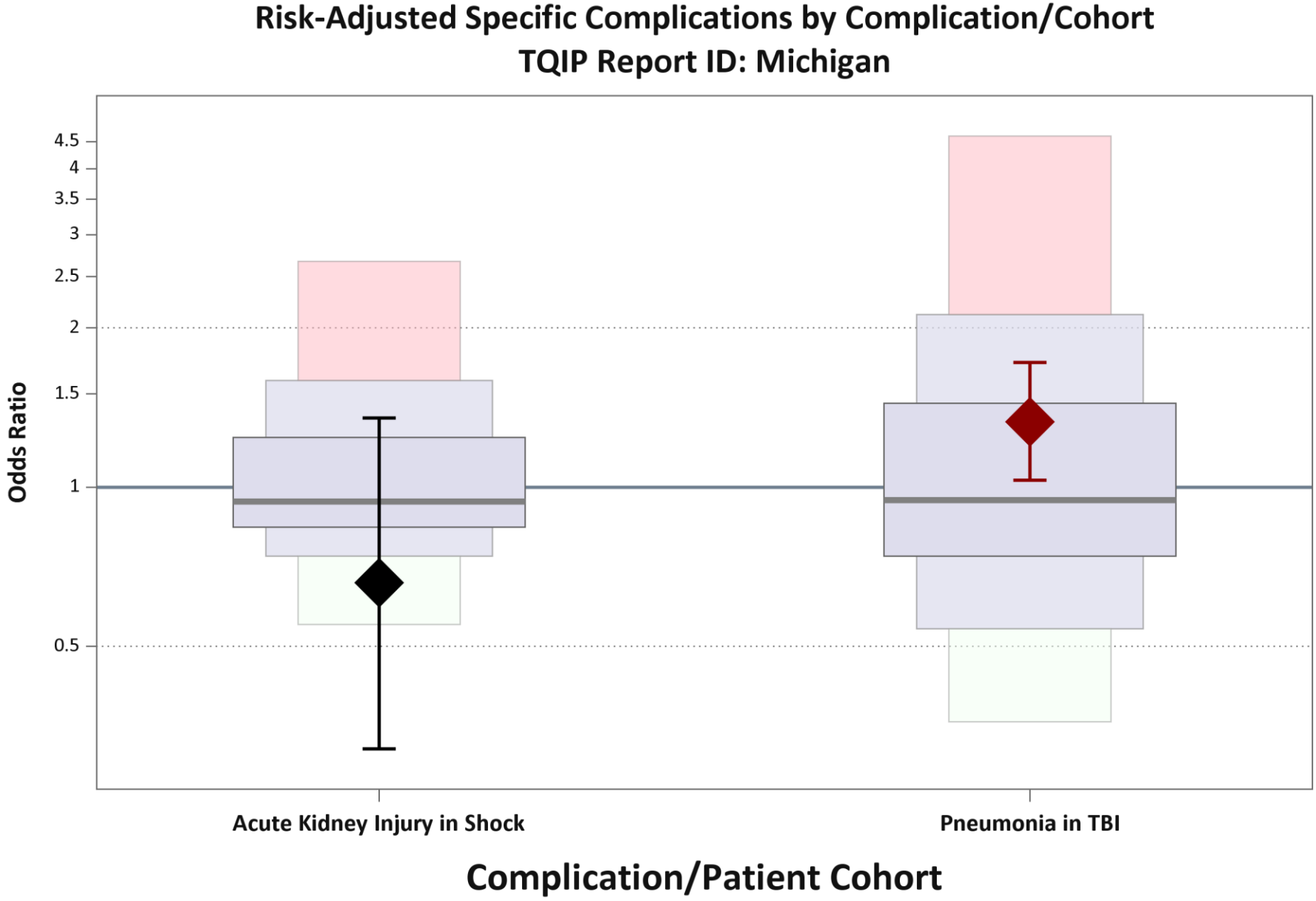

Risk-Adjusted Specific Complications by Complication/Cohort
TQIP Report ID: Michigan
Odds Ratio
4.5
4
3.5
3
2.5
2
1.5
1
0.5
Acute Kidney Injury in Shock
Pneumonia in TBI
Complication/Patient Cohort

Table 13: Time to Death by Cohort

		Patients	All Deaths[1]		In-Hospital Deaths[2]		Time to In-Hospital Death (days)				
Cohort	Hospitals	N	N	%	N	%	Median	25th Percentile	75th Percentile	In-Hospital Deaths within 72 Hours (%)	In-Hospital Deaths after 30 Days (%)
All	All Others	175,699	11,798	6.7	10,505	6.0	4.0	2.0	8.0	48.8	2.1
	Collaborative	10,784	730	6.8	620	5.7	4.0	2.0	9.0	44.0	2.1
Blunt Multisystem	All Others	32,431	4,049	12.5	3,613	11.1	4.0	2.0	9.0	49.7	2.7
	Collaborative	1,325	193	14.6	159	12.0	4.0	2.0	9.0	44.7	5.0
Penetrating	All Others	9,214	775	8.4	599	6.5	1.0	1.0	3.0	77.5	2.8
	Collaborative	533	63	11.8	27	5.1	1.0	1.0	2.0	88.9	0.0
Shock	All Others	6,880	1,927	28.0	1,544	22.4	2.0	1.0	5.0	66.5	2.2
	Collaborative	382	93	24.3	74	19.4	2.0	1.0	4.0	68.9	0.0
TBI	All Others	35,339	4,816	13.6	4,406	12.5	3.0	2.0	7.0	51.0	1.0
	Collaborative	2,103	268	12.7	249	11.8	4.0	2.0	8.0	49.8	0.8
Intubated TBI	All Others	10,361	3,916	37.8	3,575	34.5	3.0	2.0	7.0	55.0	1.2
	Collaborative	521	196	37.6	187	35.9	3.0	2.0	8.0	55.1	0.5
Severe TBI	All Others	7,030	3,140	44.7	2,770	39.4	2.0	2.0	5.0	64.5	0.8
	Collaborative	321	150	46.7	131	40.8	2.0	2.0	4.0	69.5	0.0
Elderly	All Others	54,607	5,507	10.1	5,149	9.4	5.0	2.0	9.0	39.6	1.8
	Collaborative	4,127	401	9.7	380	9.2	5.0	2.0	10.0	36.6	2.1
Elderly Blunt Multisystem	All Others	7,050	1,370	19.4	1,237	17.5	5.0	2.0	9.0	41.9	2.3
	Collaborative	361	75	20.8	66	18.3	6.0	2.0	10.0	31.8	6.1
IHF	All Others	11,267	392	3.5	392	3.5	6.0	4.0	10.0	21.2	1.8
	Collaborative	2,306	79	3.4	78	3.4	6.5	4.0	10.0	23.1	0.0

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

[2] Including deaths in the hospital

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

	Patients[1]	Missing Time to Operative Fixation		Operative Fixation more than 24 Hours	
Hospitals	N	N	%	N	%
All Others	6,800	129	1.9	1,919	28.8
Collaborative	458	5	1.1	170	37.5

[1] Mid-shaft femur fracture is defined by AIS 98 code 851814.3. Operative fixation is defined by ICD-9 procedure codes 79.35 or 79.15

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

	Patients[1]	Missing Time to Operative Fixation		Operative Fixation more than 12 Hours	
Hospitals	N	N	%	N	%
All Others	3,034	69	2.3	1,439	48.5
Collaborative	181	0	0.0	73	40.3

[1] Open tibia and open tibia/fibula shaft fractures are defined by the ICD-9 diagnosis codes: 823.10, 823.11, 823.12, 823.30, 823.31, and 823.32. Operative fixation is defined by ICD-9 procedure codes 79.36 or 79.16

Processes of Care: Spleen

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

		Patients	Operative Management[1]		Splenic Preservation[2]		Angiography with or without Embolization[3]		Time to Operative Management (hours)[4]		
Cohort	Hospitals	N	N	%	N	%	N	%	Median	25th Percentile	75th Percentile
Blunt Splenic Injury	All Others	8,232	1,962	23.8	6,393	77.7	1,350	16.4	1.8	1.1	4.2
	Collaborative	346	66	19.1	287	82.9	43	12.4	3.0	1.5	8.0
Isolated Blunt Splenic Injury	All Others	630	171	27.1	465	73.8	129	20.5	3.4	1.5	11.5
	Collaborative	33	6	18.2	27	81.8	4	12.1	6.7	5.4	8.0

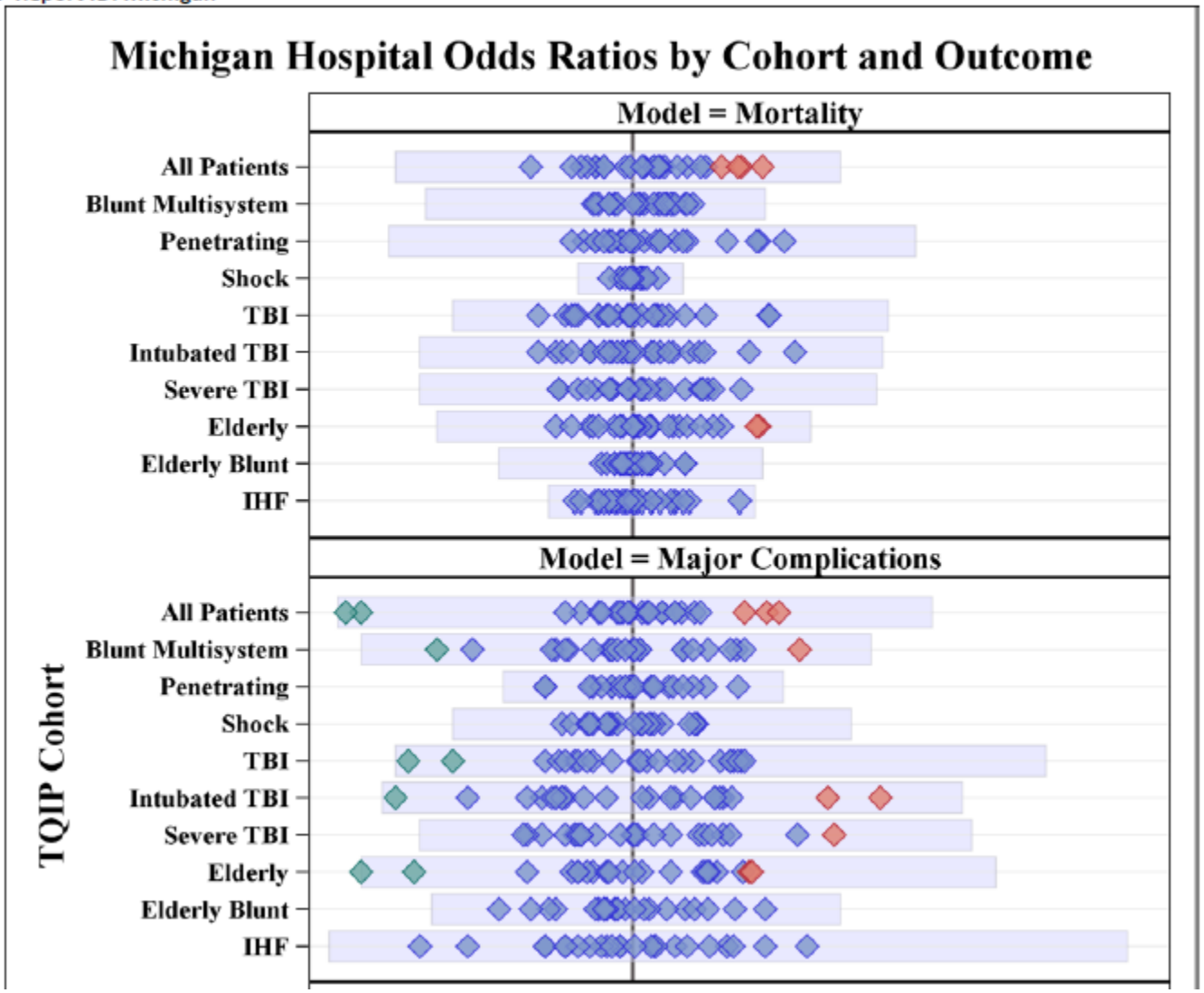
[1] Operative management of a splenic injury (splenectomy or splenorrhaphy) is defined by ICD-9 procedure codes: 41.2, 41.43, 41.42, 41.5, 41.95, 41.99

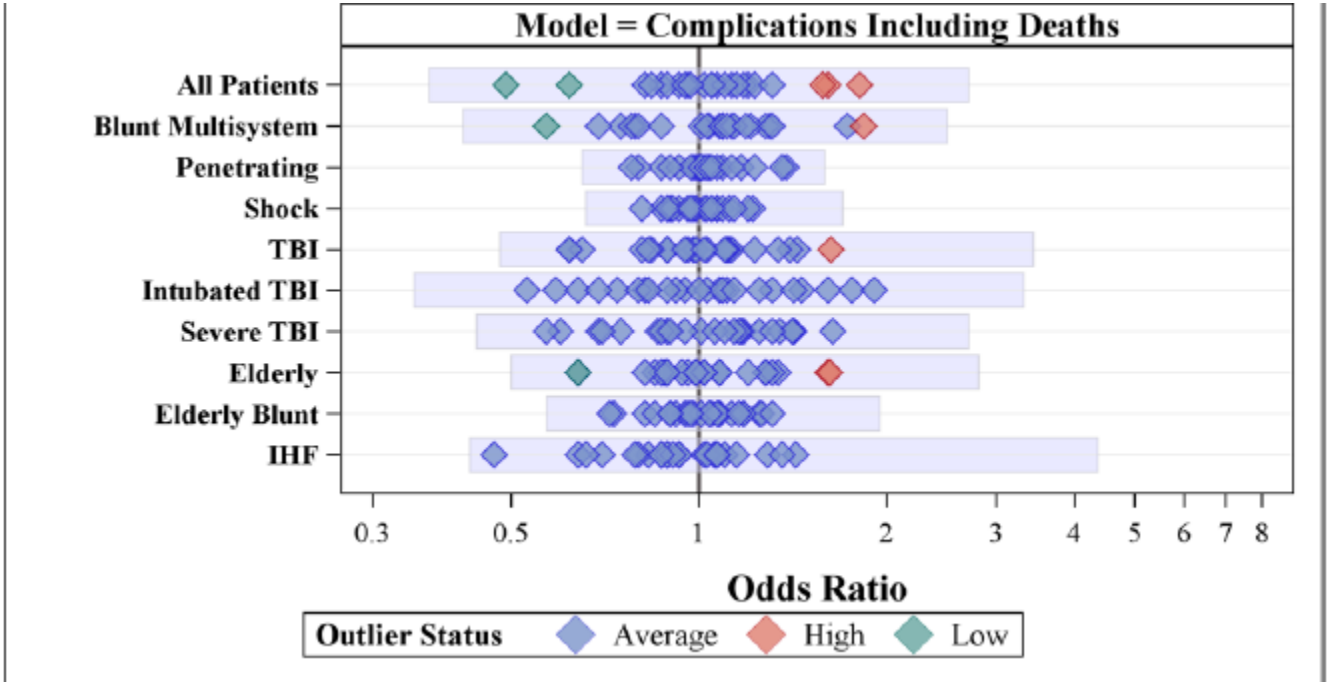
[2] Splenic preservation excludes ICD-9 procedure code: 41.5

[3] Splenic angiography is defined by ICD-9 procedure codes: 88.47, 88.49, 39.79, 38.86

[4] Among patients with an operation

Appendix F: OR Summary Figures




Model = Complications Including Deaths
All Patients
Blunt Multisystem
Penetrating
Shock
TBI
Intubated TBI
Severe TBI
Elderly
Elderly Blunt
IHF
0.3
0.5
1
2
3
4
5
6
7
8
Odds Ratio
Outlier Status
Average
High
Low

What Does It Mean?

- Our patients are probably not sicker and older
- Large n matters
- Might want to focus more on mortality
- The difference is on order of 2 patients per year per center
- Your thoughts?
- Drill down data?
- Trends?
- Review and provide feedback

MTQIP Reports

Mark Hemmila, MD

Confidentiality Agreement

- Everyone signs a confidentially agreement for entry to the meeting
- Every meeting
- No photographs
- Reports distributed

Confidentiality Agreement

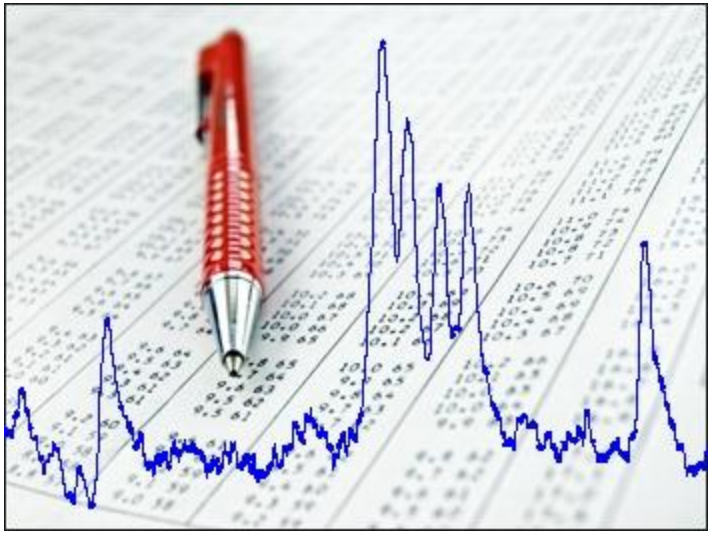
The following examples are to be considered privileged and confidential information and should be discussed only within the confines of the MTQIP Quality Collaborative meetings.

- Any and all patient information.
- Any and all patient identifiers which are considered privileged and protected health information as defined by current HIPPA laws.
- Any specific Michigan trauma case information.
- Any information discussed regarding a specific MTQIP site outcome.
- Any reference to a specific MTQIP site result or analysis.
- All trauma data presented including but not limited to Composite Metrics.

Confidentiality Agreement

By signing this document, I 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. I understand that any violation of confidentiality may result in my personal removal from participation in the project as well as the removal of the hospital site I represent.

Hospital Metrics



MTQIP 2015 Hospital Metrics

- Participation 70%
  - Data Submission
  - Surgeon Lead
  - Trauma Program Manager/Registrar
  - Site-specific QI project
  - Presentation/Use of MTQIP data
- Performance 30%
  - Data Validation
  - Massive Transfusion Protocol
  - VTE Prophylaxis

Performance

PERFORMANCE (30%)					
#6	10	**Accuracy of Data**			
			Visit #1	**Visit #2 or More**	
		5 star validation	0-4.5%	0-4.5%	10
		4 star validation	4.6-5.5%	4.6-5.5%	8
		3 star validation	5.6-8.0%	5.6-7.0%	5
		2 star validation	8.1-9.0%	7.1-8.0%	3
		1 star validation	> 9%	> 8.0%	0
#7	10	**Massive Transfusion (defined as ≥ 4 u PRBC in first 4 hours): Mean PRBC to Plasma Ratio for first 4 hours of admission**			
		≤ 1.5			10
		1.6 - 2.5			7.5
		> 2.5			5
		> 3.0			0
#8	10	**Timely VTE Prophylaxis (< 48 hours of admission)**			
		> 50%			10
		≥ 40%			5
		< 40%			0

	na
	na
	na

Blood Products (7/1/13 to 12/31/14)

Inclusion:

PRBC 4hrs ≥ 4 units

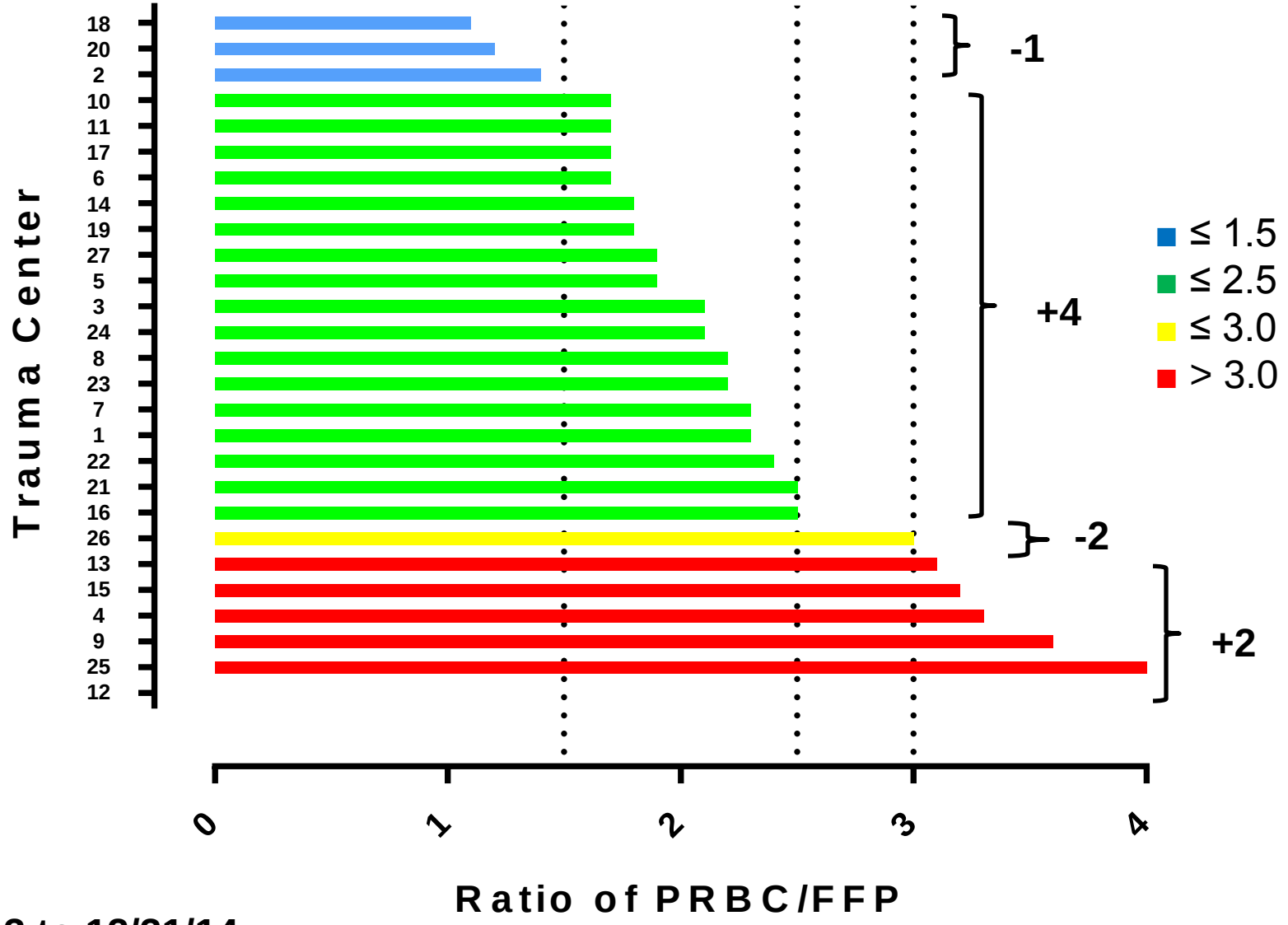
Trauma Center	N Patients	Ratio PRBC/FFP 4 hrs	N Ratio PRBC/FFP 4 hrs ≤ 3	N Ratio PRBC/FFP 4 hrs ≤ 2.5	N Ratio PRBC/FFP 4 hrs ≤ 1.5	Ratio PRBC/FFP 24 hrs	N Ratio PRBC/FFP 24 hrs ≤ 2.0	N Ratio PRBC/FFP 24 hrs ≤ 1.5	Dead
18	28	1.1	27	27	24	1.2	27	21	10
20	5	1.2	5	5	4	1.0	4	4	2
2	8	1.4	4	4	3	1.4	5	3	2
10	32	1.7	25	22	21	1.6	24	23	11
11	26	1.7	20	20	11	1.6	16	12	9
17	16	1.7	11	10	6	1.7	12	8	6
6	6	1.7	3	3	1	2.7	3	1	4
14	18	1.8	12	11	6	1.6	11	7	8
19	10	1.8	7	6	2	1.7	7	2	3
27	32	1.9	24	22	15	2.0	20	14	17
5	7	1.9	5	4	2	2.1	4	3	3
3	18	2.1	9	8	6	2.1	9	5	10
24	4	2.1	2	2	0	2.0	1	1	2
8	19	2.2	14	12	5	2.2	11	6	6
23	7	2.2	4	3	0	2.3	2	0	3
7	17	2.3	11	11	5	2.3	10	5	8
1	2	2.3	1	1	0	--	0	0	0
22	6	2.4	3	3	2	2.1	3	3	2
21	45	2.5	24	18	11	2.4	21	10	17
16	10	2.5	8	7	5	3.3	3	2	4
26	1	3.0	1	0	0	5.0	0	0	1
13	13	3.1	9	7	2	2.6	3	1	2
15	42	3.2	20	14	5	2.9	12	6	13
4	14	3.3	9	7	2	3.7	5	2	5
9	3	3.6	1	0	0	2.4	2	0	1
25	2	11.5	0	0	0	--	0	0	1
12	0	0.0	0	0	0	0.0	0	0	0
Total	391	1.8	259	227	138	1.7	215	139	150

MTQIP 2015 Hospital Metrics

- Massive Transfusion
  - ≥ 4 units PRBC's in first 4 hrs
  - Average of ratio for each patient
  - 11/1/13 to 12/31/14

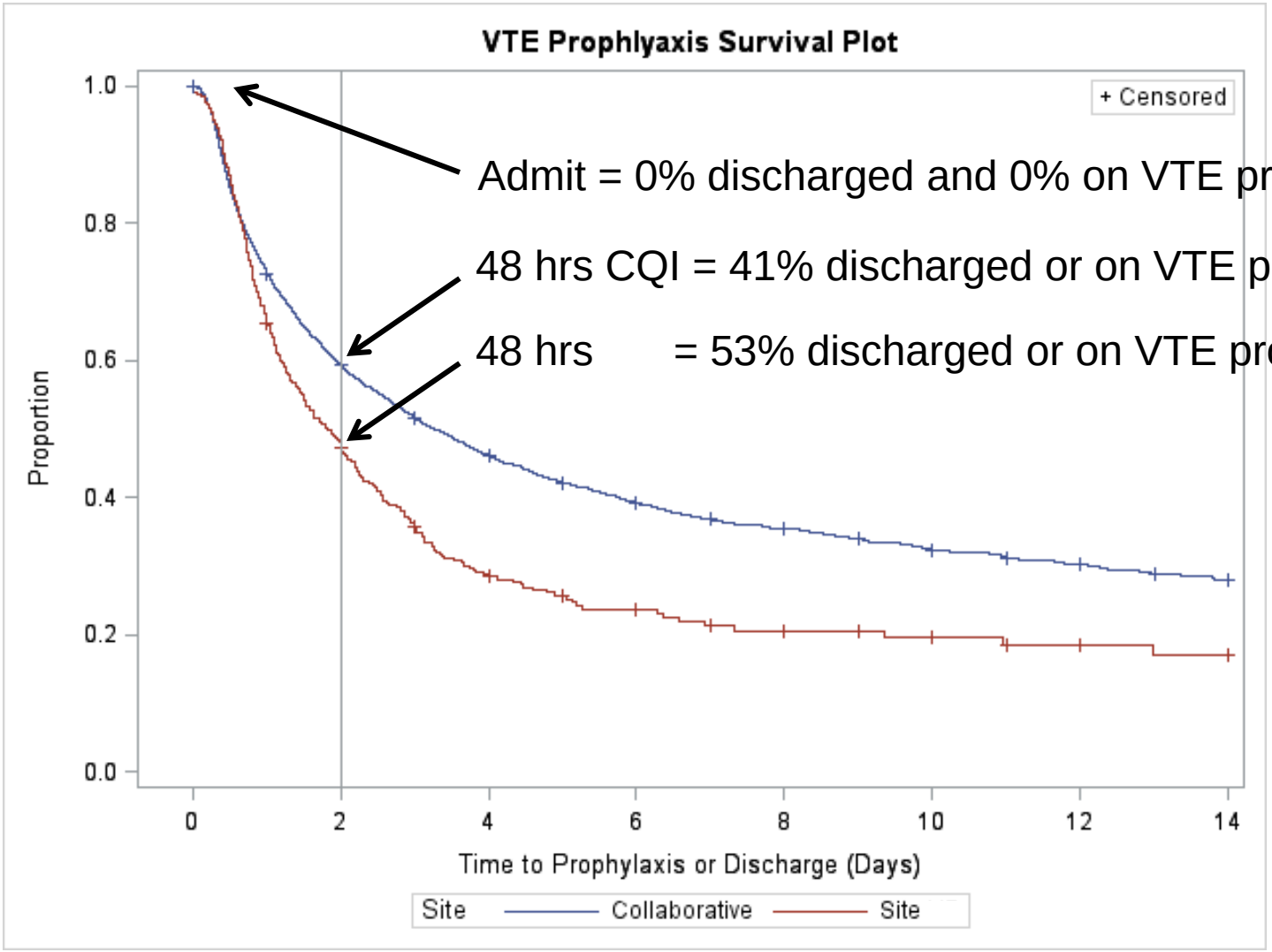
Ratio PRBC/FFP	Points
< 1.5	10
1.6 – 2.5	7.5
2.6 – 3.0	5
> 3.0	0

Blood Product Ratio in first 4 hrs if ≥ 4 uPRBCs



7/1/13 to 12/31/14

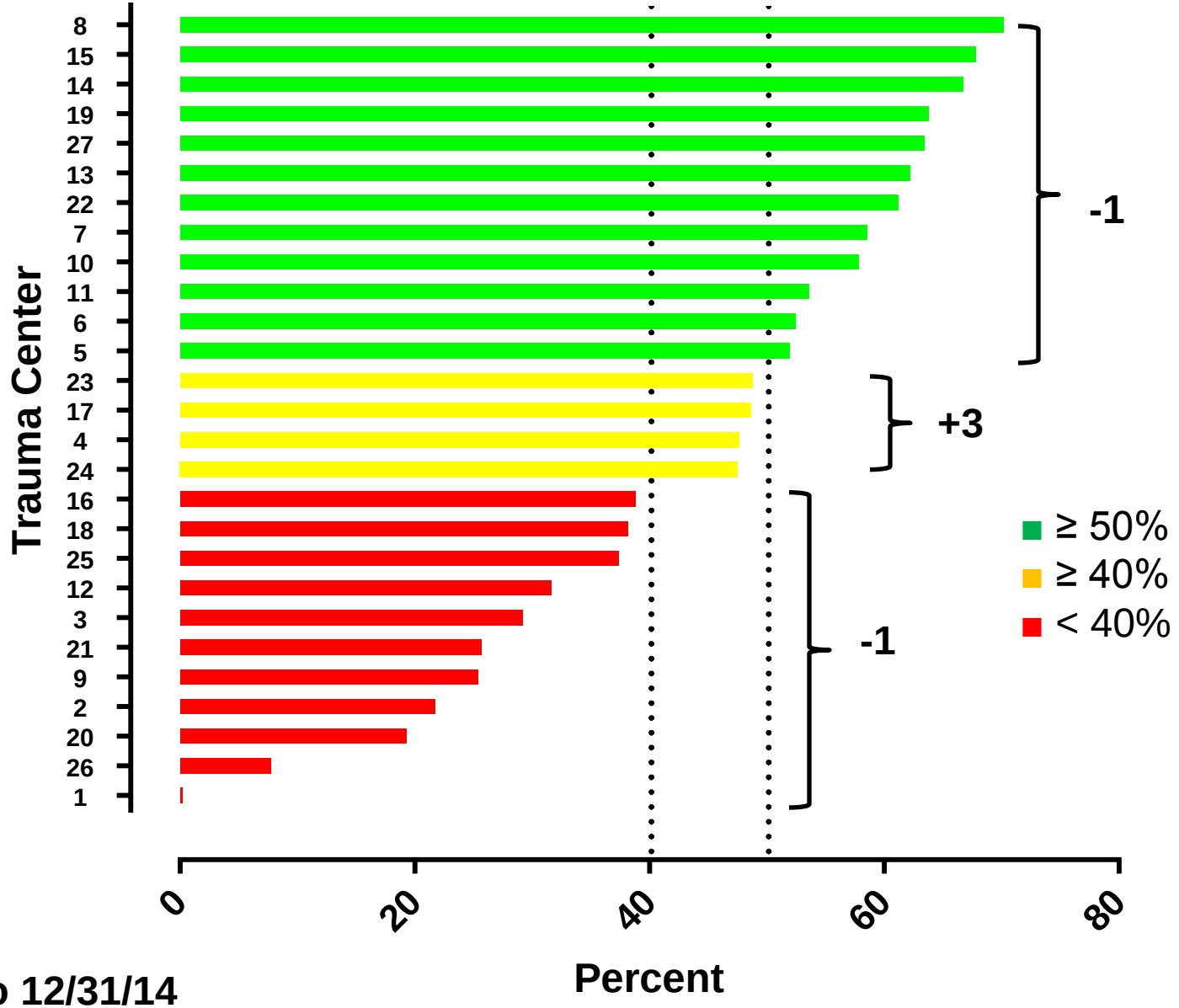
VTE Prophylaxis



VTE Prophylaxis

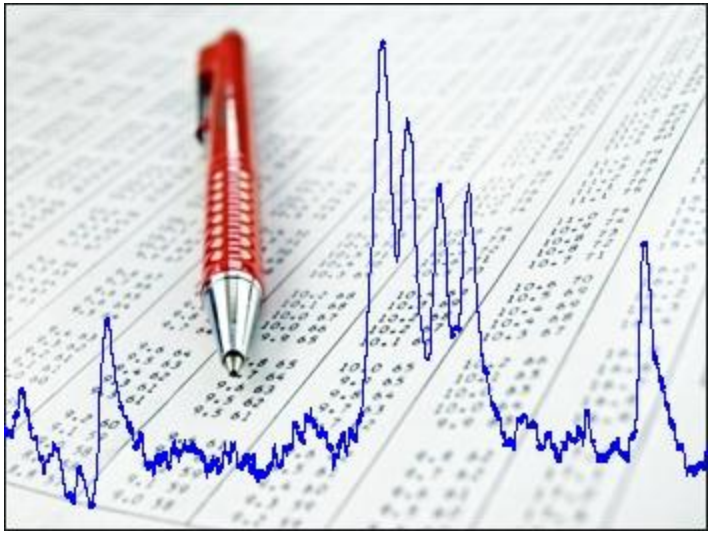
- Admit Trauma Service
  - In hospital with no VTE pro = non-Event
  - Discharge Home in 48 hrs = Event
  - VTE Prophylaxis in 48 hrs = Event
  - 11/1/13 to 12/31/14
- Rate
  - ≥ 50% (10 points)
  - ≥ 40% (5 points)
  - 0 – 39% (0 points)

Rate of VTE Prophylaxis by 48 hrs



7/1/13 to 12/31/14

Collaborative Metrics



MTQIP 2015 Collaborative Metrics

- Hemorrhage (≥ 4 u PRBC's first 4 hrs)
  - 7/1/13 to 12/31/14
  - % of patients with 4hr PRBC/FFP ratio ≤ 2.5
    - Begin = 34 %
    - Previous = 58 %
    - Current = **59 %** (149/253)
    - Target = 80 %

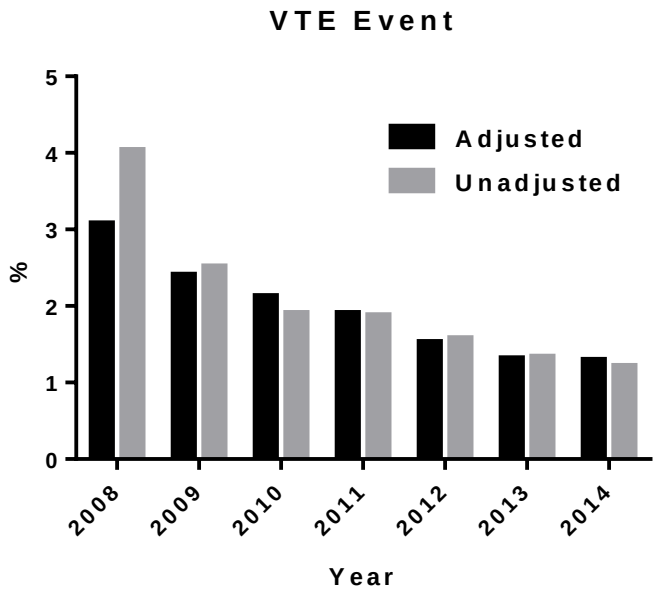
Patient List - Blood

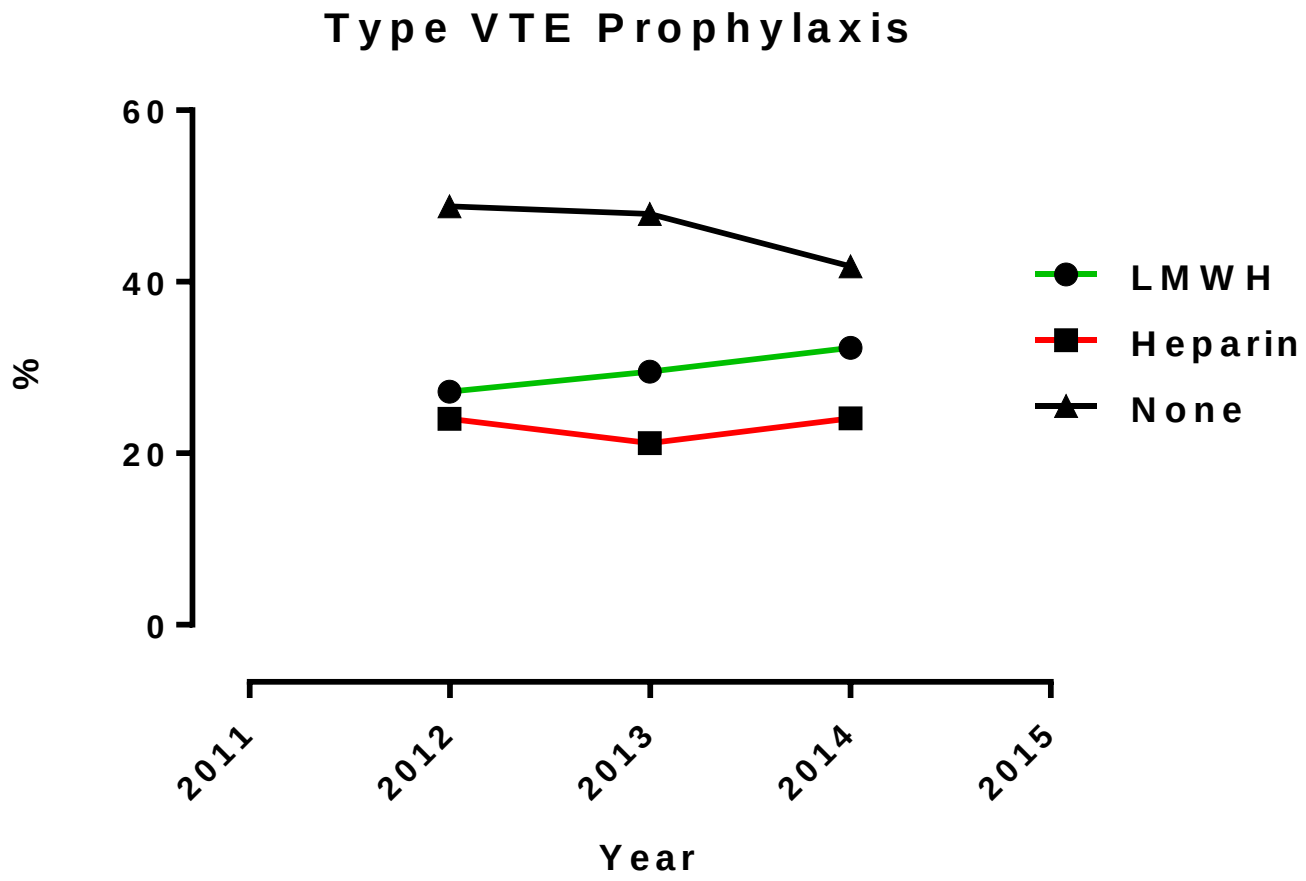
recordno	traumactr	age	blunt	ed_arrdate	ed_arrtime	ed_bp	ed_pulse	ed_mtr	usrais_iss	prbc4	ffp4	plt4	cryo4	ratio4
						64	151	6	10	6	2	5	0	3
						110	81	1	38	10	10	10	0	1
						99	84	1	34	4	4	0	0	1
						137	100	1	22	4	0	0	0	
						107	106	6	16	7	8	15	0	0.875
						0	0	1	9	11	0	0	0	
						65	73	6	59	4	3	0	0	1.333333
						137	98	6	16	4	0	0	0	
						119	150	6	34	38	36	40	2	1.055556

- Your list of patients
- 0 = No
- 1 = Yes
- Injury, Blood products, TXA, Operation, Angio
- MTQIP Report Site (Hemorrhage)

MTQIP 2015 Collaborative Metrics

- VTE
  - VTE Rate
    - Begin = 2.5 %
    - Previous = 1.4 %
    - Current = **1.3 %**
    - Target = 1.5 %
  - 48 hr VTE Prophylaxis Rate
    - Begin = 38 %
    - Previous = 43 %
    - Current = **44 %**
    - Target = 50 %




Type VTE Prophylaxis
60
40
20
0
%
2011
2012
2013
2014
2015
Year
LMWH
Heparin
None

Processes of Care: Venous Thromboembolism Prophylaxis

Table 20: Pharmacologic VTE Prophylaxis by Cohort

		Patients[1]	VTE Prophylaxis				Time to VTE Prophylaxis (days)		
Cohort	Hospitals	N	N	%	No Prophylaxis (%)	Unknown (%)	Median	25th Percentile	75th Percentile
All	All Others	170,382	80,032	57.5	42.5	18.3	2.0	1.0	3.0
	Collaborative	10,463	5,870	63.5	36.5	11.6	2.0	1.0	2.0
Blunt Multisystem	All Others	30,552	18,007	72.2	27.8	18.4	3.0	2.0	4.0
	Collaborative	1,234	792	71.2	28.8	9.8	3.0	1.0	4.0
Penetrating	All Others	8,596	4,993	71.6	28.4	18.9	2.0	1.0	3.0
	Collaborative	473	326	81.3	18.7	15.2	1.0	1.0	2.0
Shock	All Others	5,587	3,291	72.8	27.2	19.1	2.0	1.0	4.0
	Collaborative	317	207	76.1	23.9	14.2	2.0	1.0	3.0
TBI	All Others	33,248	8,158	29.6	70.4	17.2	3.0	2.0	5.0
	Collaborative	1,988	502	28.5	71.5	11.4	3.0	2.0	5.0
Intubated TBI	All Others	8,500	3,365	47.9	52.1	17.3	4.0	2.0	6.0
	Collaborative	432	199	52.2	47.8	11.8	4.0	3.0	7.0
Severe TBI	All Others	5,234	2,128	47.9	52.1	15.2	4.0	2.0	6.0
	Collaborative	230	103	51.0	49.0	12.2	4.0	3.0	6.0
Elderly	All Others	52,809	22,276	51.9	48.1	18.8	2.0	1.0	3.0
	Collaborative	4,007	2,170	60.4	39.6	10.3	2.0	1.0	3.0
Elderly Blunt Multisystem	All Others	6,523	3,526	67.1	32.9	19.4	3.0	2.0	4.0
	Collaborative	334	207	67.6	32.4	8.4	3.0	1.0	4.0
IHF	All Others	11,230	7,843	83.6	16.4	16.4	2.0	1.0	2.0
	Collaborative	2,294	1,823	90.3	9.7	12.0	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

Processes of Care: Venous Thromboembolism Prophylaxis

Table 22: Pharmacologic VTE Prophylaxis Type by Cohort

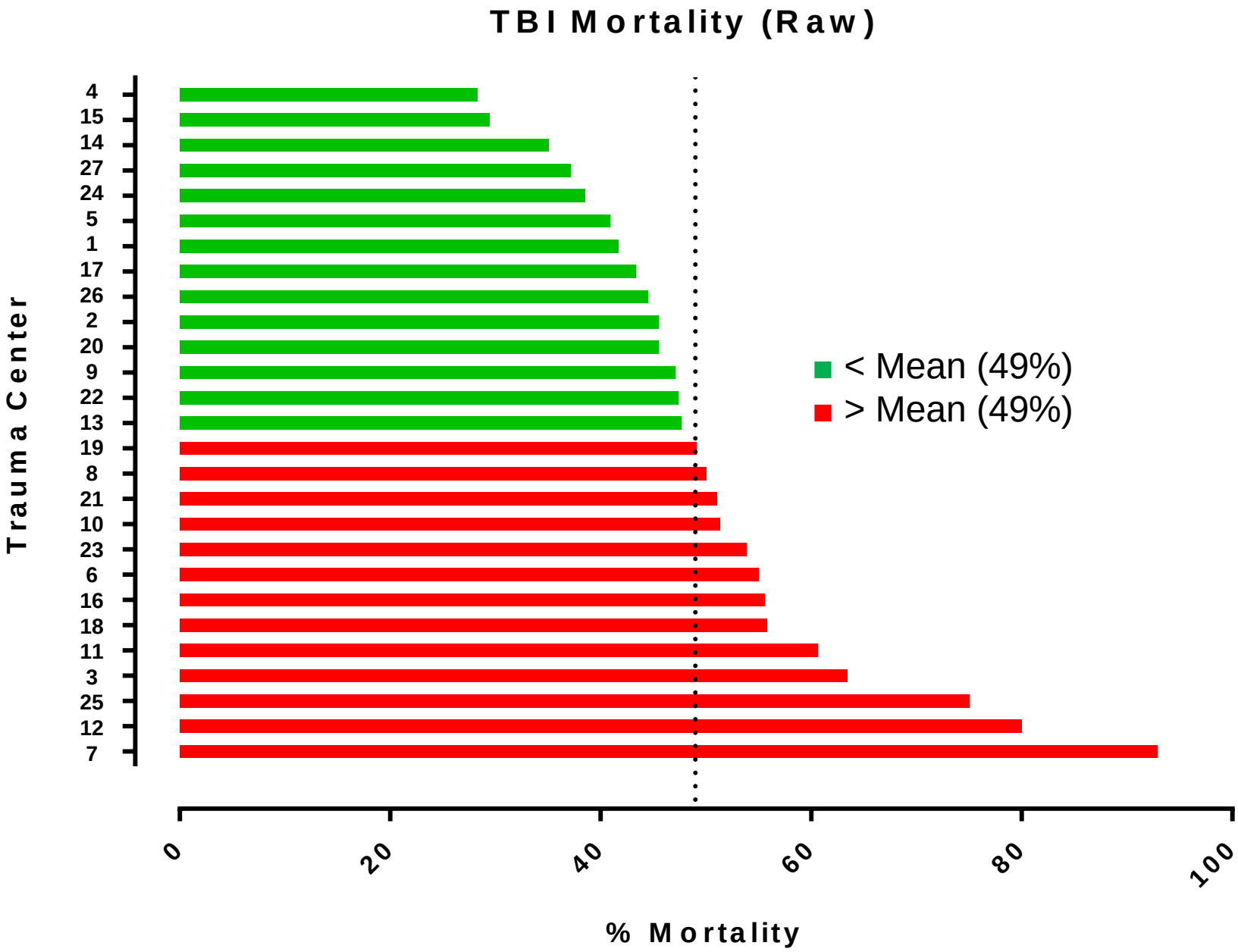
		VTE Prophylaxis	Unfractionated Heparin		LMWH		Direct Thrombin or Oral Xa Inhibitor		Coumadin		Other	
Cohort	Hospitals	N	N	%	N	%	N	%	N	%	N	%
All	All Others	80,117	18,705	23.3	58,644	73.2	343	0.4	770	1.0	1,655	2.1
	Collaborative	5,880	2,328	39.6	3,224	54.8	36	0.6	136	2.3	156	2.7
Blunt Multisystem	All Others	18,037	4,159	23.1	13,483	74.8	37	0.2	63	0.3	295	1.6
	Collaborative	795	287	36.1	487	61.3	6	0.8	3	0.4	12	1.5
Penetrating	All Others	5,005	955	19.1	3,963	79.2	2	0.0	7	0.1	78	1.6
	Collaborative	327	165	50.5	159	48.6	0	0.0	0	0.0	3	0.9
Shock	All Others	3,309	851	25.7	2,362	71.4	12	0.4	9	0.3	75	2.3
	Collaborative	213	94	44.1	113	53.1	0	0.0	2	0.9	4	1.9
TBI	All Others	8,178	4,155	50.8	3,676	44.9	21	0.3	56	0.7	270	3.3
	Collaborative	503	267	53.1	209	41.6	2	0.4	7	1.4	18	3.6
Intubated TBI	All Others	3,384	1,542	45.6	1,740	51.4	5	0.1	15	0.4	82	2.4
	Collaborative	199	114	57.3	80	40.2	2	1.0	0	0.0	3	1.5
Severe TBI	All Others	2,147	912	42.5	1,165	54.3	4	0.2	5	0.2	61	2.8
	Collaborative	103	55	53.4	45	43.7	1	1.0	0	0.0	2	1.9
Elderly	All Others	22,308	7,197	32.3	13,867	62.2	159	0.7	528	2.4	557	2.5
	Collaborative	2,177	917	42.1	1,054	48.4	20	0.9	99	4.5	87	4.0
Elderly Blunt Multisystem	All Others	3,534	1,135	32.1	2,287	64.7	8	0.2	37	1.0	67	1.9
	Collaborative	208	82	39.4	116	55.8	1	0.5	2	1.0	7	3.4
IHF	All Others	7,849	1,343	17.1	5,804	73.9	162	2.1	347	4.4	193	2.5
	Collaborative	1,826	733	40.1	809	44.3	14	0.8	191	10.5	79	4.3

MTQIP 2015 Collaborative Metrics

- Brain Injury
  - Selection Criteria
    - AIS Head > 0, excluding vascular, scalp, and bony injuries
    - Exclude if penetrating mechanism
    - Exclude if no signs of life
    - Exclude if direct admission transfer
    - Exclude if TBI GCS>8

MTQIP 2015 Collaborative Metrics

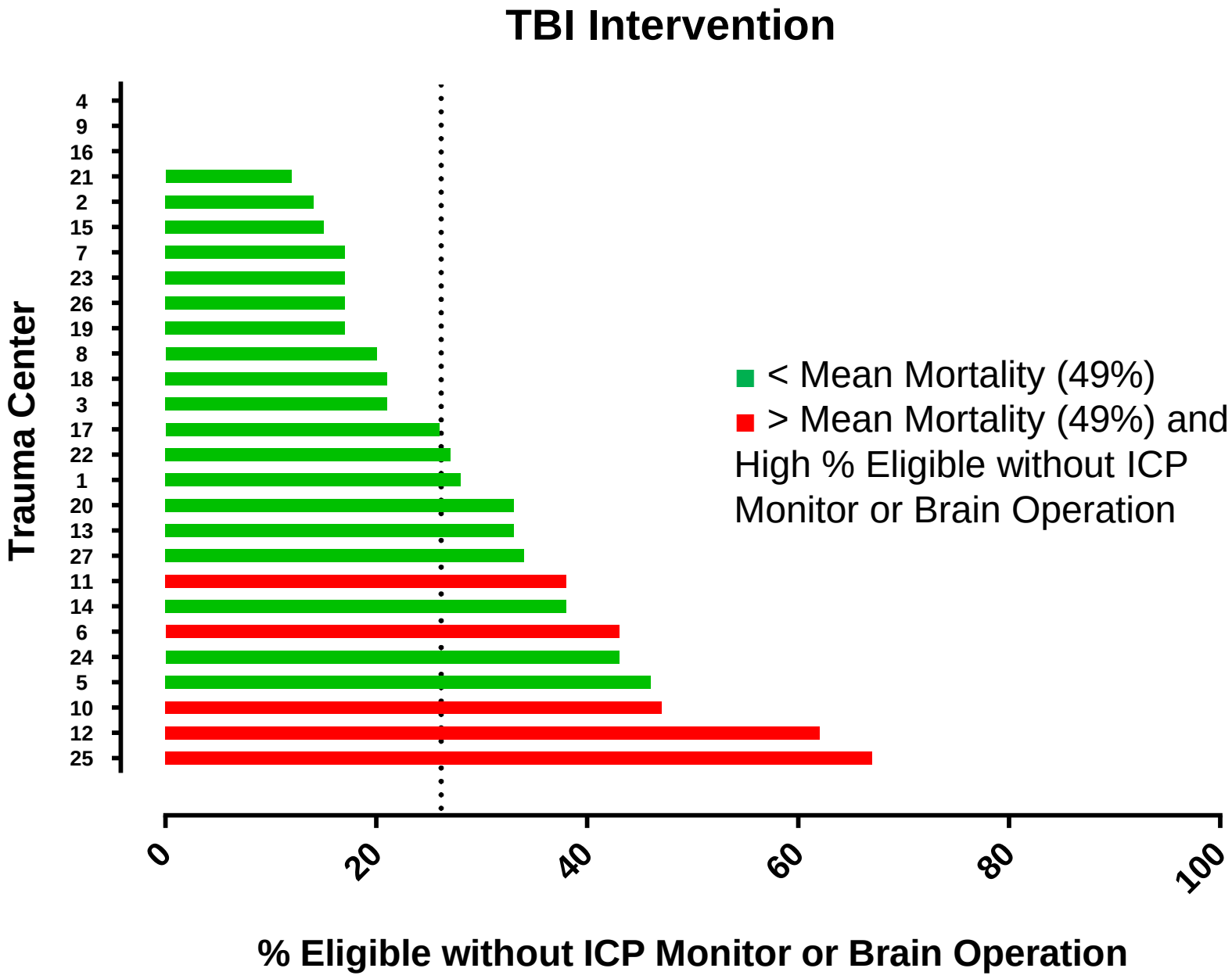
- Brain Injury
  - % of eligible patients with TBI intervention (Monitor or Operation)
    - Begin = 57 %
    - Previous = 70 %
    - Current = **74 %**
    - Target = 70 %


TBI Mortality (Raw)
Trauma Center
4
15
14
27
24
5
1
17
26
2
20
9
22
13
19
8
21
10
23
6
16
18
11
3
25
12
7
< Mean (49%)
> Mean (49%)
0
20
40
60
80
100
% Mortality

Monitor or Operation for Head Injury (7/1/2013 to 12/31/14)

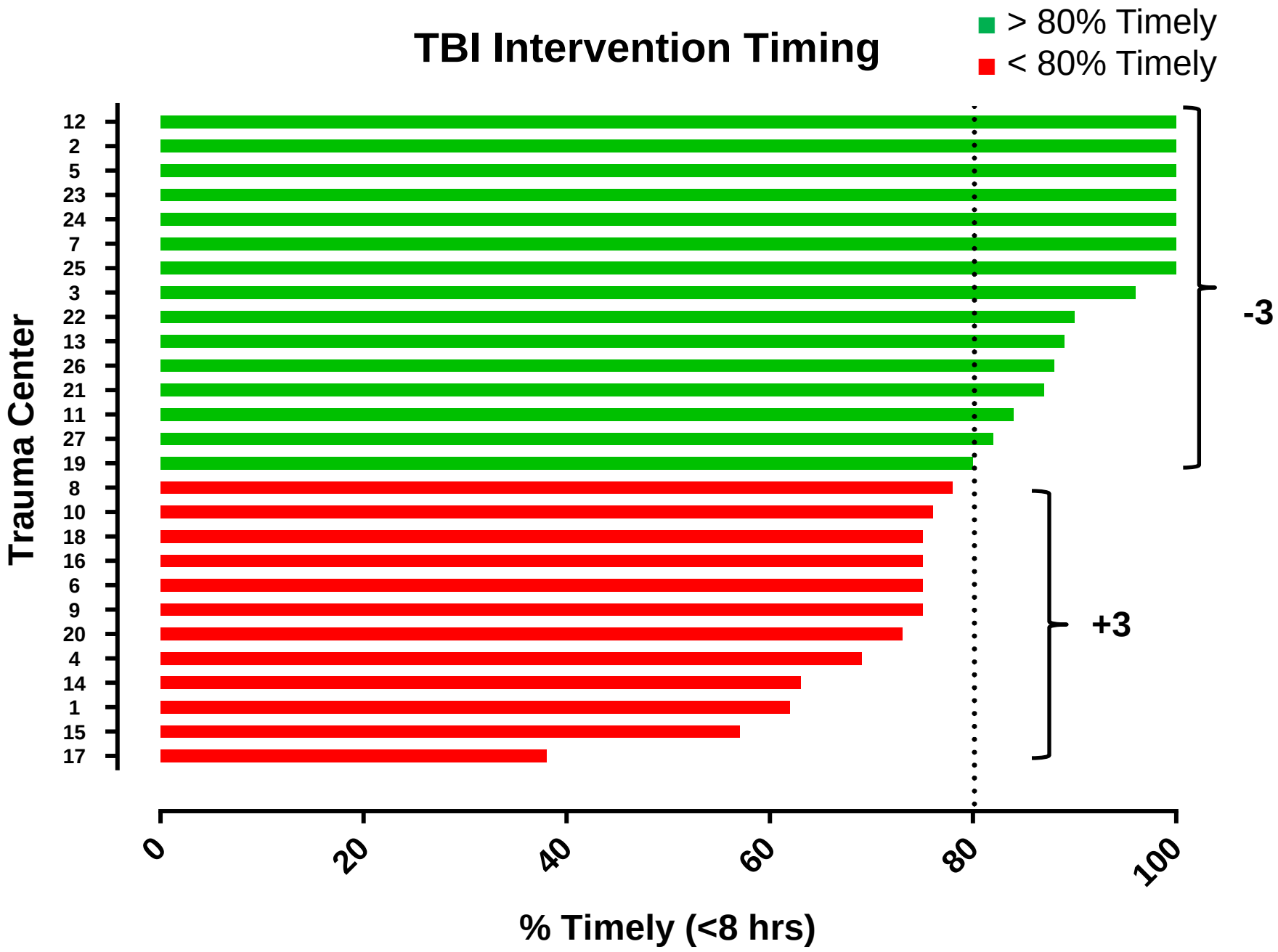
Inclusion:	Exclusion:	
AIS Head > 0	Penetrating Mechanism	No signs of life
	Direct Admit Transfer	Max GCS > 8 & TBI GCS > 8

Trauma Cente	N	Dead	Alive w/o Intervent	Alive with Intervent	Dead w/o Intervent	Dead with Intervent	Dead and Intervent Withheld	Eligible & no Intervent	Eligible	% Eligible w/no Interven	% Dead / N
21	96	49	22	25	30	19	24	6	50	12%	51%
27	62	23	24	15	13	10	0	13	38	34%	37%
19	53	26	19	8	15	11	11	4	23	17%	49%
18	52	29	7	16	18	11	11	7	34	21%	56%
1	49	20	13	16	10	10	0	10	36	28%	41%
4	46	13	13	20	6	7	6	0	27	0%	28%
3	42	27	5	10	14	13	8	6	29	21%	64%
10	39	20	9	10	14	6	0	14	30	47%	51%
11	33	20	5	8	15	5	7	8	21	38%	61%
17	30	13	10	7	6	7	1	5	19	26%	43%
5	23	10	8	5	8	2	2	6	13	46%	43%
20	22	10	7	5	7	3	3	4	12	33%	45%
13	21	10	9	2	6	4	3	3	9	33%	48%
12	20	16	2	2	13	3	5	8	13	62%	80%
14	20	7	7	6	5	2	0	5	13	38%	35%
6	20	11	6	3	6	5	0	6	14	43%	55%
22	19	9	3	7	5	4	1	4	15	27%	47%
9	17	8	5	4	7	1	7	0	5	0%	47%
15	17	5	2	10	4	1	2	2	13	15%	29%
8	14	7	3	4	3	4	1	2	10	20%	50%
7	14	13	1	0	8	5	7	1	6	17%	93%
23	13	7	4	2	4	3	3	1	6	17%	54%
24	13	5	6	2	3	2	0	3	7	43%	38%
2	11	5	3	3	2	3	1	1	7	14%	45%
26	9	4	3	2	1	3	0	1	6	17%	44%
16	9	5	1	3	0	5	0	0	8	0%	56%
25	8	6	1	1	6	0	4	2	3	67%	75%
Total	772	378	198	196	229	149	107	122	467	26%	49%


TBI Intervention
Trauma Center
4
9
16
21
2
15
7
23
26
19
8
18
3
17
22
1
20
13
27
11
14
6
24
5
10
12
25
< Mean Mortality (49%)
> Mean Mortality (49%) and High % Eligible without ICP Monitor or Brain Operation
0
20
40
60
80
100
% Eligible without ICP Monitor or Brain Operation

MTQIP 2015 Collaborative Metrics

- Brain Injury
  - % of TBI intervention patients with timely intervention (≤ 8 hrs after arrival)
    - Begin = 65 %
    - Previous = 68 %
    - Current = **79 %**
    - Target = 80 %


TBI Intervention Timing
> 80% Timely
< 80% Timely
Trauma Center
12
2
5
23
24
7
25
3
22
13
26
21
11
27
19
8
10
18
16
6
9
20
4
14
1
15
17
-3
+3
0
20
40
60
80
100
% Timely (<8 hrs)

Patient List – TBI Intervention

any_m	brain_op	vent	ippm	o2mon	jvb	time_to_br	time_to_ve	time_to_ip	time_to_o2	time_to_jv	minimum_	earliest_pl	timely
1	0	1	0	0	0		700				11.66667	vent	0
1	0	1	1	0	0		944	944			15.73333	multiple	0
1	0	1	0	0	0		1696				28.26667	vent	0
1	0	0	1	0	0			1640			27.33333	ippm	0
1	0	1	1	0	0			402			6.7	ippm	1
0	0	0	0	0	0								0
0	0	0	0	0	0								0
1	0	1	0	0	0		278				4.633333	vent	1
0	0	0	0	0	0								0
0	0	0	0	0	0								0
1	1	1	0	0	0	410	410				6.833333	multiple	1
1	0	1	0	0	0		1248				20.8	vent	0

- Your list of patients
- 0 = No
- 1 = Yes
- MTQIP Report Site (TBI management & Timing of TBI interventions)

MTQIP Shock - Operation

- 7/1/2013 to 12/31/2014
- Inclusion
  - First ED SBP or Lowest ED SBP ≤ 90 mmHg
  - Operation
    - MTQIP hemorrhage data
- Exclude
  - Time to operation negative or > 24 hrs

Trauma Center	N Operation	Dead	Penetrating	Mean Time to Operation, hrs	Ratio PRBC/FFP 4 hrs	Ratio PRBC/FFP 24 hrs	Laparot	Thorac	Stern	Extrem	Neck	Amp
15	45	12	40	1.1	2.8	2.5	17	14	0	12	1	1
18	32	12	15	1.5	1.1	1.2	19	7	0	3	1	2
10	26	8	22	1.7	1.7	1.6	14	5	2	5	0	0
27	20	9	3	2.2	2.0	2.0	12	2	0	4	1	1
21	19	5	2	1.7	2.0	2.1	17	0	0	2	0	0
14	18	10	12	1.9	1.9	1.7	12	5	0	0	0	1
7	17	6	6	2.1	2.6	2.1	7	3	0	6	0	1
11	14	4	8	1.7	1.7	1.8	8	1	0	4	0	1
13	13	2	6	1.1	3.1	2.5	8	2	0	2	0	1
3	12	3	7	3.4	1.3	1.2	8	0	0	2	2	0
16	11	4	8	1.5	3.2	3.2	5	5	0	0	1	0
19	11	3	9	1.3	1.1	1.0	5	5	0	0	1	0
8	10	4	7	1.8	2.4	1.9	5	2	0	1	2	0
1	10	5	8	0.5	2.7	2.7	4	2	0	4	0	0
20	10	2	3	2.6	1.1	0.7	4	0	0	6	0	0
4	10	4	1	15.2	2.8	3.5	7	1	0	0	0	2
22	8	2	2	1.9	1.5	1.6	3	3	0	2	0	0
17	6	3	4	1.2	1.3	1.2	3	2	0	1	0	0
5	5	2	0	1.6	1.8	1.9	4	0	0	1	0	0
6	5	3	2	2.3	1.8	1.5	2	3	0	0	0	0
23	4	2	2	4.7	2.0	4.0	3	1	0	0	0	0
9	3	0	1	2.5	3.7	3.3	2	0	0	1	0	0
24	3	1	1	1.7	2.1	2.0	2	0	0	1	0	0
12	2	2	0	0.8		3.0	2	0	0	0	0	0
25	2	1	2	0.9	11.5		1	0	0	1	0	0
2	1	1	0	2.0		1.0	1	0	0	0	0	0
26	1	1	0	2.0	3.0	5.0	1	0	0	0	0	0

MTQIP Shock - Angio

- 7/1/2013 to 12/31/2014
- Inclusion
  - First ED SBP or Lowest ED SBP ≤ 90 mmHg
  - Angio procedure
    - MTQIP hemorrhage data
    - Procedure data (ICD9 code)
- Exclude
  - Time to angio negative or > 24 hrs

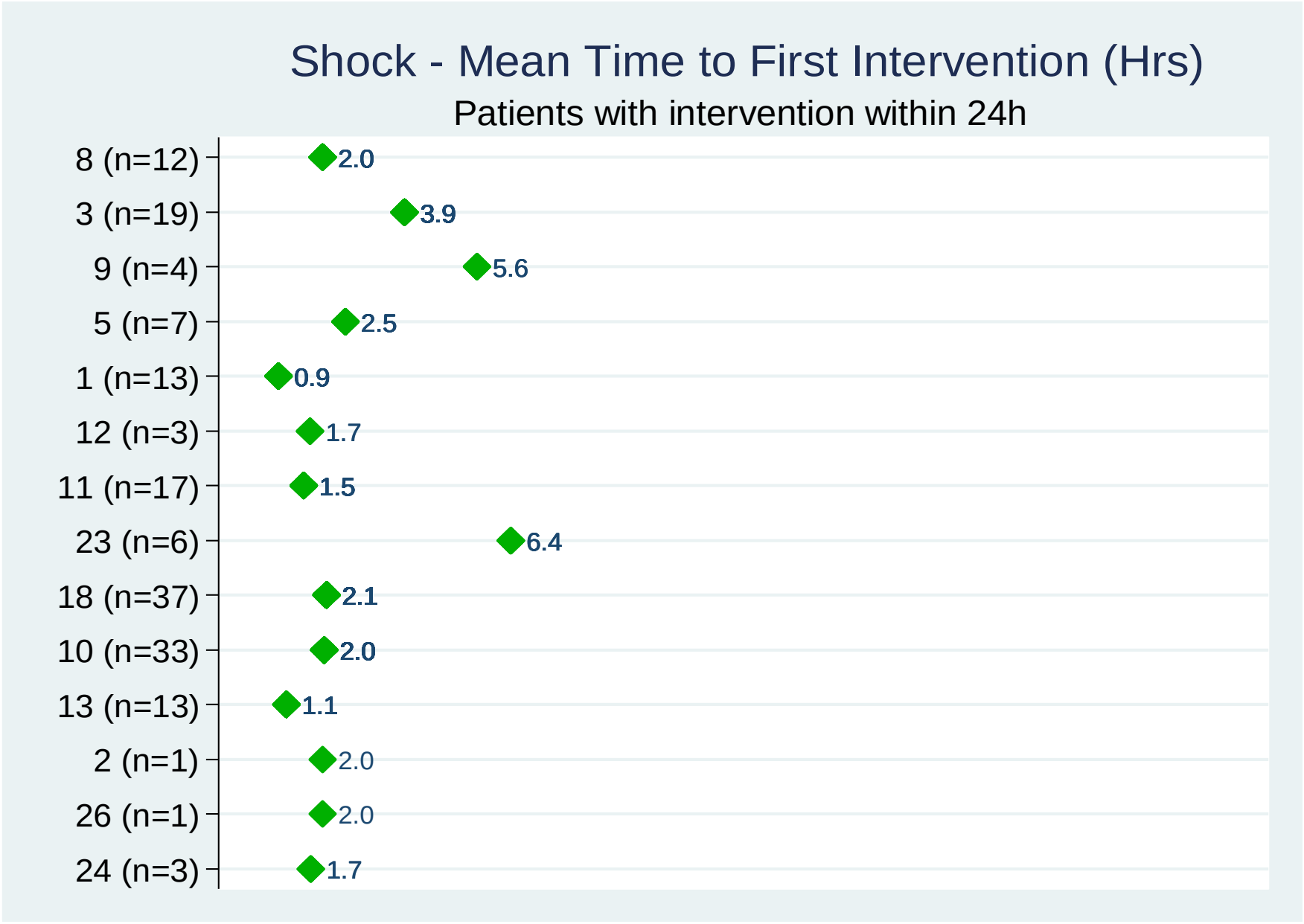
Trauma Center	N Angio	Dead	Mean Time to Angio Procedure, hrs	Ratio PRBC/FFP 4 hrs	Ratio PRBC/FFP 24 hrs	Diagnostic	Therapeutic
21	17	0	4.7	1.2	1.1	4	5
10	12	4	4.4	1.6	1.7	9	2
3	11	3	9.8	1.1	1.5	8	3
15	11	0	4.8	3.0	2.9	8	1
19	10	3	2.7	2.0	1.6	3	5
4	10	2	6.4	1.7	2.6	3	7
18	8	2	6.8	1.0	1.0	4	3
14	6	2	7.5	1.8	1.7	3	2
11	5	0	1.7	2.3	1.5	0	2
7	5	0	3.0	1.7	1.8	4	1
16	4	1	2.4	1.8	2.0	2	1
8	3	2	3.6	1.1	1.3	2	0
1	3	0	2.3			0	1
22	3	1	1.2	1.0	1.0	1	0
5	2	0	10.3	1.3	1.0	2	0
23	2	0	9.9	2.0	2.5	0	1
25	2	0	4.2			1	1
27	2	1	2.4	1.5	1.5	1	1
9	1	0	15.0	1.0	2.0	1	0
12	1	0	3.3			0	1
17	1	0	16.3			0	0

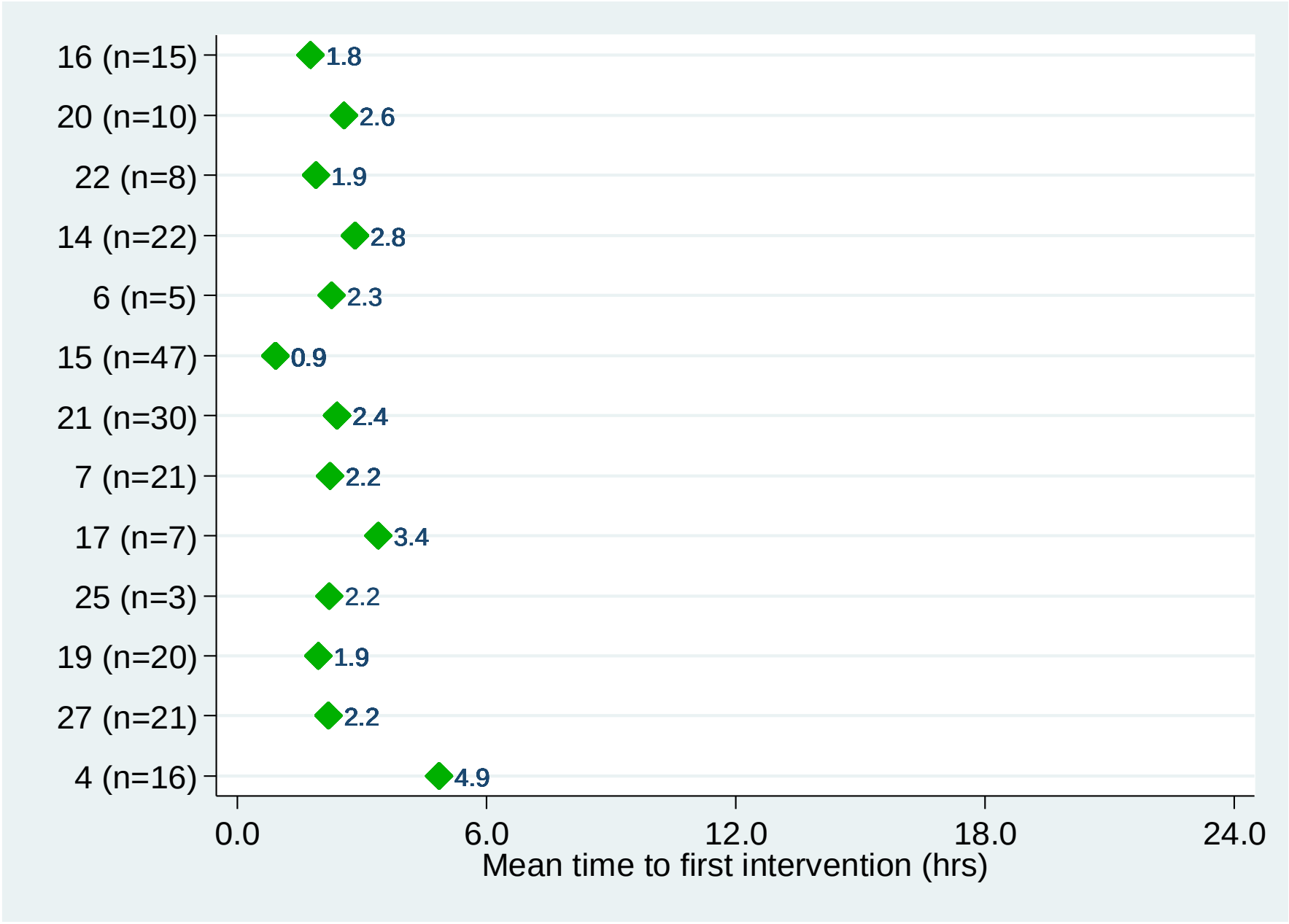
Trauma Center	N Angio	Diagnostic	Therapeutic	Liver	Spleen	Kidney	Pelvis	Retro	Neck or Extremity	Aorta	Other
21	17	4	5	3	1	1	0	1	0	0	0
10	12	9	2	0	0	0	1	0	1	0	0
3	11	8	3	0	0	0	3	0	0	0	0
15	11	8	1	0	0	0	0	0	4	0	0
19	10	3	5	1	1	1	1	0	1	0	0
4	10	3	7	1	0	0	6	0	0	0	0
18	8	4	3	0	1	0	1	0	1	0	0
14	6	3	2	0	1	0	0	0	1	0	0
11	5	0	2	0	0	0	2	0	0	0	0
7	5	4	1	0	0	0	1	0	0	0	0
16	4	2	1	0	0	0	0	0	0	0	1
8	3	2	0	0	0	0	0	0	0	0	0
1	3	0	1	0	0	0	0	0	0	0	0
22	3	1	0	0	0	0	0	0	0	0	0
5	2	2	0	0	0	0	0	0	0	0	0
23	2	0	1	1	0	0	1	0	0	0	0
25	2	1	1	0	1	0	0	0	0	0	0
27	2	1	1	0	0	1	0	0	0	0	0
9	1	1	0	0	0	0	0	0	0	0	0
12	1	0	1	0	1	0	0	0	0	0	0
17	1	0	0	0	0	0	0	0	0	0	0

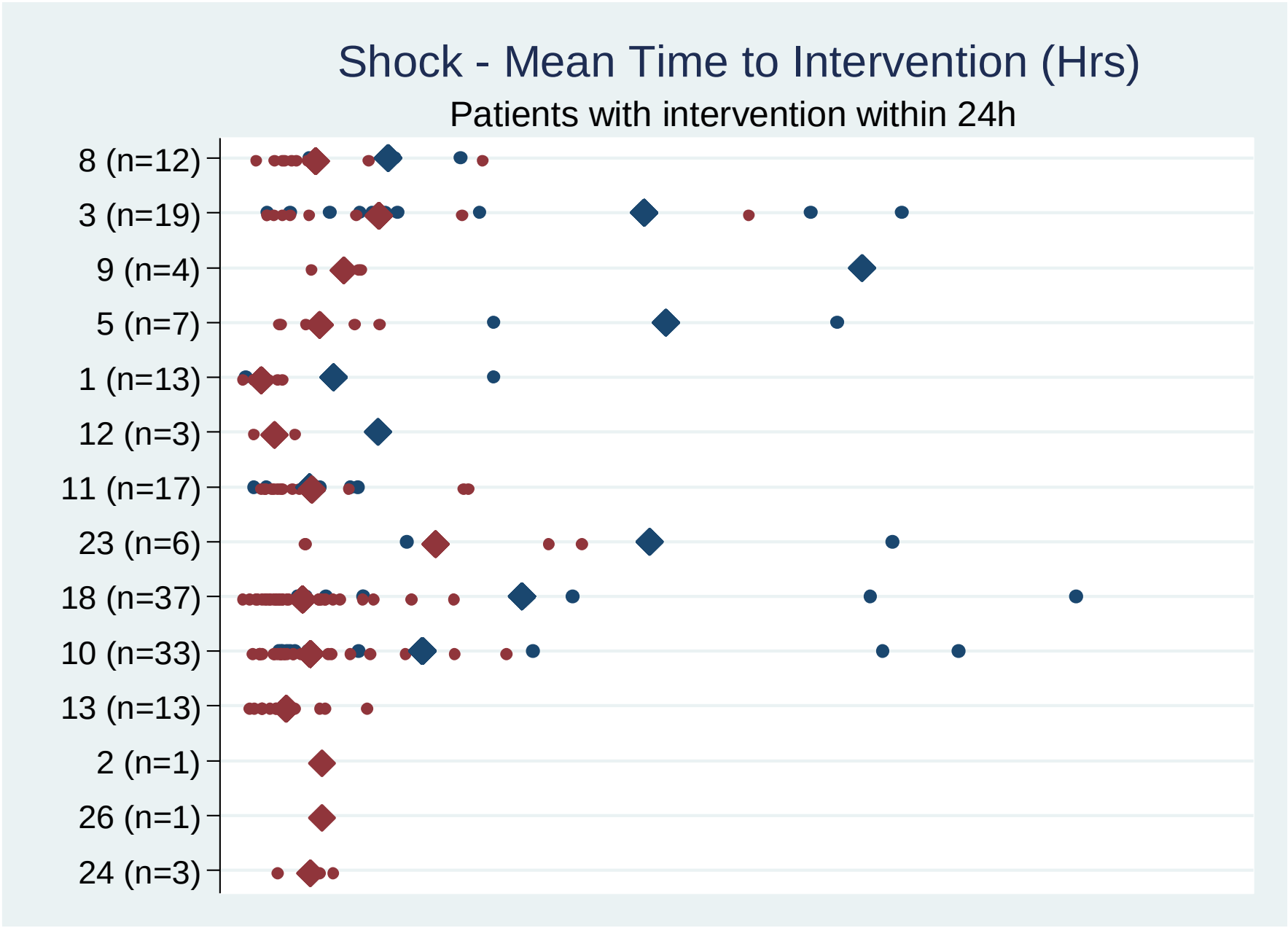
MTQIP Shock – Angio and or Operation

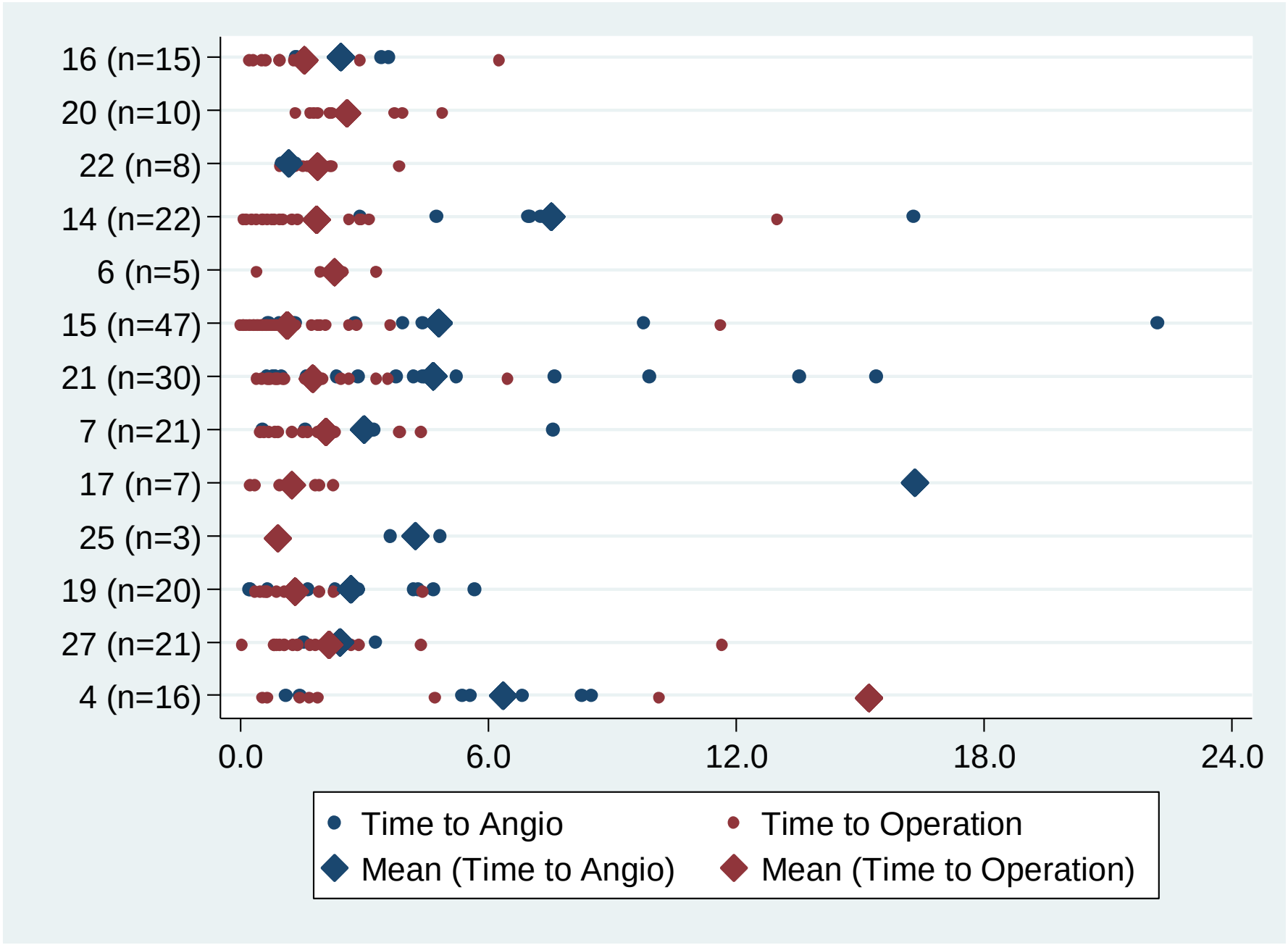
- 7/1/2013 to 12/31/2014
- Inclusion
  - First ED SBP or Lowest ED SBP ≤ 90 mmHg
  - Angio procedure
    - MTQIP hemorrhage data
    - Procedure data (ICD9 code)
  - Operation
    - MTQIP hemorrhage data
- Exclude
  - Time to angio negative or > 24 hrs
  - Time to operation negative or > 24 hrs

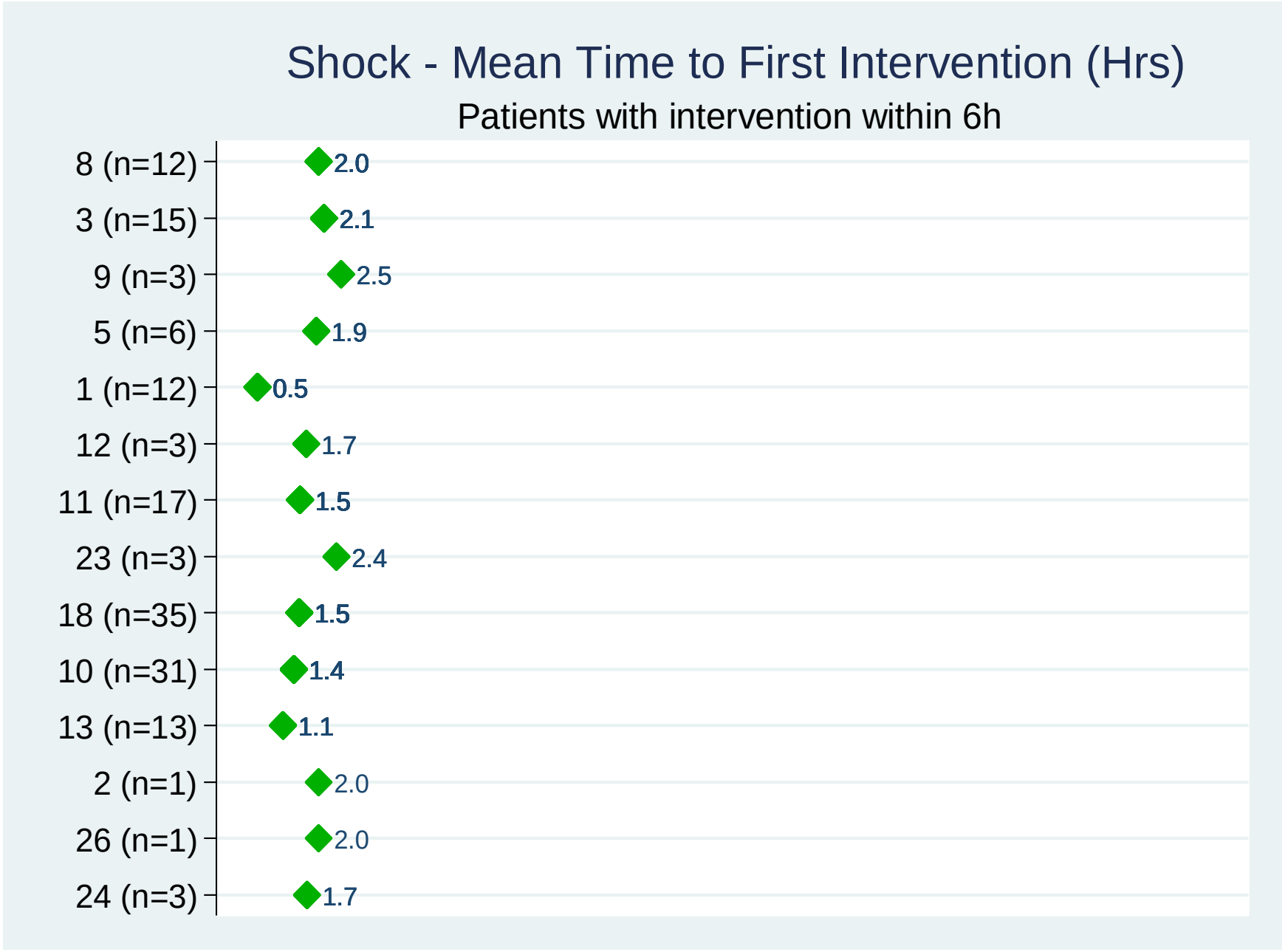
Trauma Center	N Patients	Angio	Operation	Both	Dead	Mean Time to Angio, hrs	Median Time to Angio, hrs	Mean Time to Operation, hrs	Median Time to Operation, hrs	Mean Time to First (Angio or Operation), hrs	Median Time to First (Angio or Operation), hrs	Ratio PRBC/FFP 4 hrs	Ratio PRBC/FFP 24 hrs
15	47	11	45	9	12	4.8	2.8	1.1	0.6	0.9	0.6	2.8	2.5
18	37	8	32	3	12	6.8	3.0	1.5	1.1	2.1	1.3	1.1	1.1
10	33	12	26	5	10	4.4	1.5	1.7	1.1	2.0	1.1	1.8	1.6
21	30	17	19	6	5	4.7	3.8	1.7	1.1	2.4	1.3	1.9	1.9
14	22	6	18	2	11	7.5	7.0	1.9	0.9	2.8	1.0	1.9	1.7
7	21	5	17	1	6	3.0	2.1	2.1	1.9	2.2	1.9	2.4	2.0
27	21	2	20	1	9	2.4	2.4	2.2	1.5	2.2	1.5	2.0	2.0
19	20	10	11	1	6	2.7	2.6	1.3	0.9	1.9	1.2	1.3	1.2
3	19	11	12	4	5	9.8	3.5	3.4	1.4	3.9	2.2	1.2	1.3
11	17	5	14	2	4	1.7	1.9	1.7	1.0	1.5	1.0	1.8	1.8
4	16	10	10	4	4	6.4	5.9	15.2	1.9	4.9	5.0	2.5	3.0
16	15	4	11	0	5	2.4	2.4	1.5	0.9	1.8	1.3	2.8	2.9
1	13	3	10	0	5	2.3	0.5	0.5	0.4	0.9	0.5	2.7	2.7
13	13	0	13	0	2			1.1	0.9	1.1	0.9	3.1	2.5
8	12	3	10	1	5	3.6	3.7	1.8	1.3	2.0	1.5	2.1	1.8
20	10	0	10	0	2			2.6	2.2	2.6	2.2	1.1	0.7
22	8	3	8	3	2	1.2	1.2	1.9	1.6	1.9	1.6	1.5	1.6
5	7	2	5	0	2	10.3	10.3	1.9	1.7	2.5	1.9	1.4	1.4
17	7	1	6	0	3	16.3	16.3	1.2	1.4	3.4	1.8	1.3	1.2
23	6	2	4	0	2	9.9	9.9	4.7	4.5	6.4	5.8	2.0	3.3
6	5	0	5	0	3			2.3	2.5	2.3	2.5	1.8	1.5
9	4	1	3	0	0	15.0	15.0	2.5	2.9	5.6	2.9	2.3	2.6
12	3	1	2	0	2	3.3	3.3	0.8	0.8	1.7	1.3		3.0
24	3	0	3	0	1			1.7	1.9	1.7	1.9	2.1	2.0
25	3	2	2	1	1	4.2	4.2	0.9	0.9	2.2	1.0	11.5	
2	1	0	1	0	1			2.0	2.0	2.0	2.0		1.0
26	1	0	1	0	1			2.0	2.0	2.0	2.0	3.0	5.0

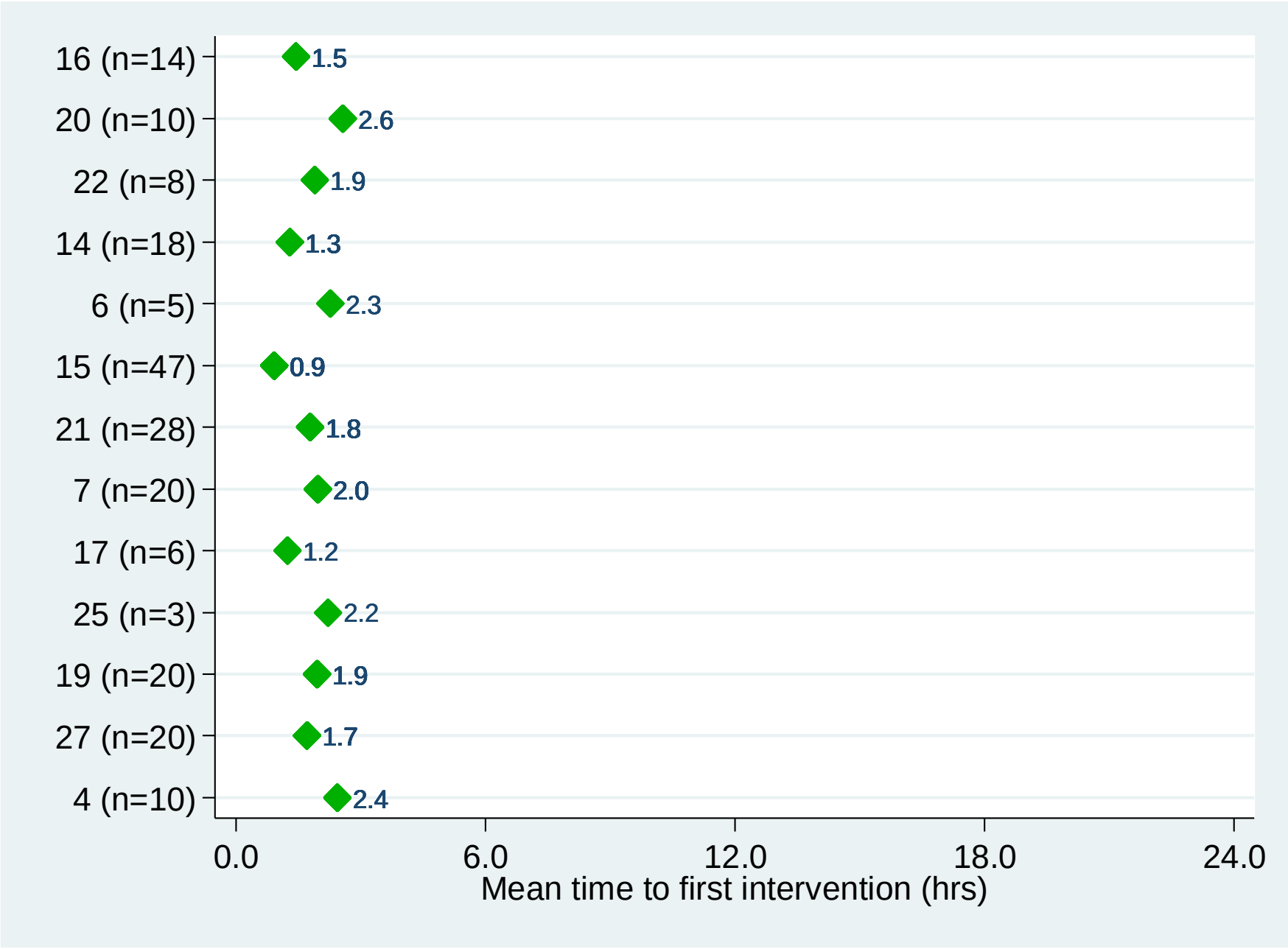

Shock - Mean Time to First Intervention (Hrs)
Patients with intervention within 24h
8 (n=12)
2.0
3 (n=19)
3.9
9 (n=4)
5.6
5 (n=7)
2.5
1 (n=13)
0.9
12 (n=3)
1.7
11 (n=17)
1.5
23 (n=6)
6.4
18 (n=37)
2.1
10 (n=33)
2.0
13 (n=13)
1.1
2 (n=1)
2.0
26 (n=1)
2.0
24 (n=3)
1.7

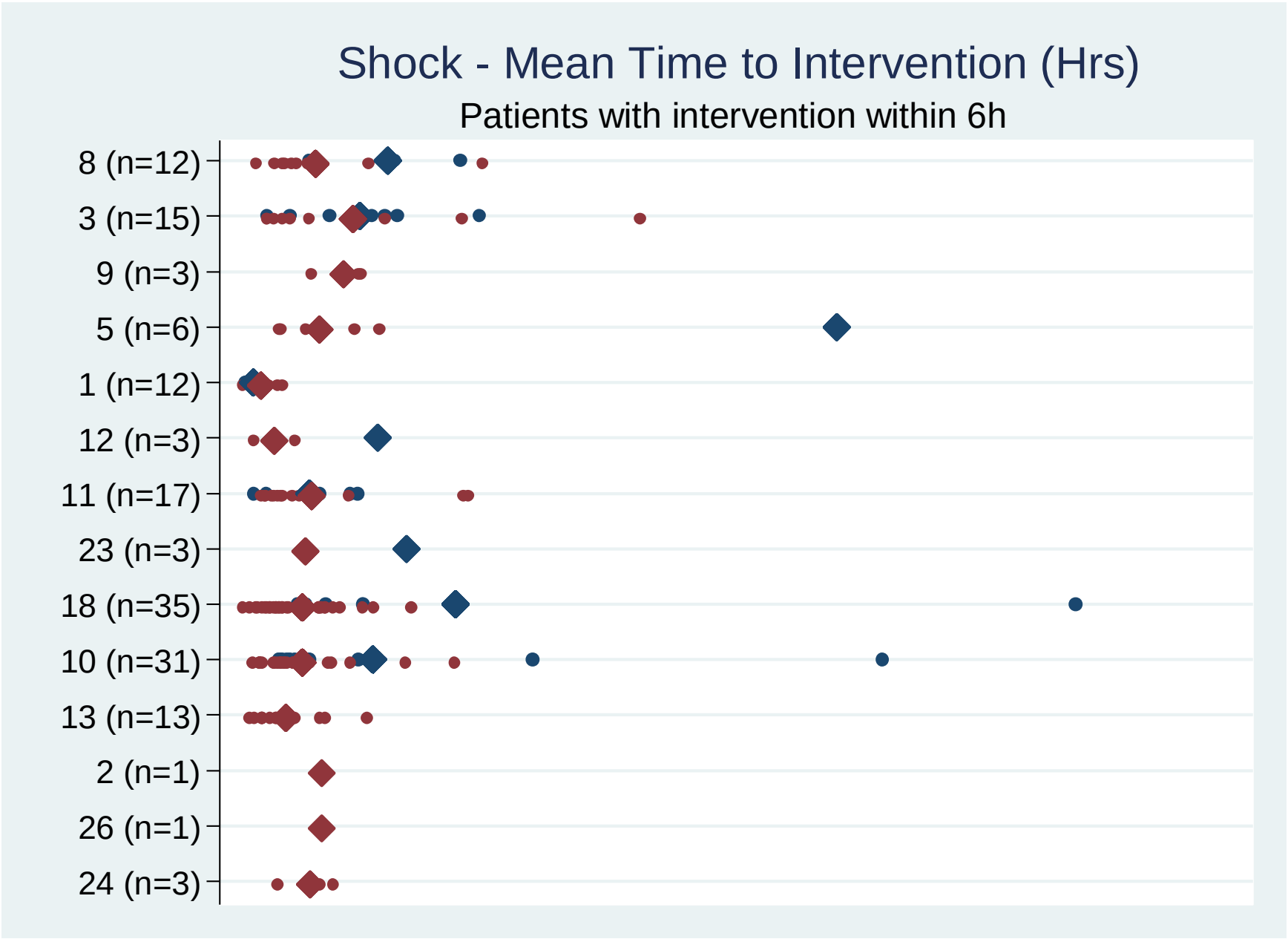

16 (n=15)
20 (n=10)
22 (n=8)
14 (n=22)
6 (n=5)
15 (n=47)
21 (n=30)
7 (n=21)
17 (n=7)
25 (n=3)
19 (n=20)
27 (n=21)
4 (n=16)
1.8
2.6
1.9
2.8
2.3
0.9
2.4
2.2
3.4
2.2
1.9
2.2
4.9
0.0
6.0
12.0
18.0
24.0
Mean time to first intervention (hrs)

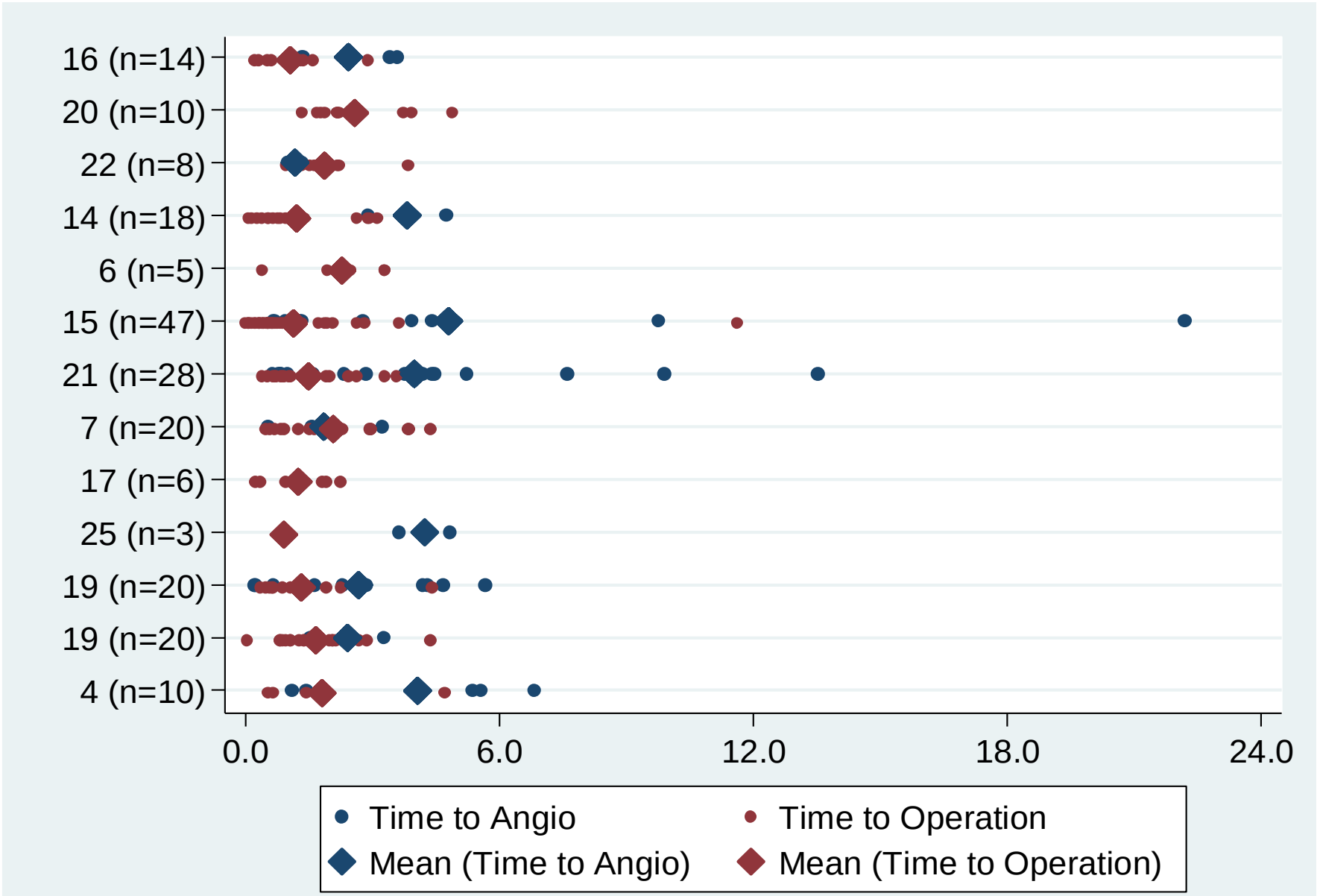

Shock - Mean Time to Intervention (Hrs)
Patients with intervention within 24h
8 (n=12)
3 (n=19)
9 (n=4)
5 (n=7)
1 (n=13)
12 (n=3)
11 (n=17)
23 (n=6)
18 (n=37)
10 (n=33)
13 (n=13)
2 (n=1)
26 (n=1)
24 (n=3)


16 (n=15)
20 (n=10)
22 (n=8)
14 (n=22)
6 (n=5)
15 (n=47)
21 (n=30)
7 (n=21)
17 (n=7)
25 (n=3)
19 (n=20)
27 (n=21)
4 (n=16)
0.0
6.0
12.0
18.0
24.0
Time to Angio
Time to Operation
Mean (Time to Angio)
Mean (Time to Operation)


Shock - Mean Time to First Intervention (Hrs)
Patients with intervention within 6h
8 (n=12)
2.0
3 (n=15)
2.1
9 (n=3)
2.5
5 (n=6)
1.9
1 (n=12)
0.5
12 (n=3)
1.7
11 (n=17)
1.5
23 (n=3)
2.4
18 (n=35)
1.5
10 (n=31)
1.4
13 (n=13)
1.1
2 (n=1)
2.0
26 (n=1)
2.0
24 (n=3)
1.7

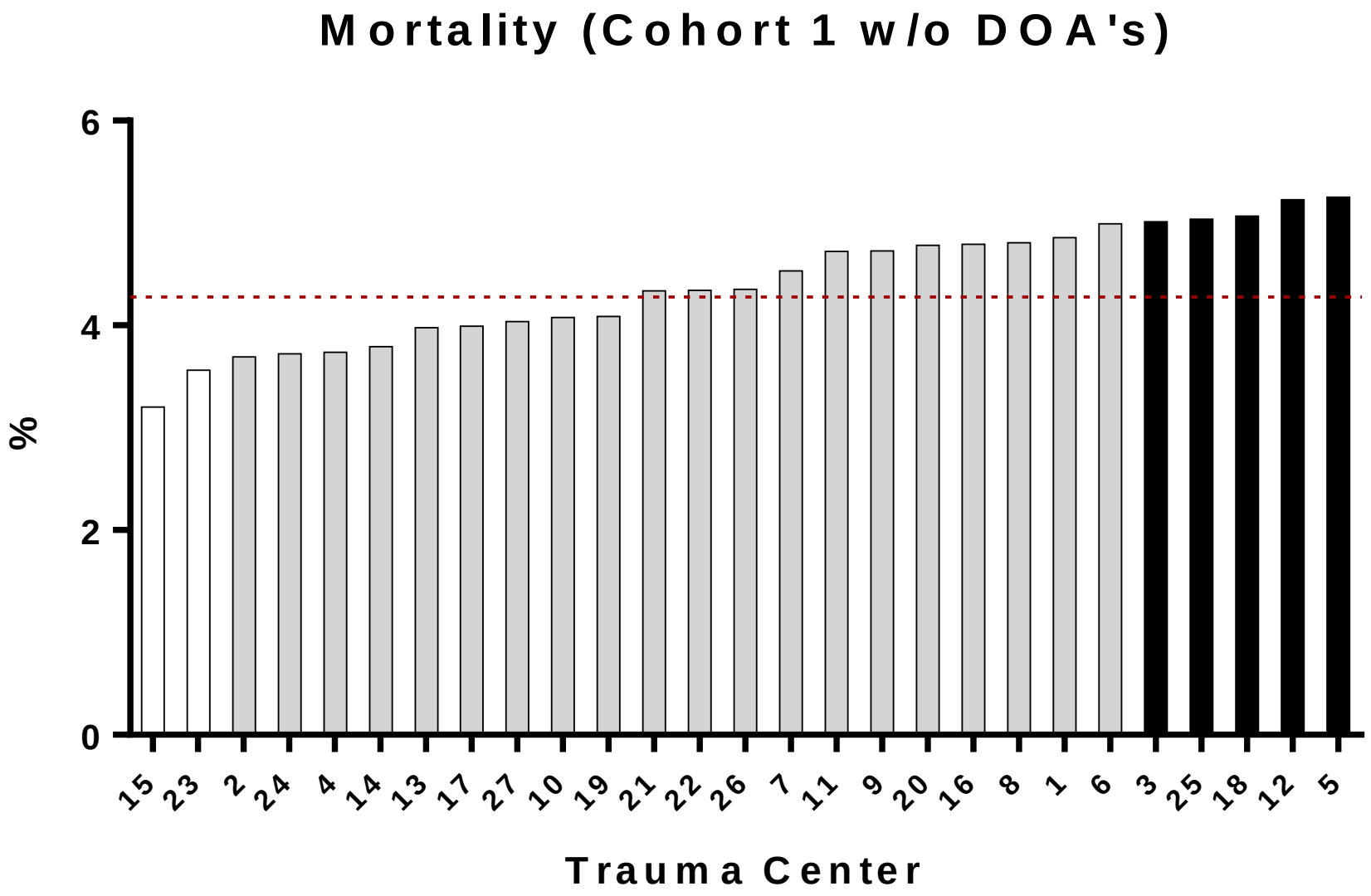

16 (n=14)
1.5
20 (n=10)
2.6
22 (n=8)
1.9
14 (n=18)
1.3
6 (n=5)
2.3
15 (n=47)
0.9
21 (n=28)
1.8
7 (n=20)
2.0
17 (n=6)
1.2
25 (n=3)
2.2
19 (n=20)
1.9
27 (n=20)
1.7
4 (n=10)
2.4
0.0
6.0
12.0
18.0
24.0
Mean time to first intervention (hrs)

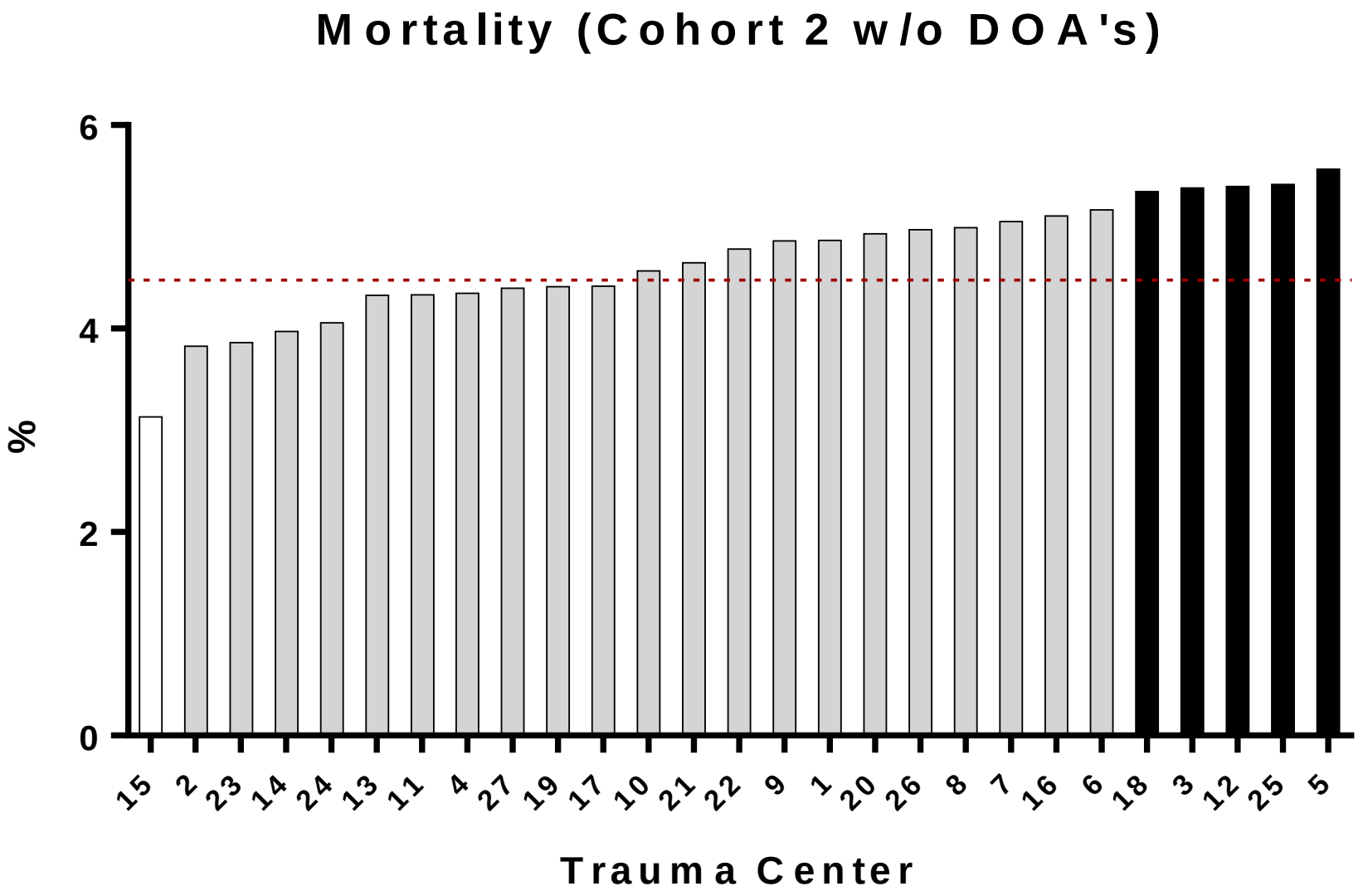

Shock - Mean Time to Intervention (Hrs)
Patients with intervention within 6h
8 (n=12)
3 (n=15)
9 (n=3)
5 (n=6)
1 (n=12)
12 (n=3)
11 (n=17)
23 (n=3)
18 (n=35)
10 (n=31)
13 (n=13)
2 (n=1)
26 (n=1)
24 (n=3)

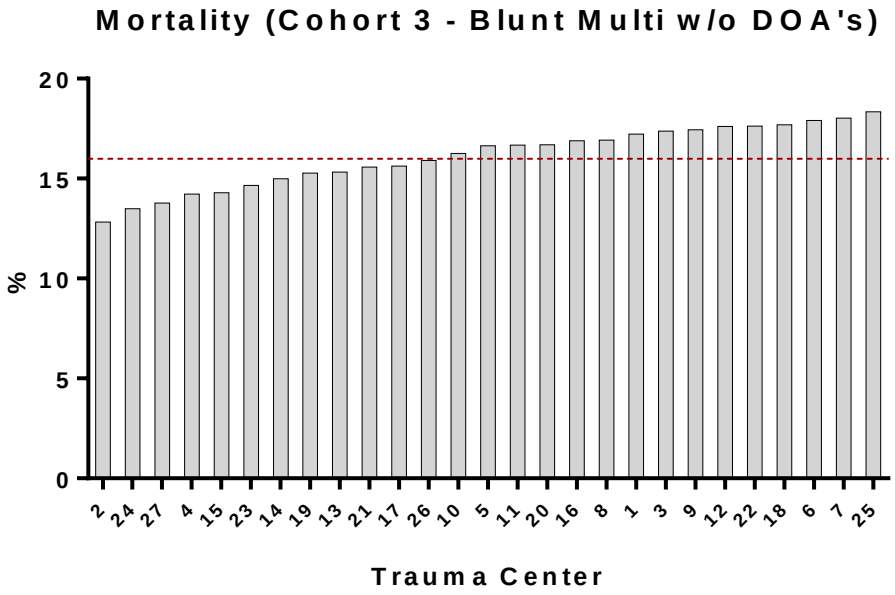

16 (n=14)
20 (n=10)
22 (n=8)
14 (n=18)
6 (n=5)
15 (n=47)
21 (n=28)
7 (n=20)
17 (n=6)
25 (n=3)
19 (n=20)
19 (n=20)
4 (n=10)
0.0
6.0
12.0
18.0
24.0
Time to Angio
Time to Operation
Mean (Time to Angio)
Mean (Time to Operation)

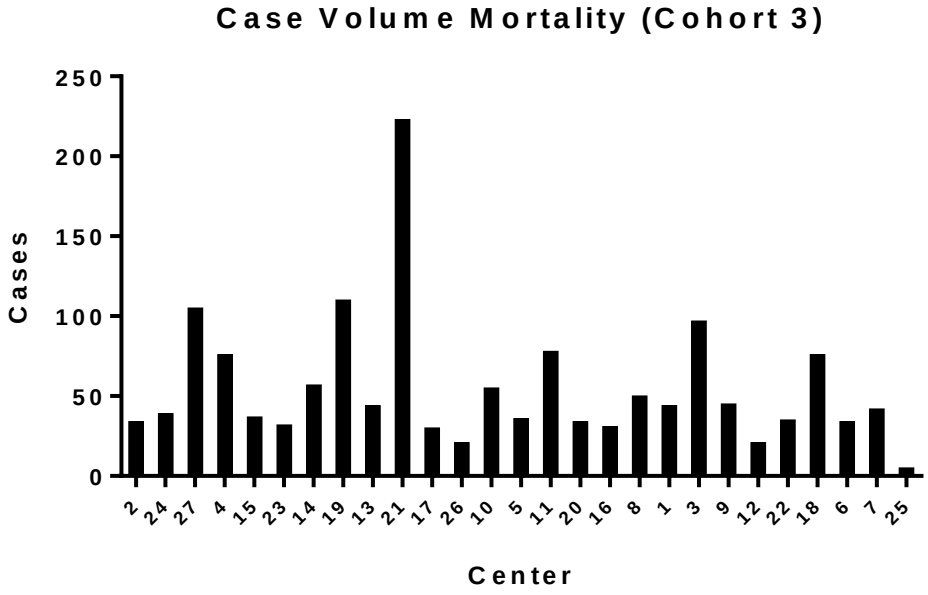
MTQIP Outcomes

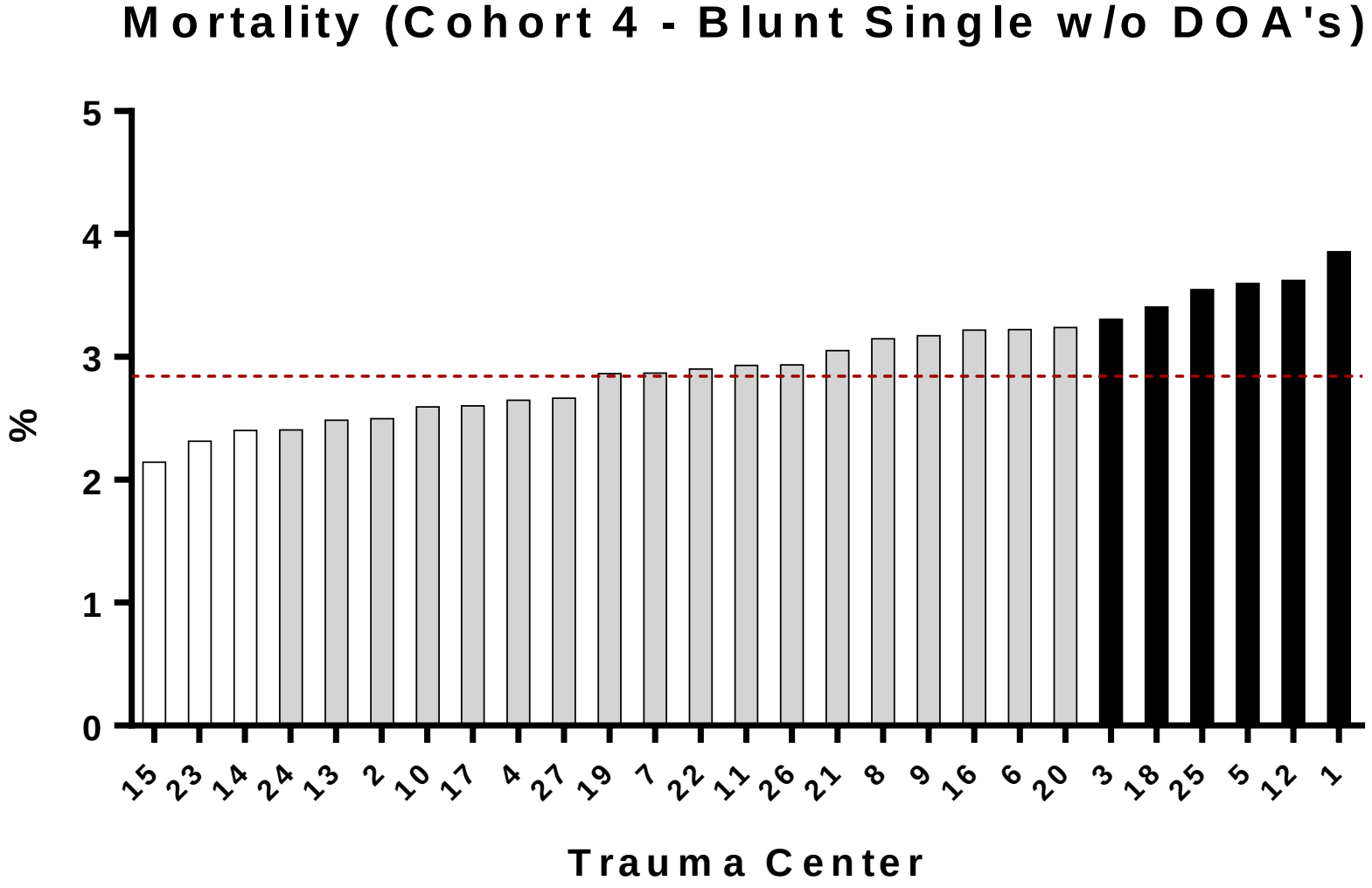
- ArborMetrix Report
- 7/1/2013 to 12/31/2014
- Rates
  - Risk and Reliability-adjusted
  - Red dash line is collaborative mean
- Legend
  - □ Low-outlier status (better performance)
  - ▒ Non-outlier status (average performance
  - ■ High-outlier status (worse performance)

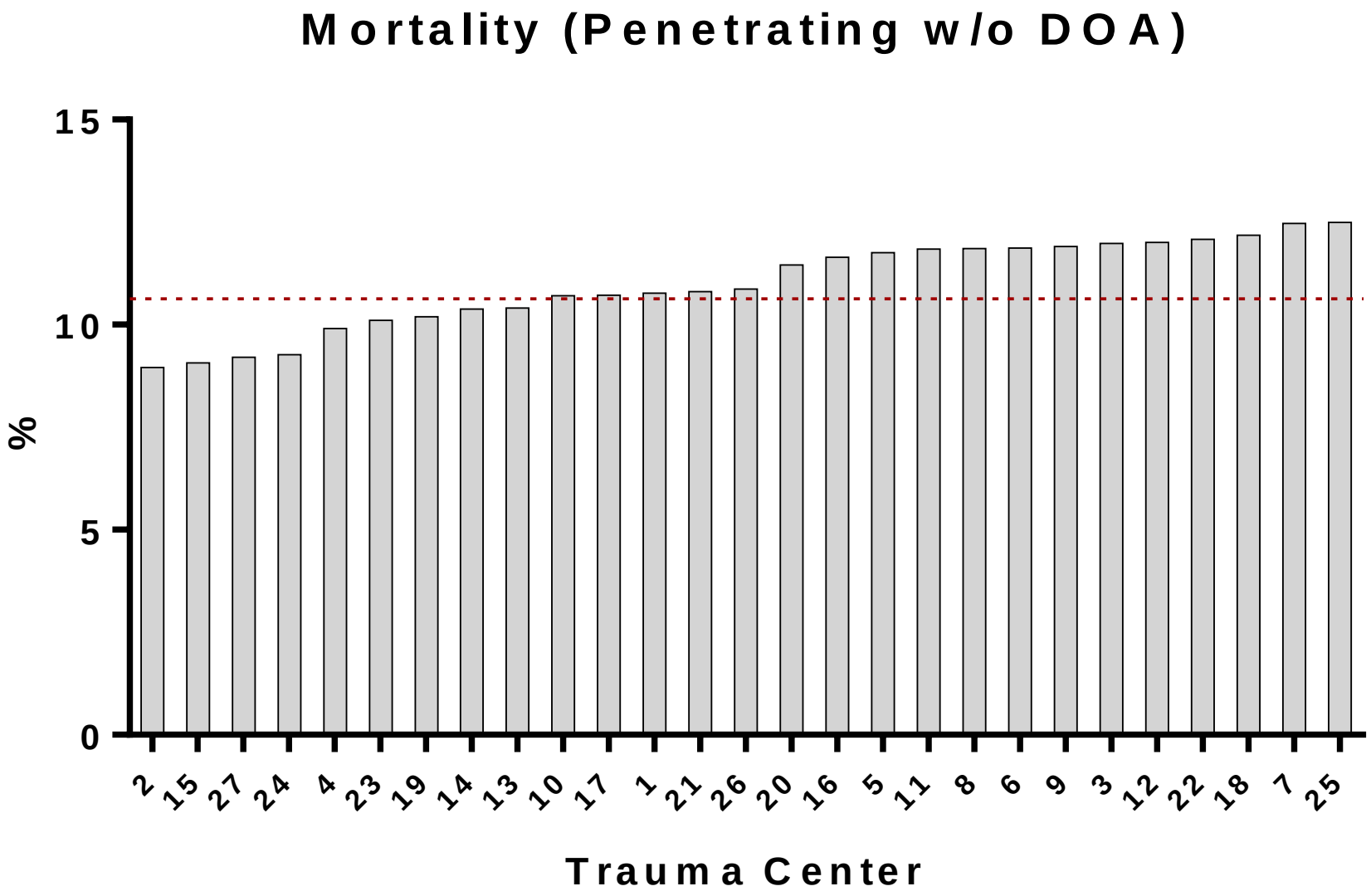

Mortality (Cohort 1 w/o DOA's)
6
4
2
0
%
15
23
2
24
4
14
13
17
27
10
19
21
22
26
7
11
9
20
16
8
1
6
3
25
18
12
5
Trauma Center

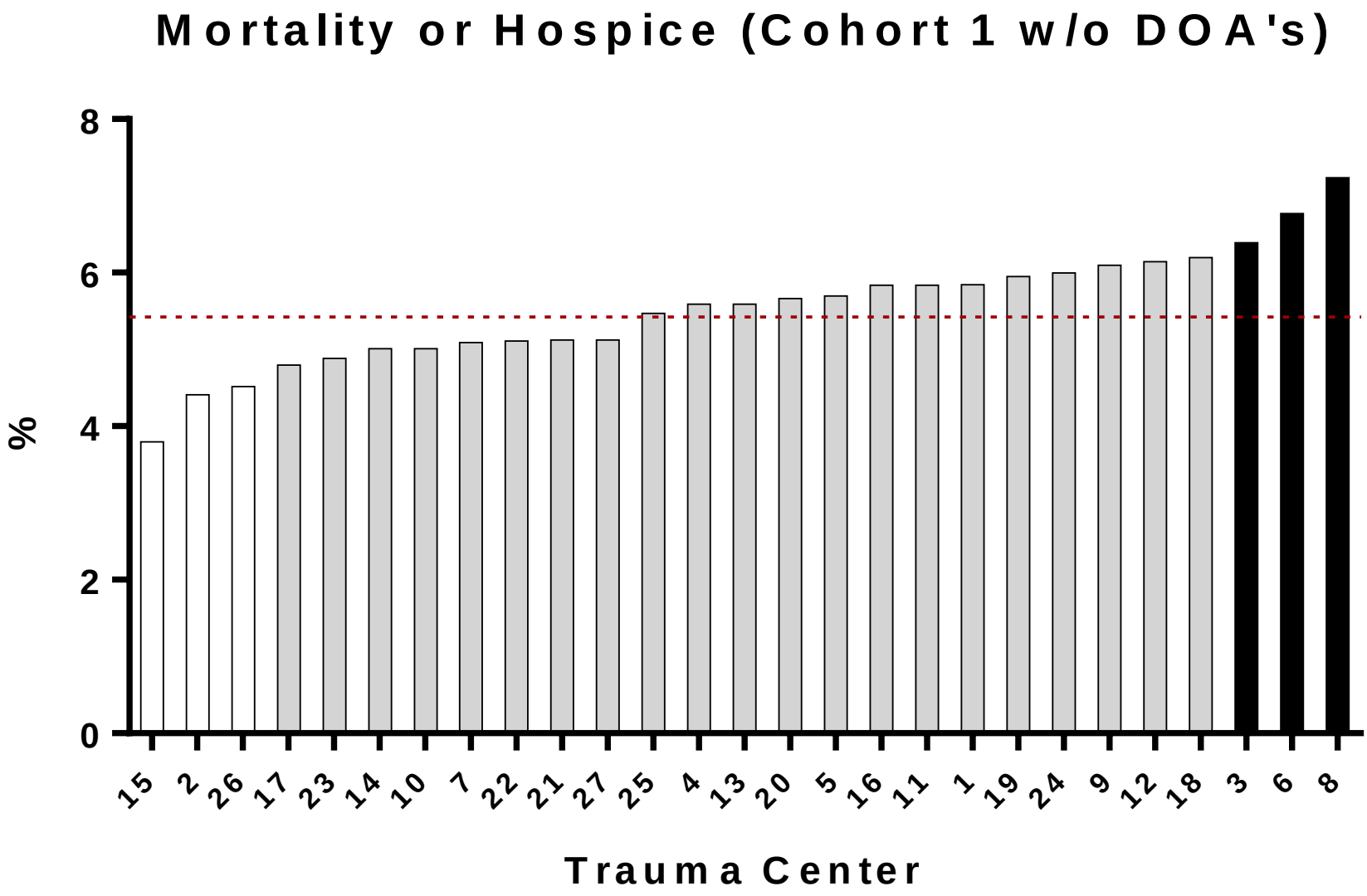

Mortality (Cohort 2 w/o DOA's)
%
6
4
2
0
15
2
23
14
24
13
11
4
27
19
17
10
21
22
9
1
20
26
8
7
16
6
18
3
12
25
5
Trauma Center

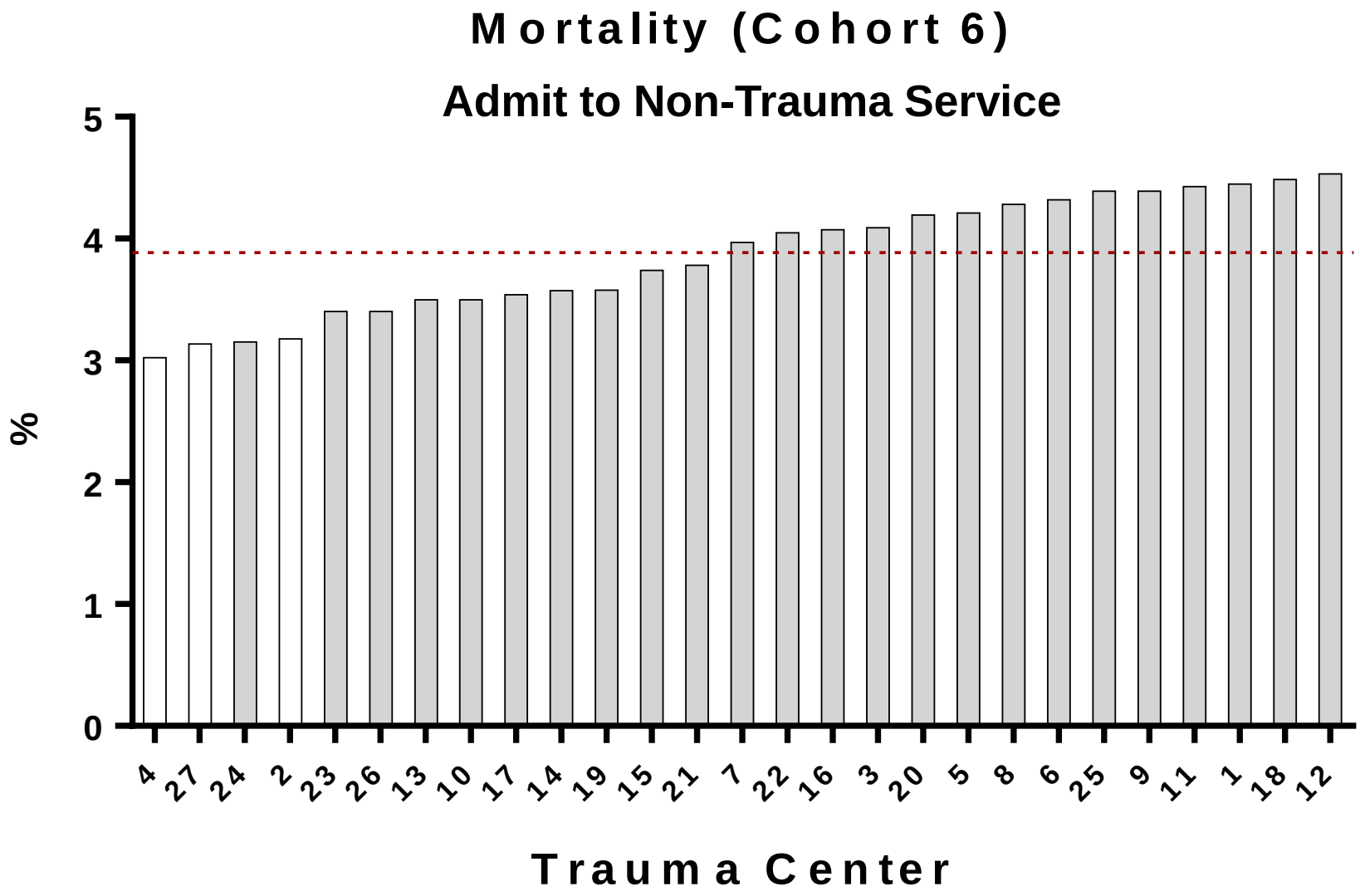

Mortality (Cohort 3 - Blunt Multi w/o DOA's)
%
20
15
10
5
0
2 24 27 4 15 23 14 19 13 21 17 26 10 5 11 20 16 8 1 3 9 12 22 18 6 7 25
Trauma Center

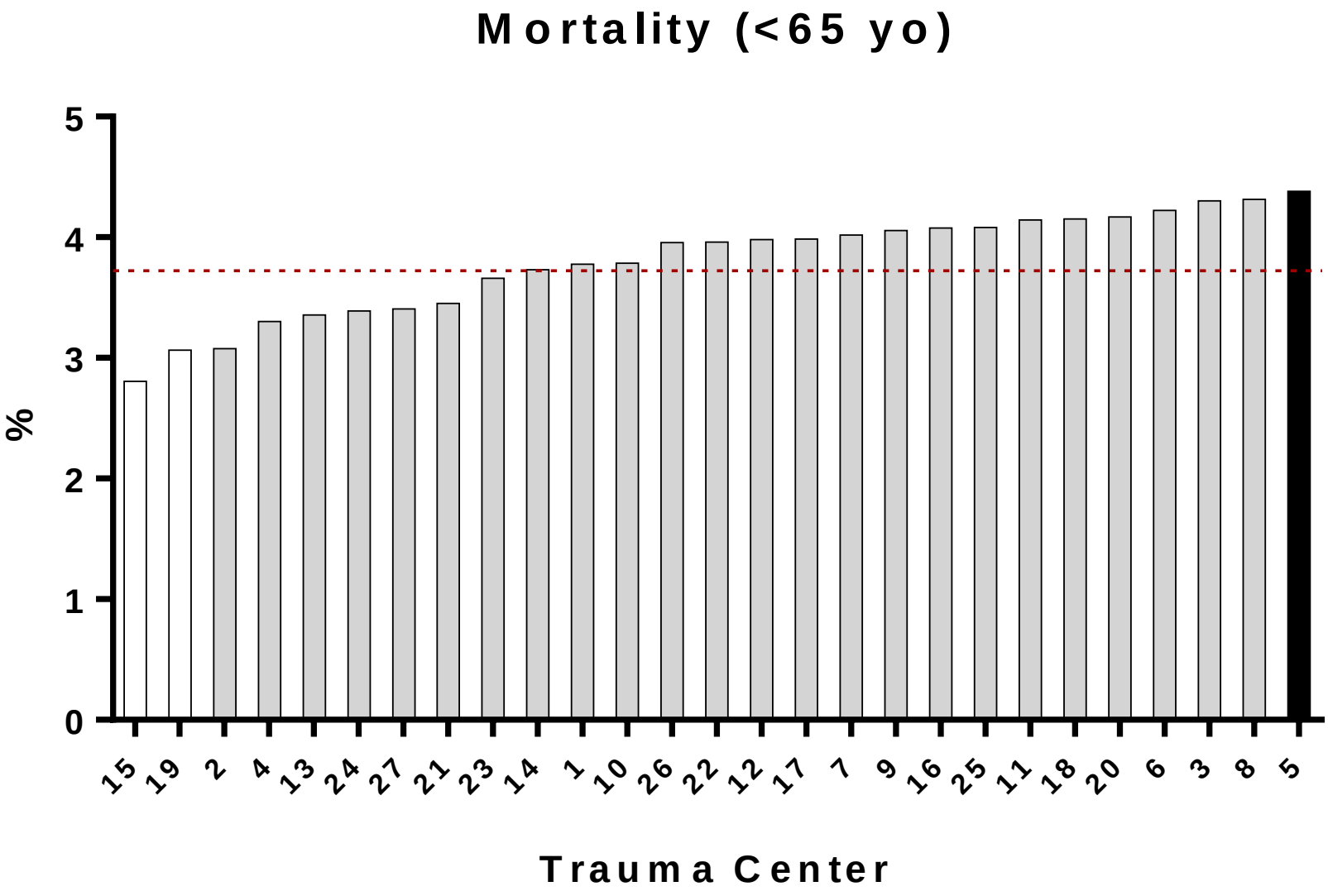

Case Volume Mortality (Cohort 3)
Cases
250
200
150
100
50
0
2 24 27 4 15 23 14 19 13 21 17 26 10 5 11 20 16 8 1 3 9 12 22 18 6 7 25
Center

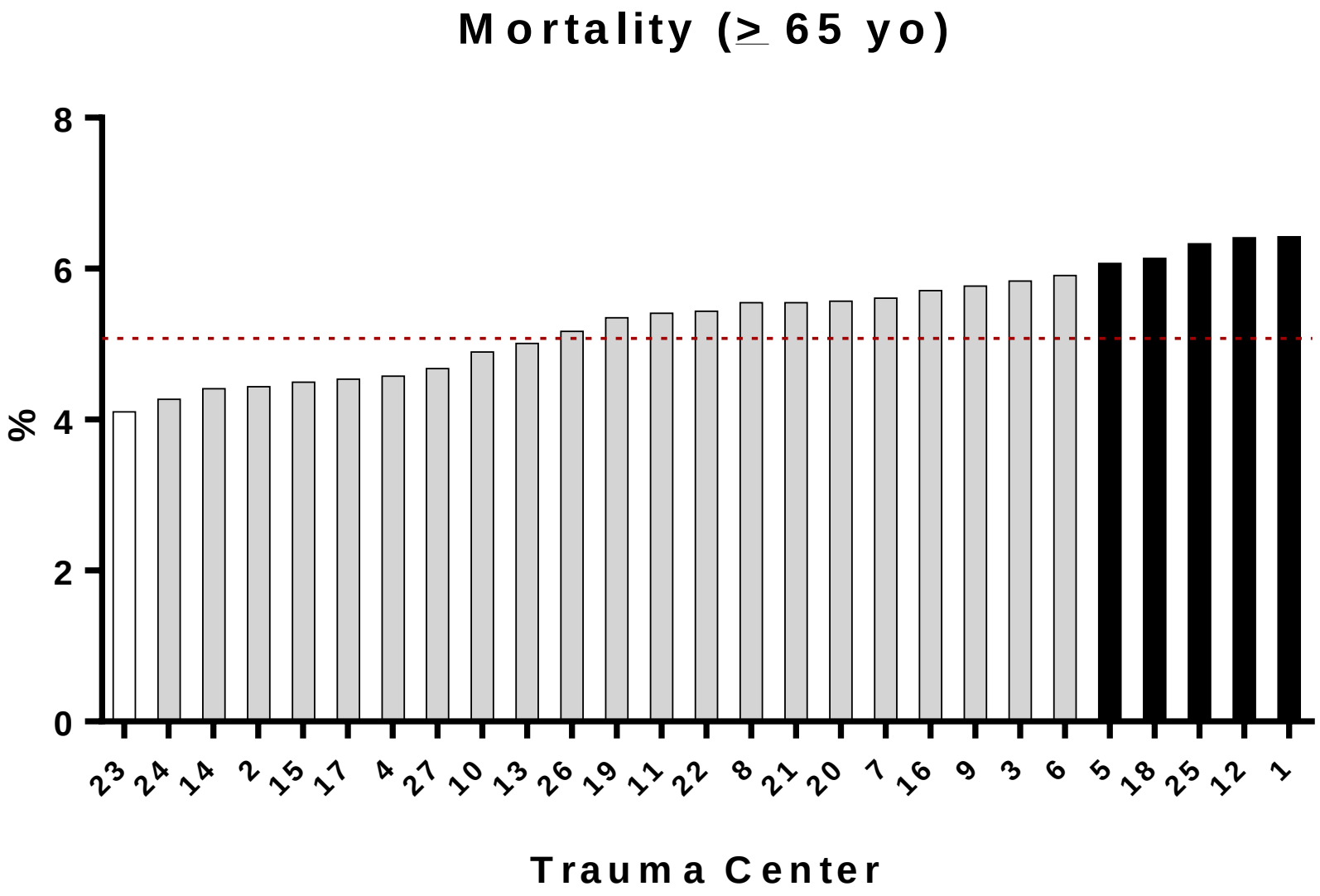

Mortality (Cohort 4 - Blunt Single w/o DOA's)
%
5
4
3
2
1
0
15 23 14 24 13 2 10 17 4 27 19 7 22 11 26 21 8 9 16 6 20 3 18 25 5 12 1
Trauma Center

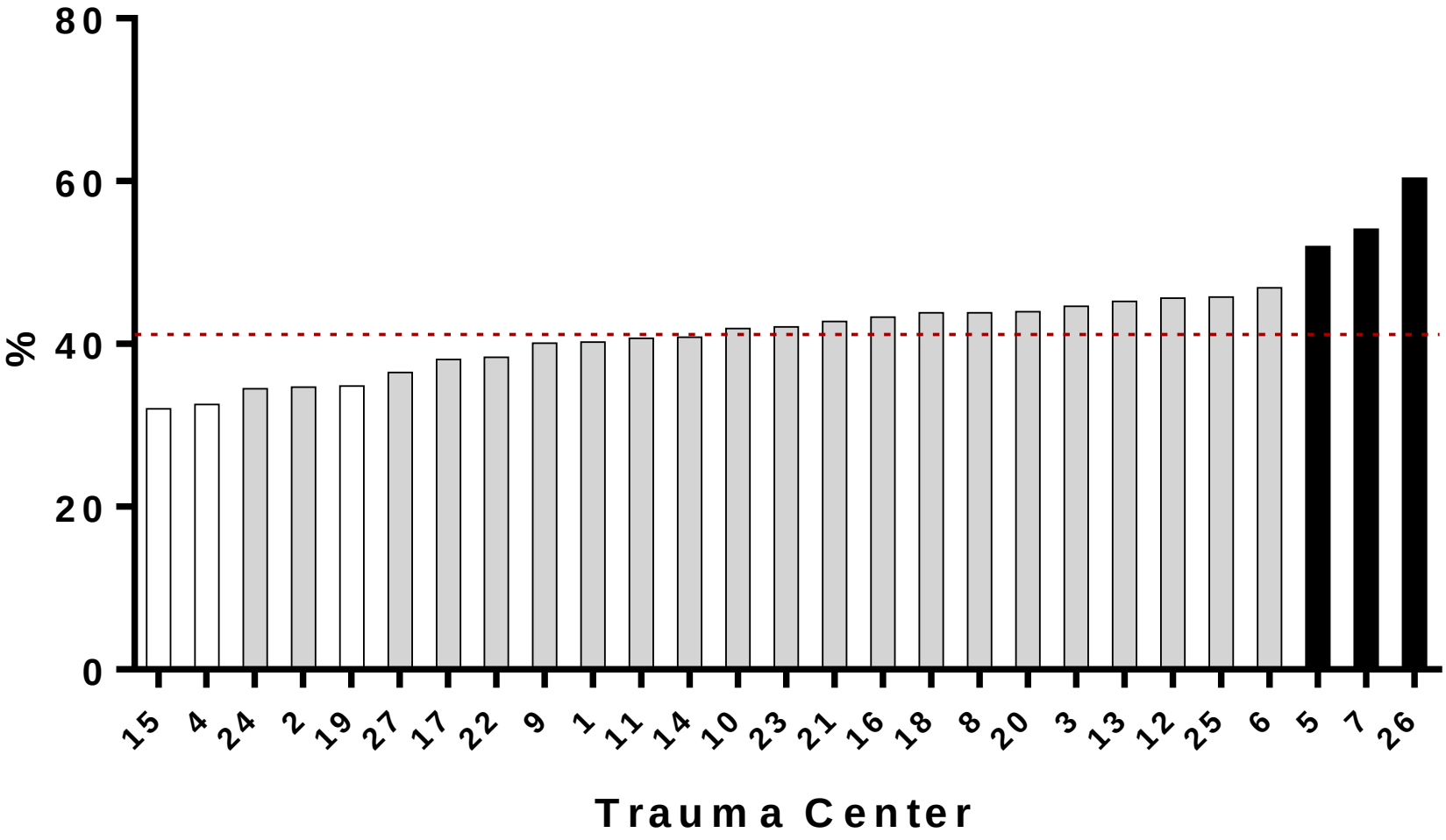

Mortality (Penetrating w/o DOA)
15
10
5
0
%
2
15
27
24
4
23
19
14
13
10
17
1
21
26
20
16
5
11
8
6
9
3
12
22
18
7
25
Trauma Center

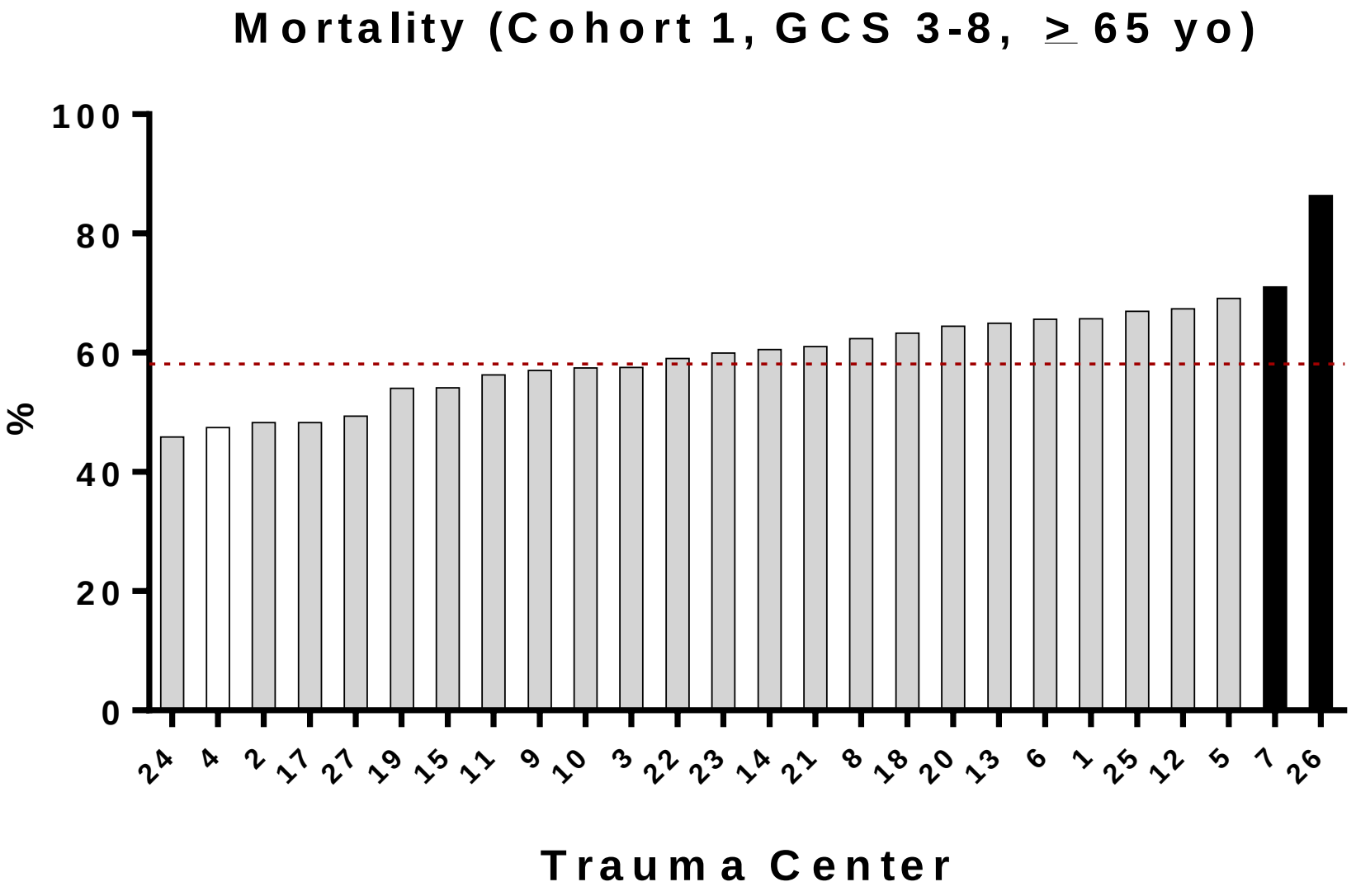

Mortality or Hospice (Cohort 1 w/o DOA's)
%
8
6
4
2
0
15
2
26
17
23
14
10
7
22
21
27
25
4
13
20
5
16
11
1
19
24
9
12
18
3
6
8
Trauma Center

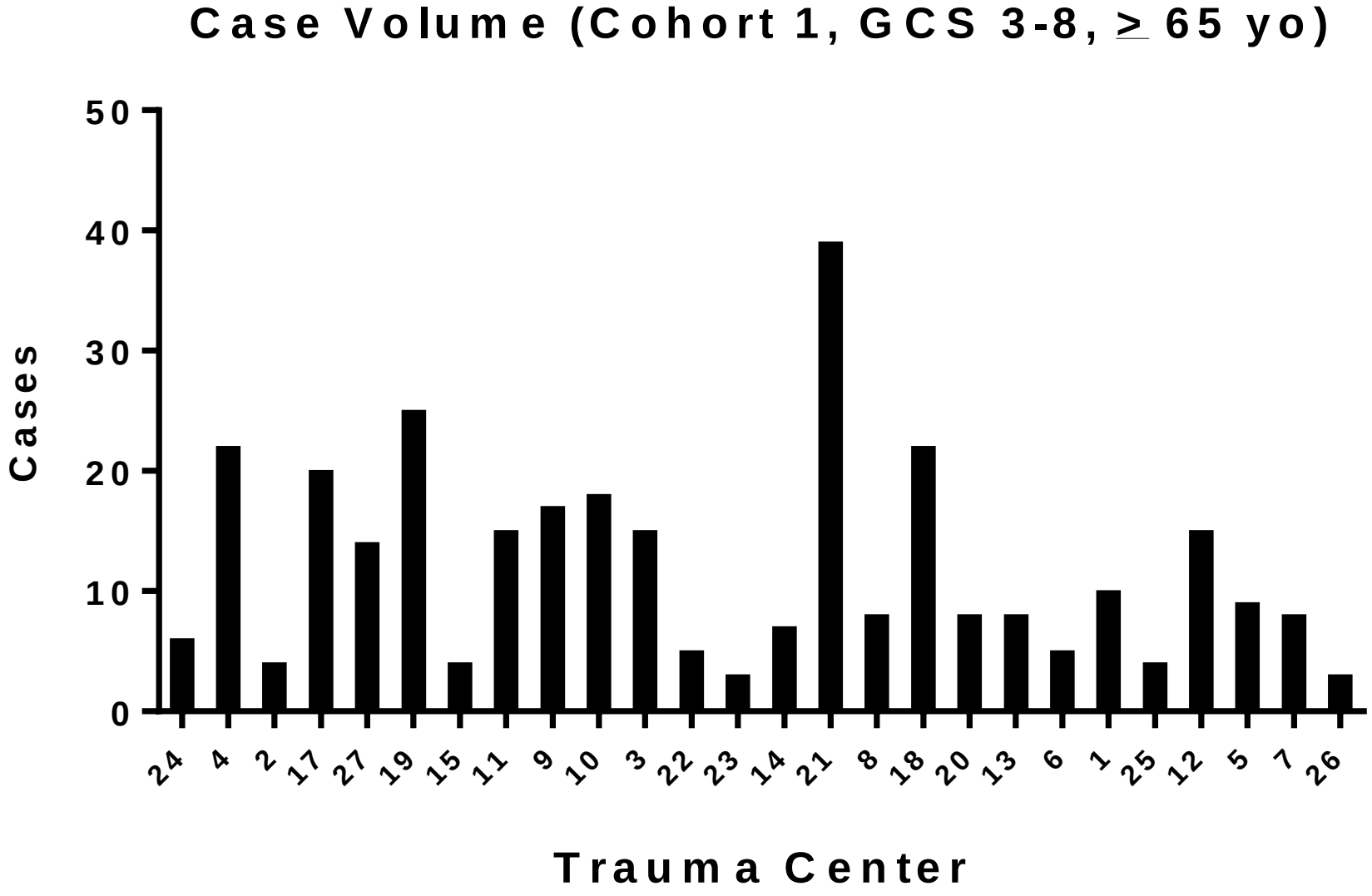

Mortality (Cohort 6)
Admit to Non-Trauma Service
%
5
4
3
2
1
0
4
27
24
2
23
26
13
10
17
14
19
15
21
7
22
16
3
20
5
8
6
25
9
11
1
18
12
Trauma Center


Mortality (<65 yo)
%
0
1
2
3
4
5
15 19 2 4 13 24 27 21 23 14 1 10 26 22 12 17 7 9 16 25 11 18 20 6 3 8 5
Trauma Center


Mortality (≥ 65 yo)
%
8
6
4
2
0
23 24 14 2 15 17 4 27 10 13 26 19 11 22 8 21 20 7 16 9 3 6 5 18 25 12 1
Trauma Center

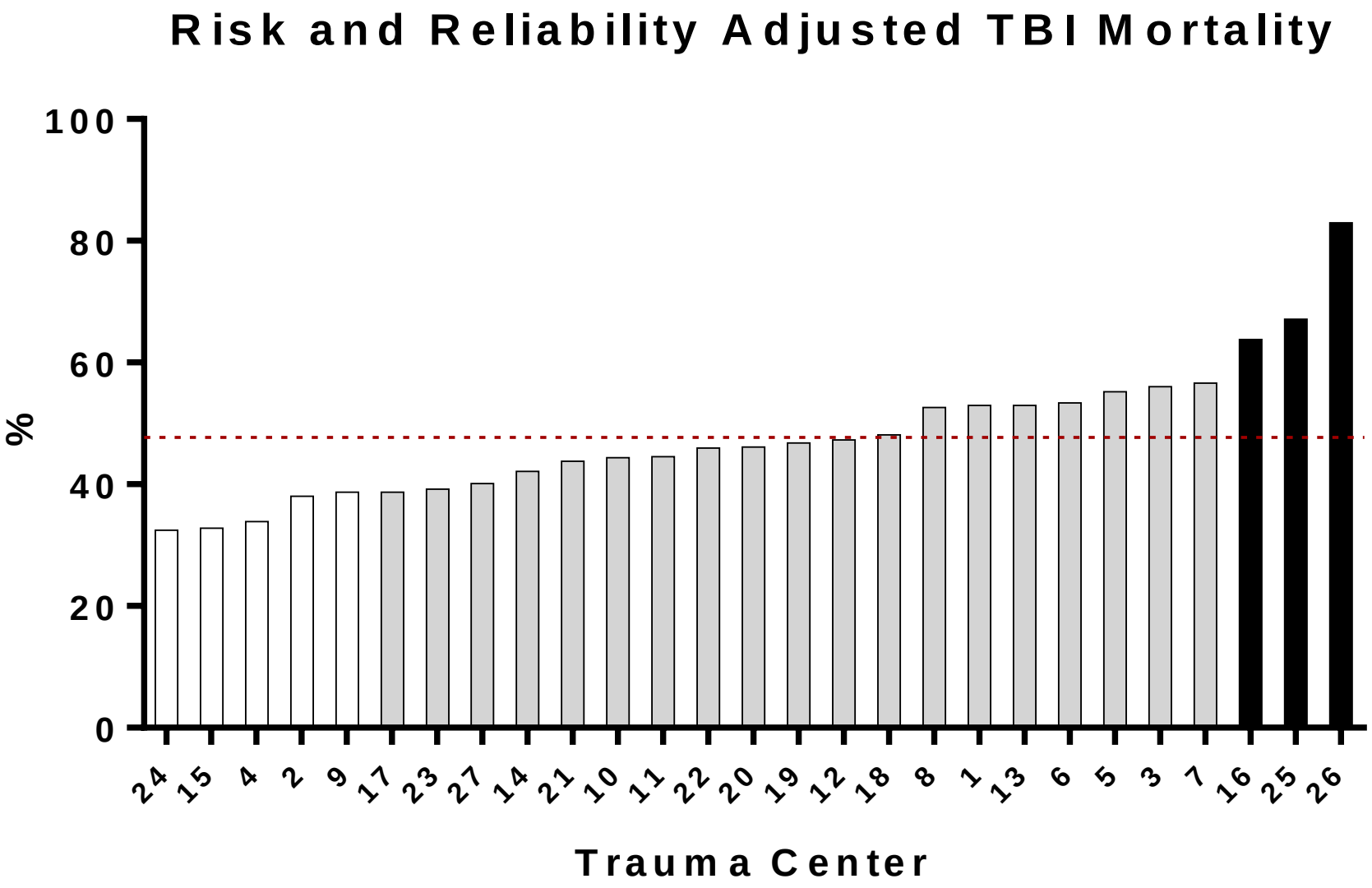

Mortality GCS 3-8
80
60
40
20
0
%
15
4
24
2
19
27
17
22
9
1
11
14
10
23
21
16
18
8
20
3
13
12
25
6
5
7
26
Trauma Center

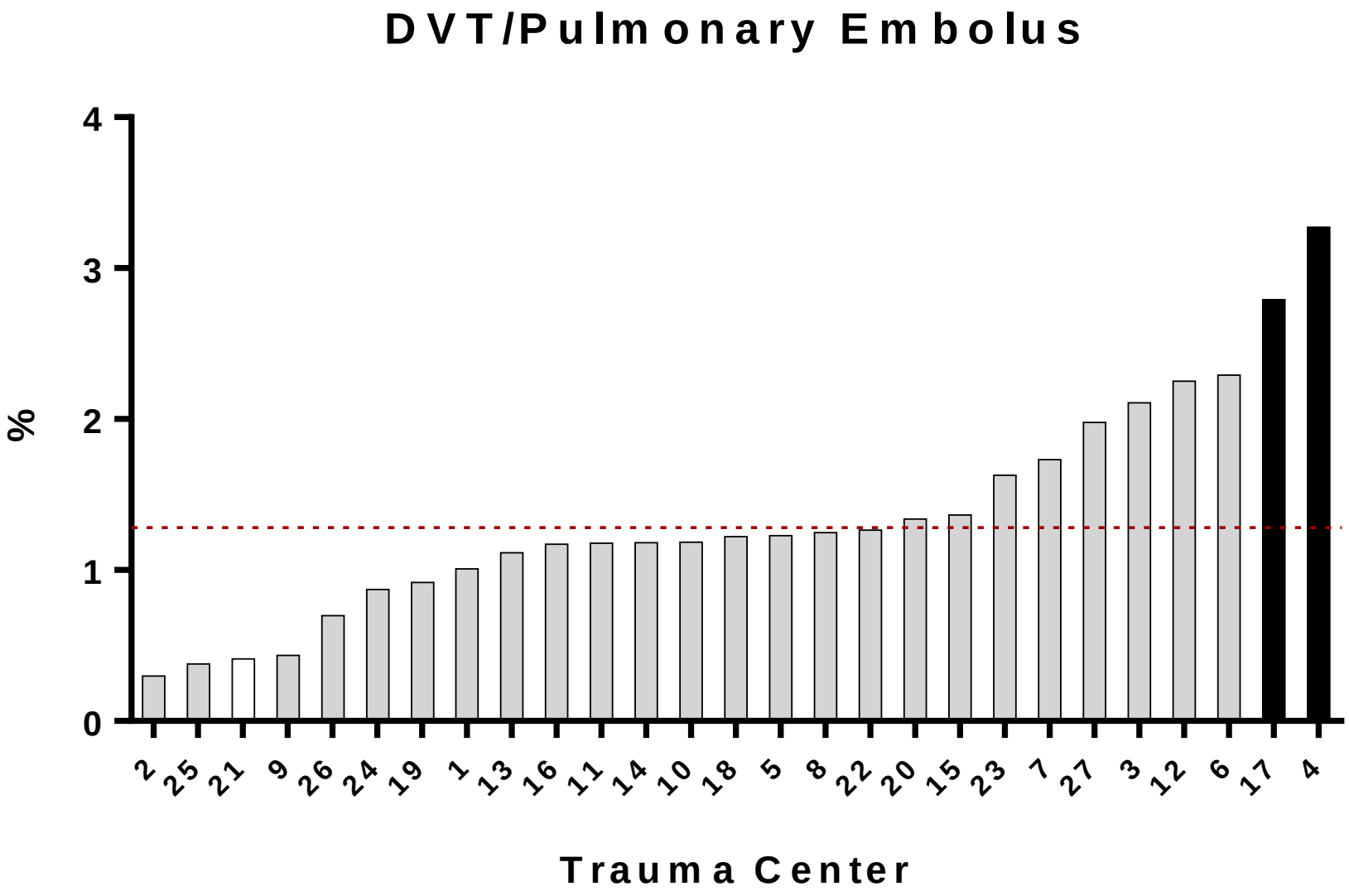

Mortality (Cohort 1, GCS 3-8, ≥ 65 yo)
100
80
60
40
20
0
%
24 4 2 17 27 19 15 11 9 10 3 22 23 14 21 8 18 20 13 6 1 25 12 5 7 26
Trauma Center

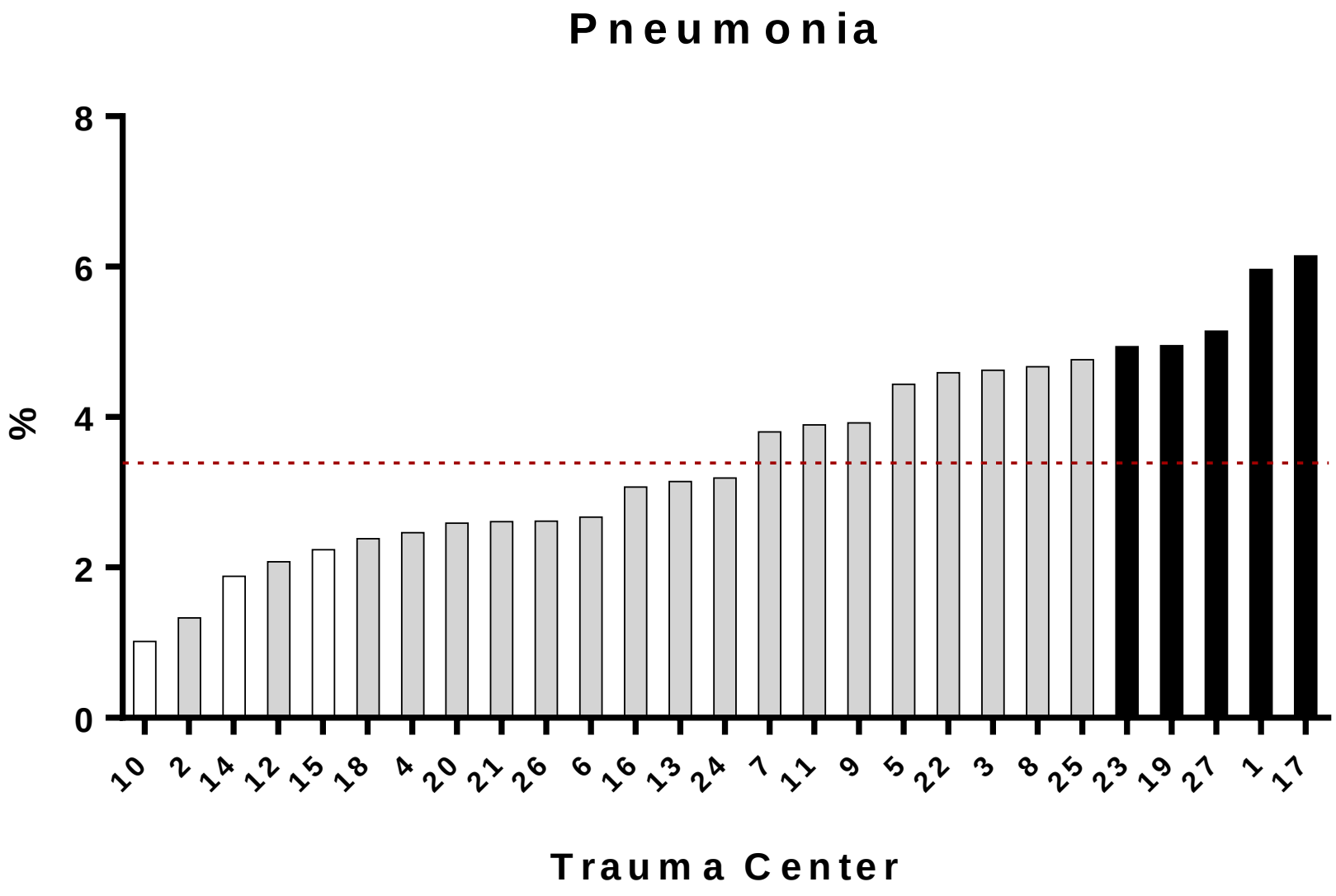

Case Volume (Cohort 1, GCS 3-8, ≥ 65 yo)
Cases
50
40
30
20
10
0
24 4 2 17 27 19 15 11 9 10 3 22 23 14 21 8 18 20 13 6 1 25 12 5 7 26
Trauma Center

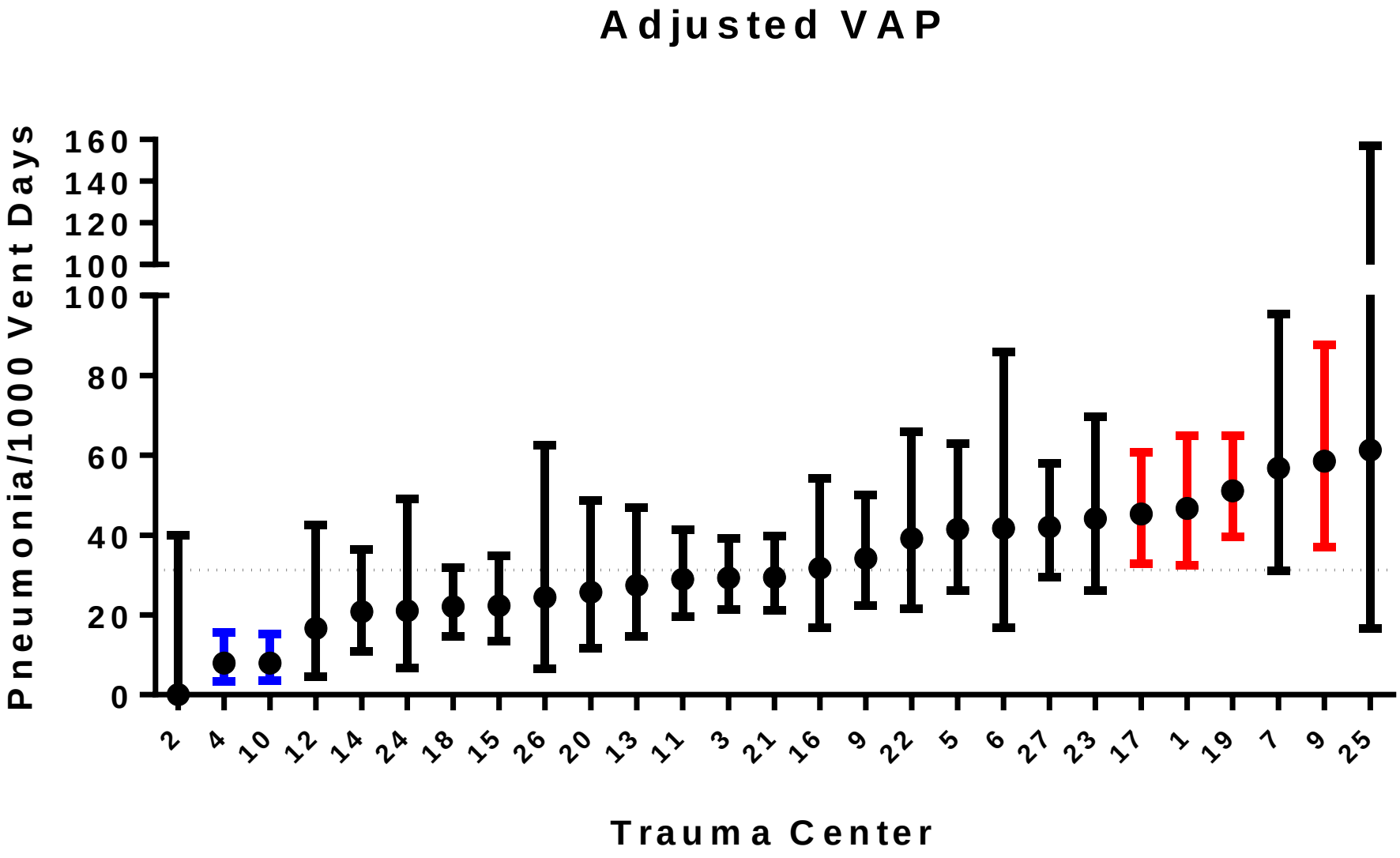
TBI Mortality

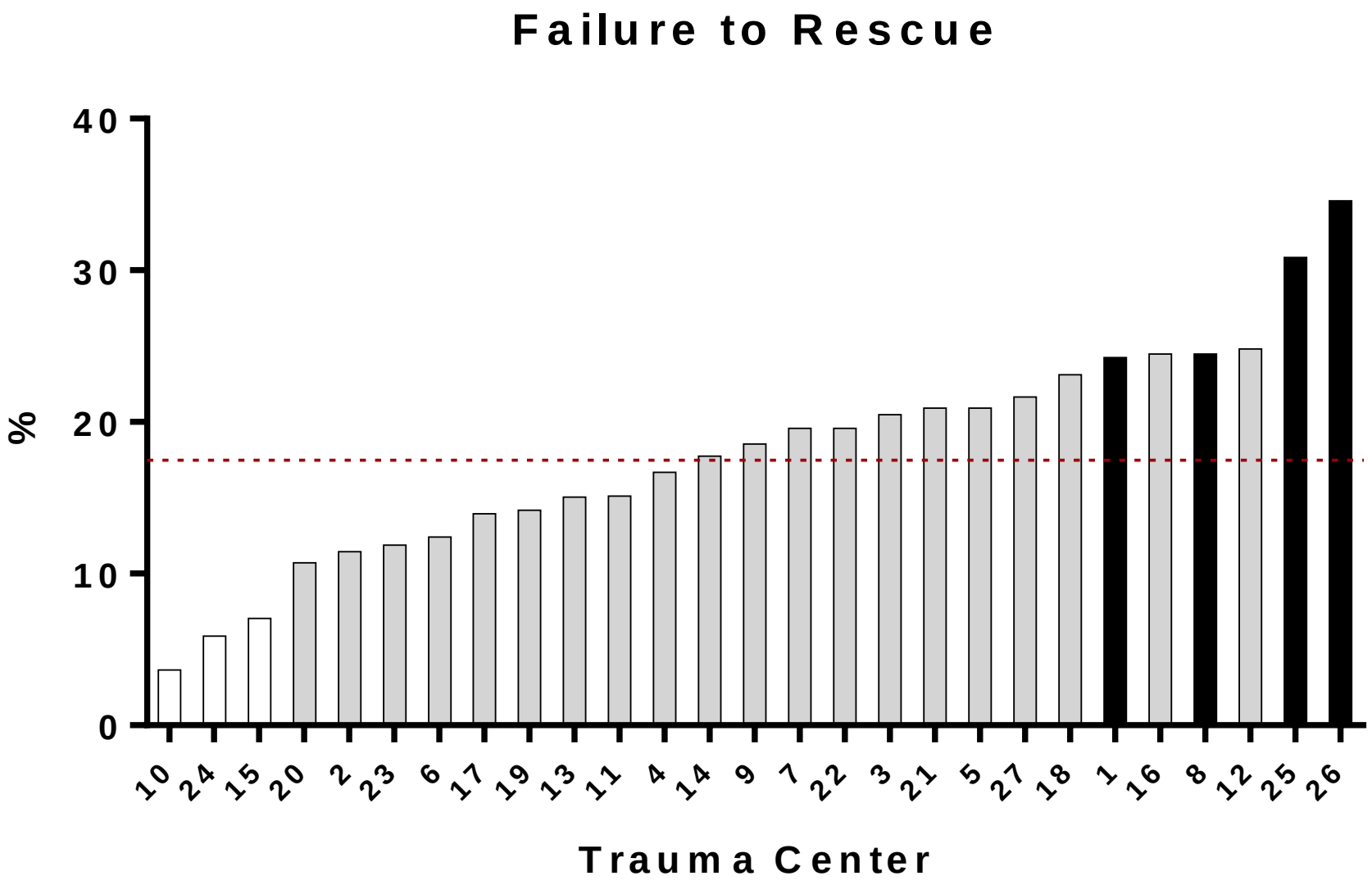
- Brain Injury
  - Selection Criteria
    - AIS Head > 0, excluding vascular, scalp, and bony injuries
    - Exclude if penetrating mechanism
    - Exclude if no signs of life
    - Exclude if direct admission transfer
    - Exclude if Max GCS>8

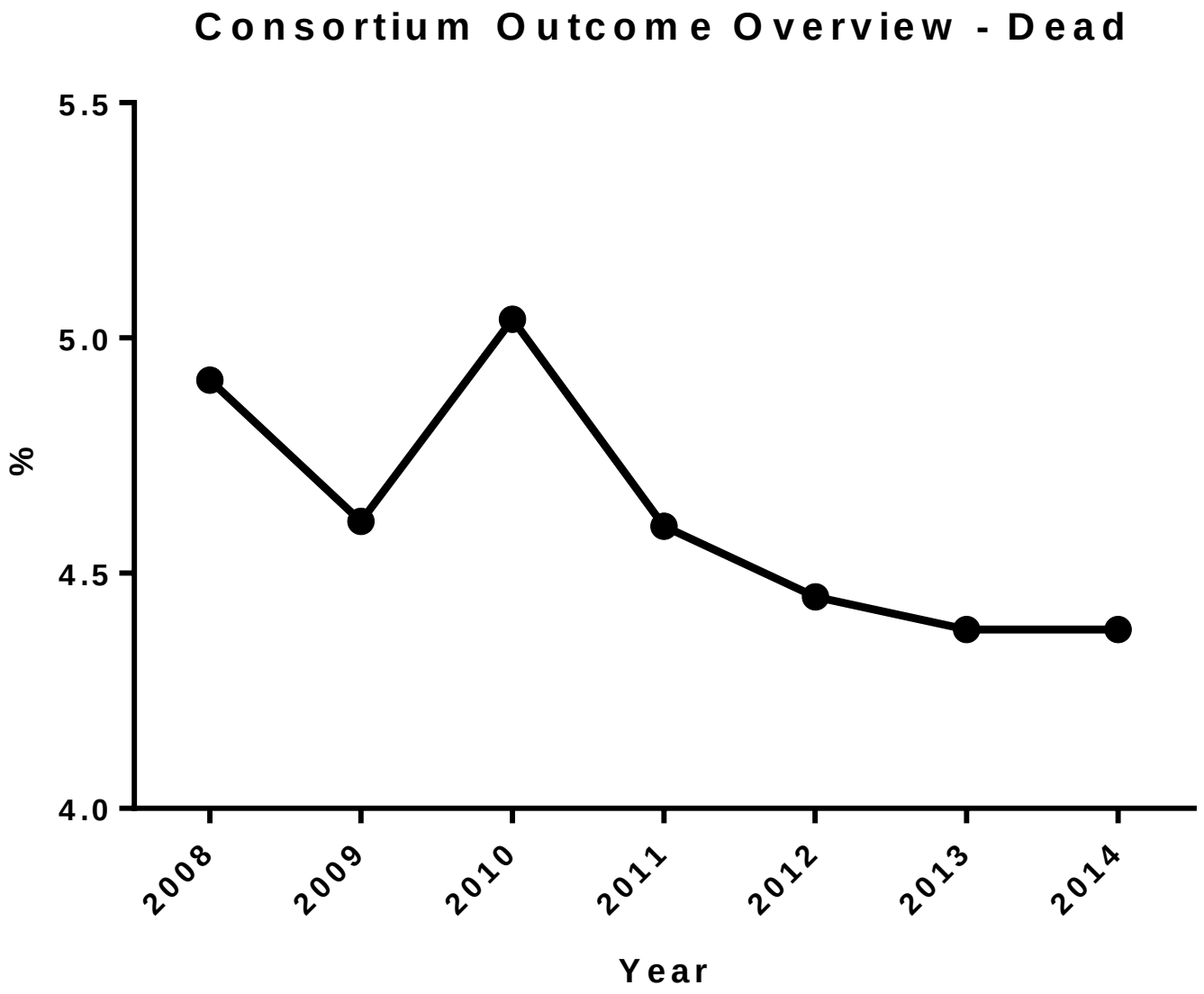

Risk and Reliability Adjusted TBI Mortality
100
80
60
40
20
0
%
24 15 4 2 9 17 23 27 14 21 10 11 22 20 19 12 18 8 1 13 6 5 3 7 16 25 26
Trauma Center

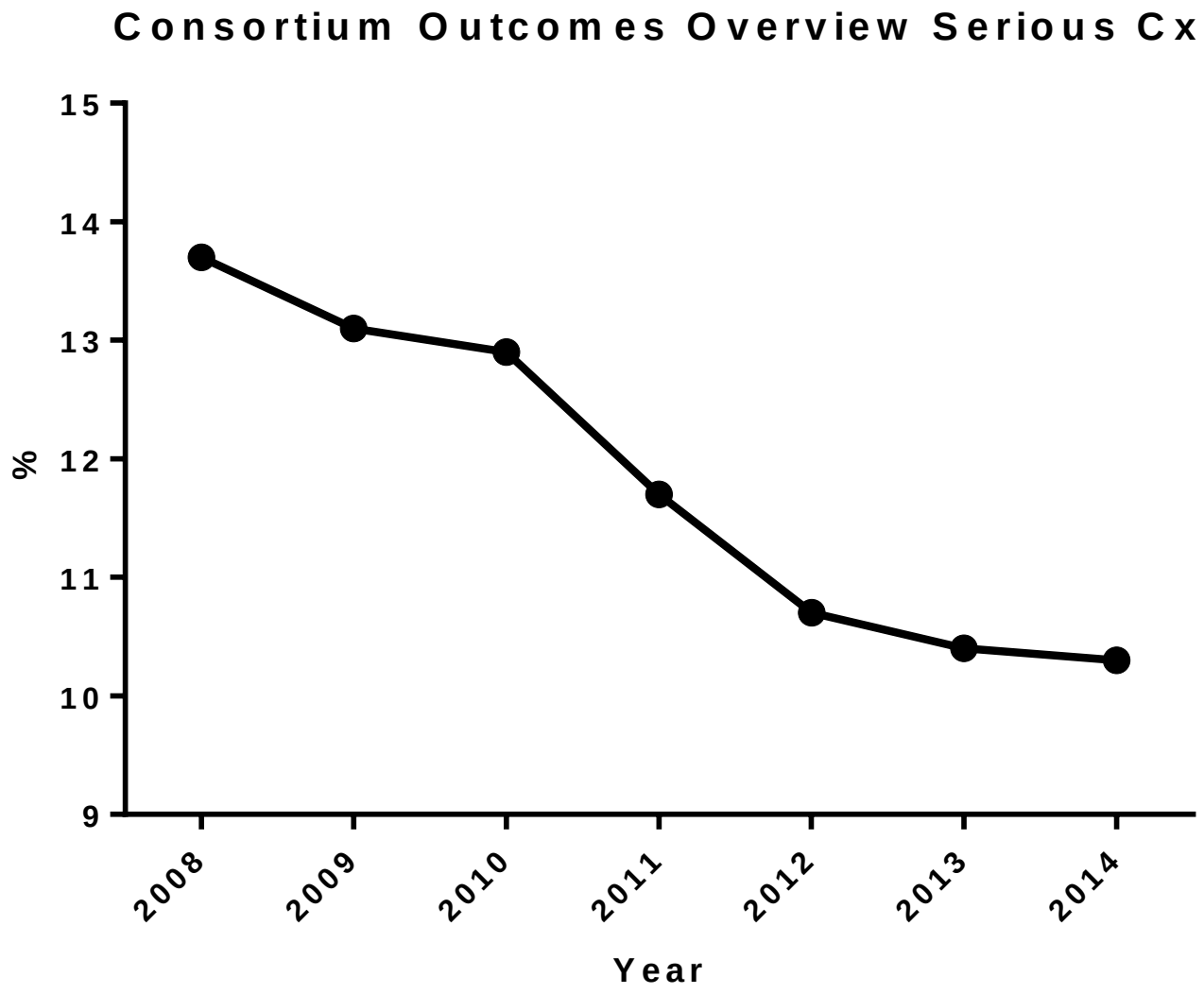

DVT/Pulmonary Embolus
%
4
3
2
1
0
2 25 21 9 26 24 19 1 13 16 11 14 10 18 5 8 22 20 15 23 7 27 3 12 6 17 4
Trauma Center


Pneumonia
%
8
6
4
2
0
10
2
14
12
15
18
4
20
21
26
6
16
13
24
7
11
9
5
22
3
8
25
23
19
27
1
17
Trauma Center

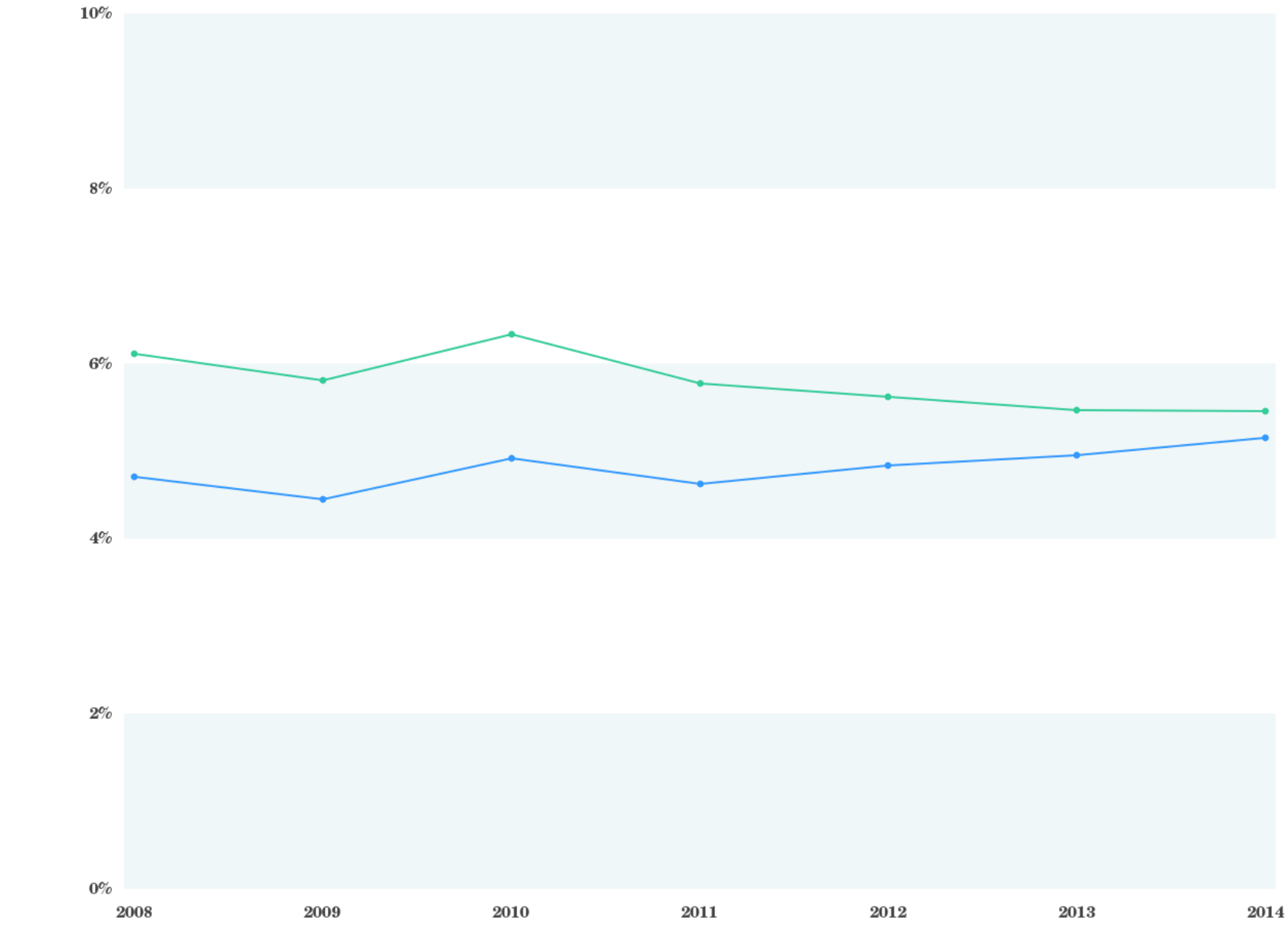

Adjusted VAP
Pneumonia/1000 Vent Days
160
140
120
100
100
80
60
40
20
0
2
4
10
12
14
24
18
15
26
20
13
11
3
21
16
9
22
5
6
27
23
17
1
19
7
9
25
Trauma Center


Failure to Rescue
40
30
20
10
0
%
10 24 15 20 2 23 6 17 19 13 11 4 14 9 7 22 3 21 5 27 18 1 16 8 12 25 26
Trauma Center

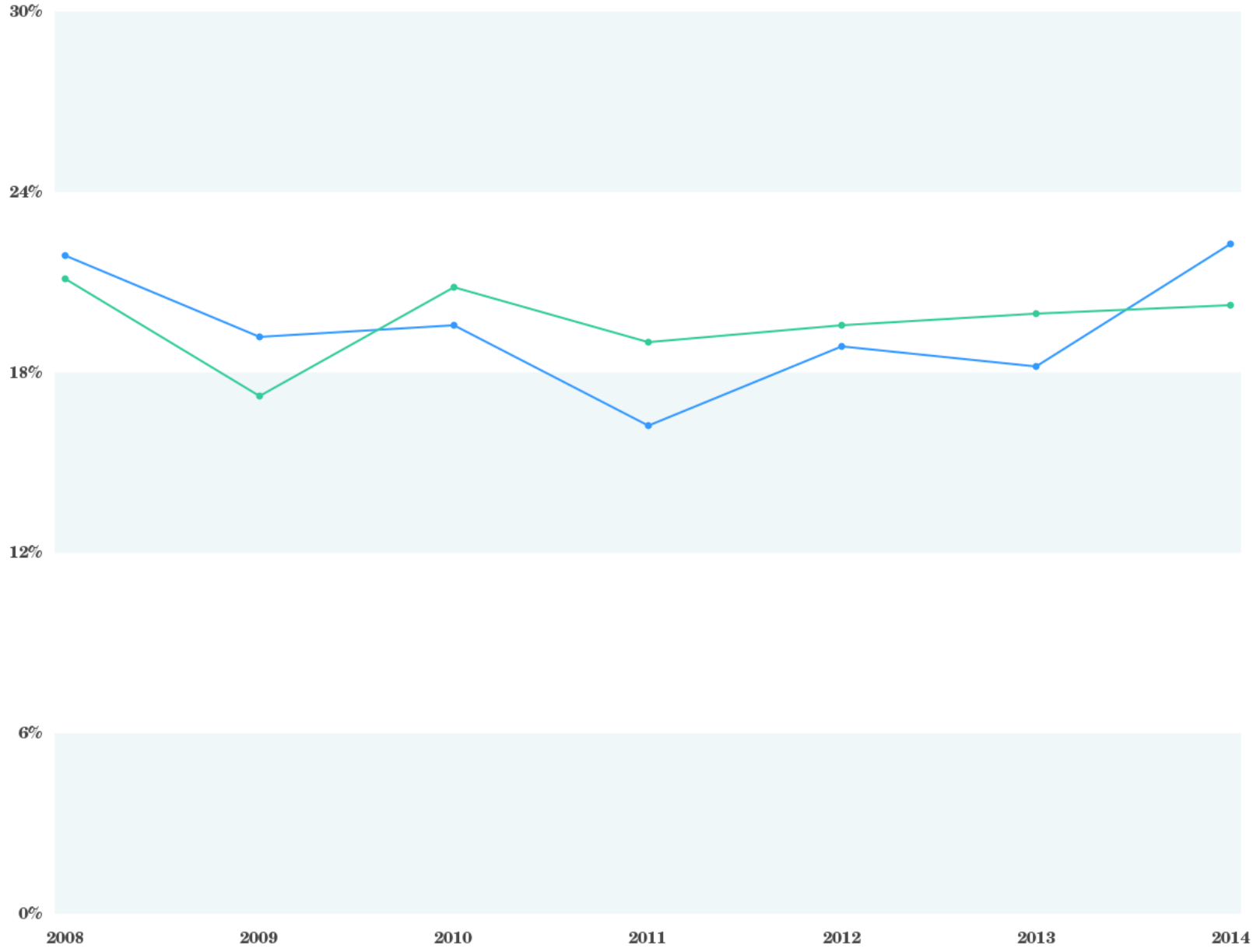

Consortium Outcome Overview - Dead
5.5
5.0
4.5
4.0
%
2008
2009
2010
2011
2012
2013
2014
Year


Consortium Outcomes Overview Serious Cx
15
14
13
12
11
10
9
%
2008
2009
2010
2011
2012
2013
2014
Year

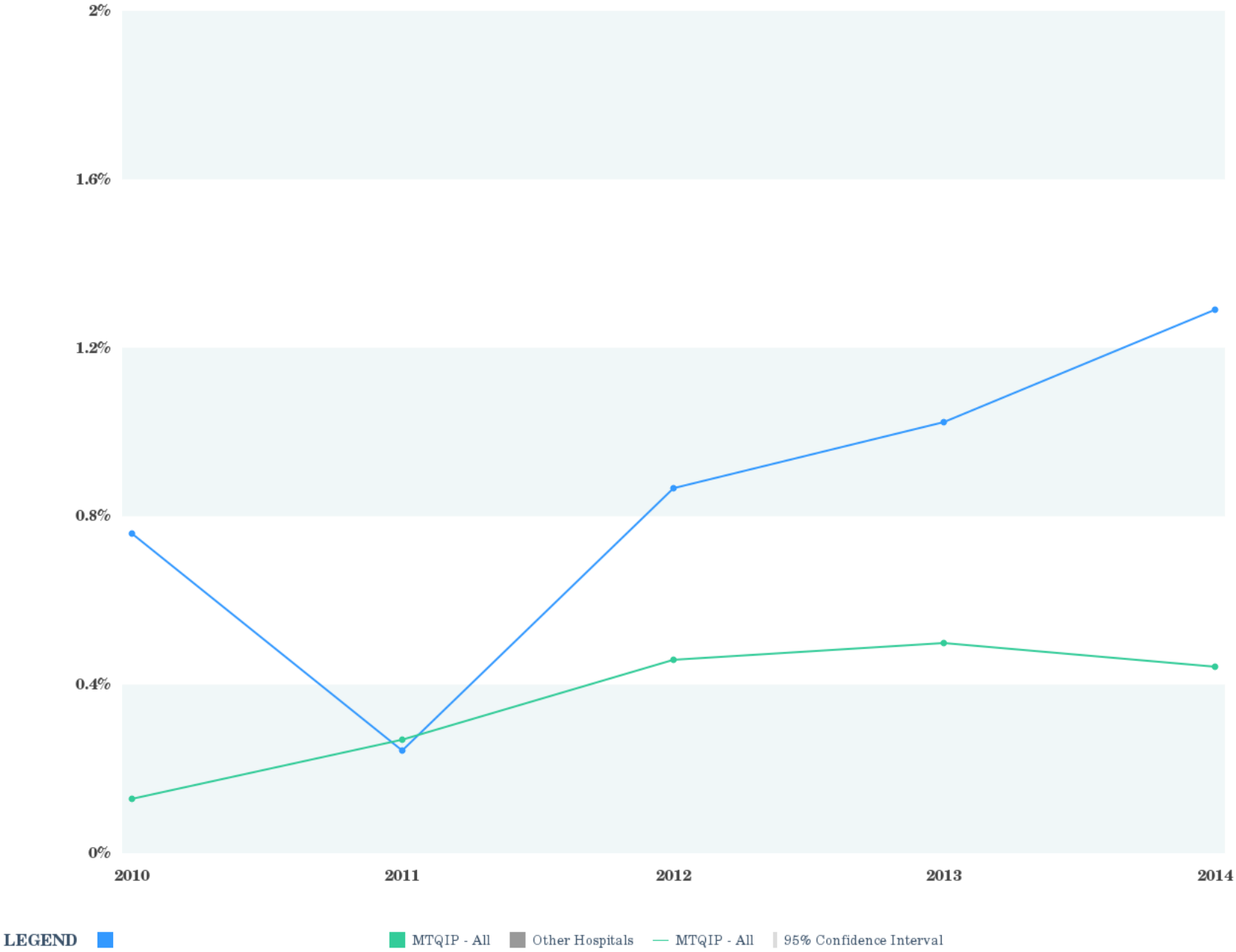
Outcomes Overview - Dead

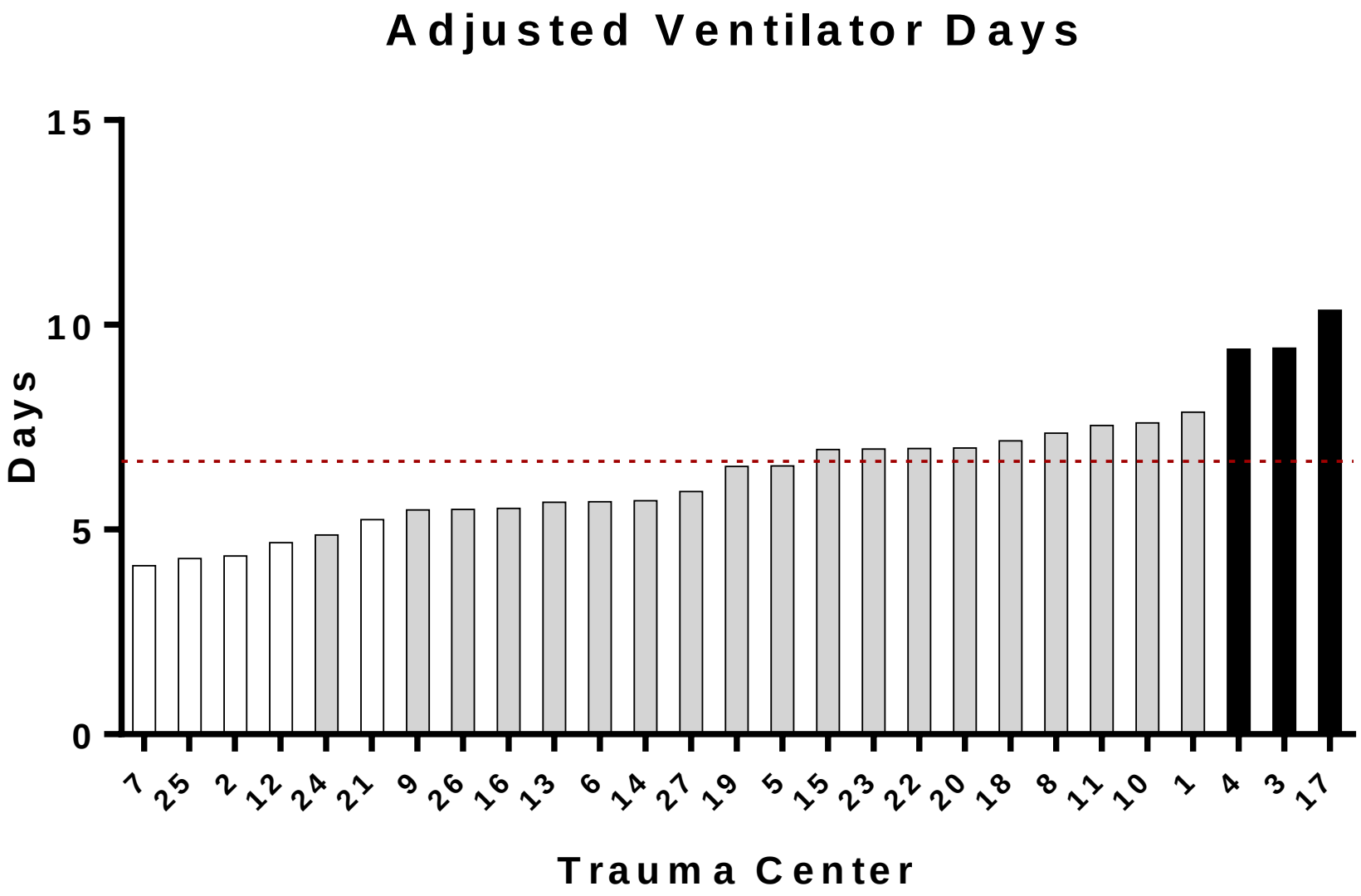


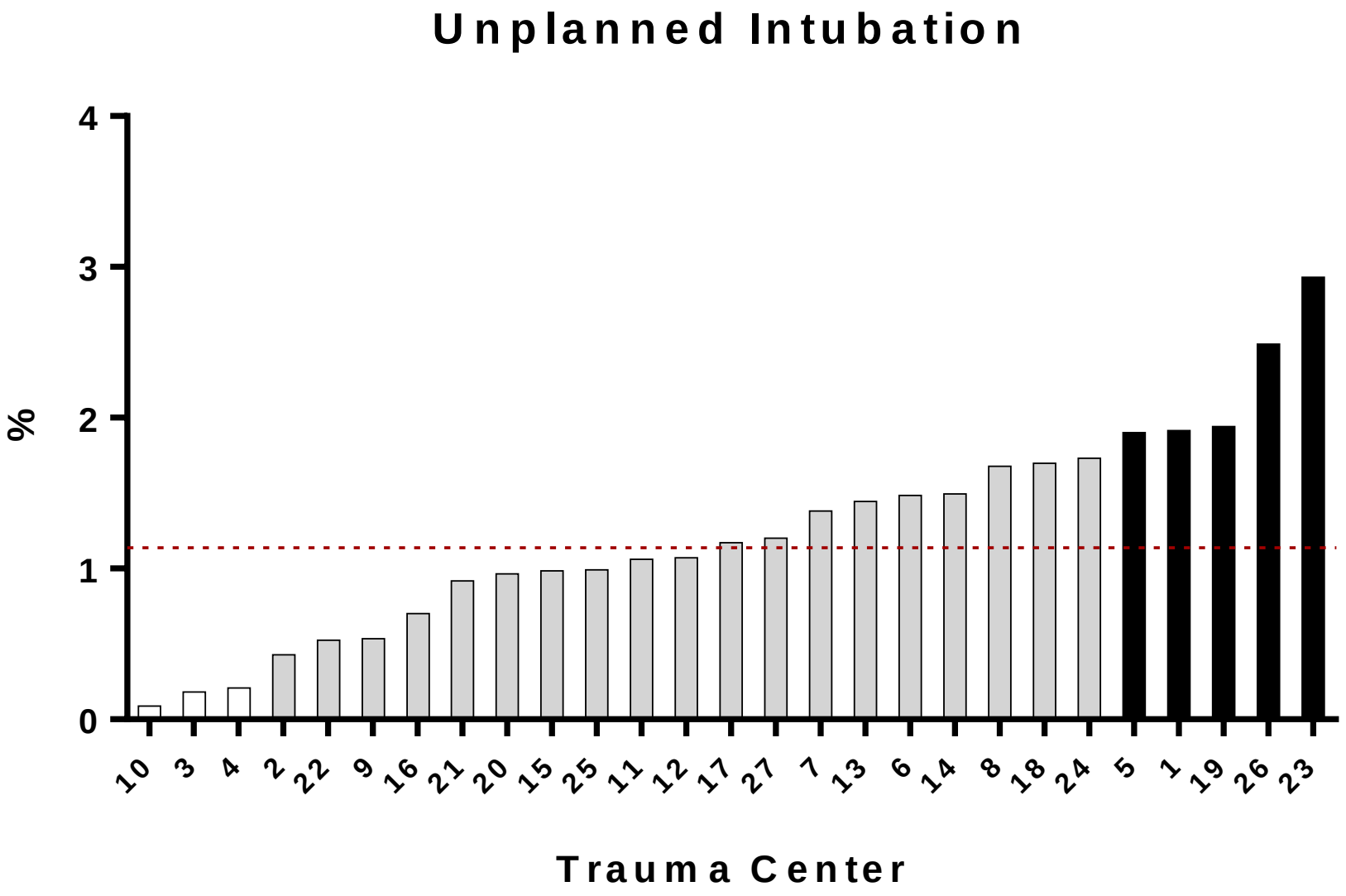
Outcomes Overview - Failure to Rescue

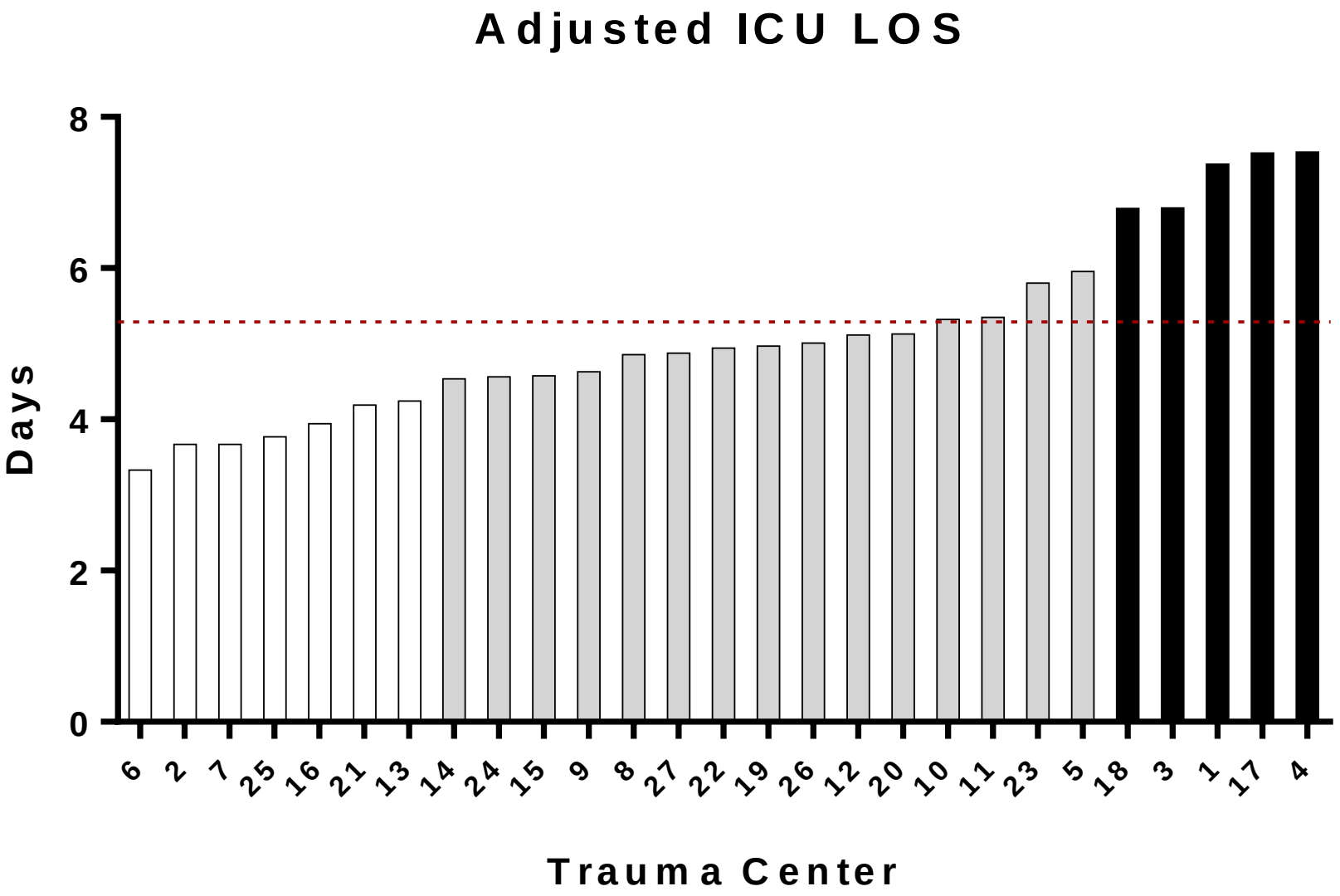


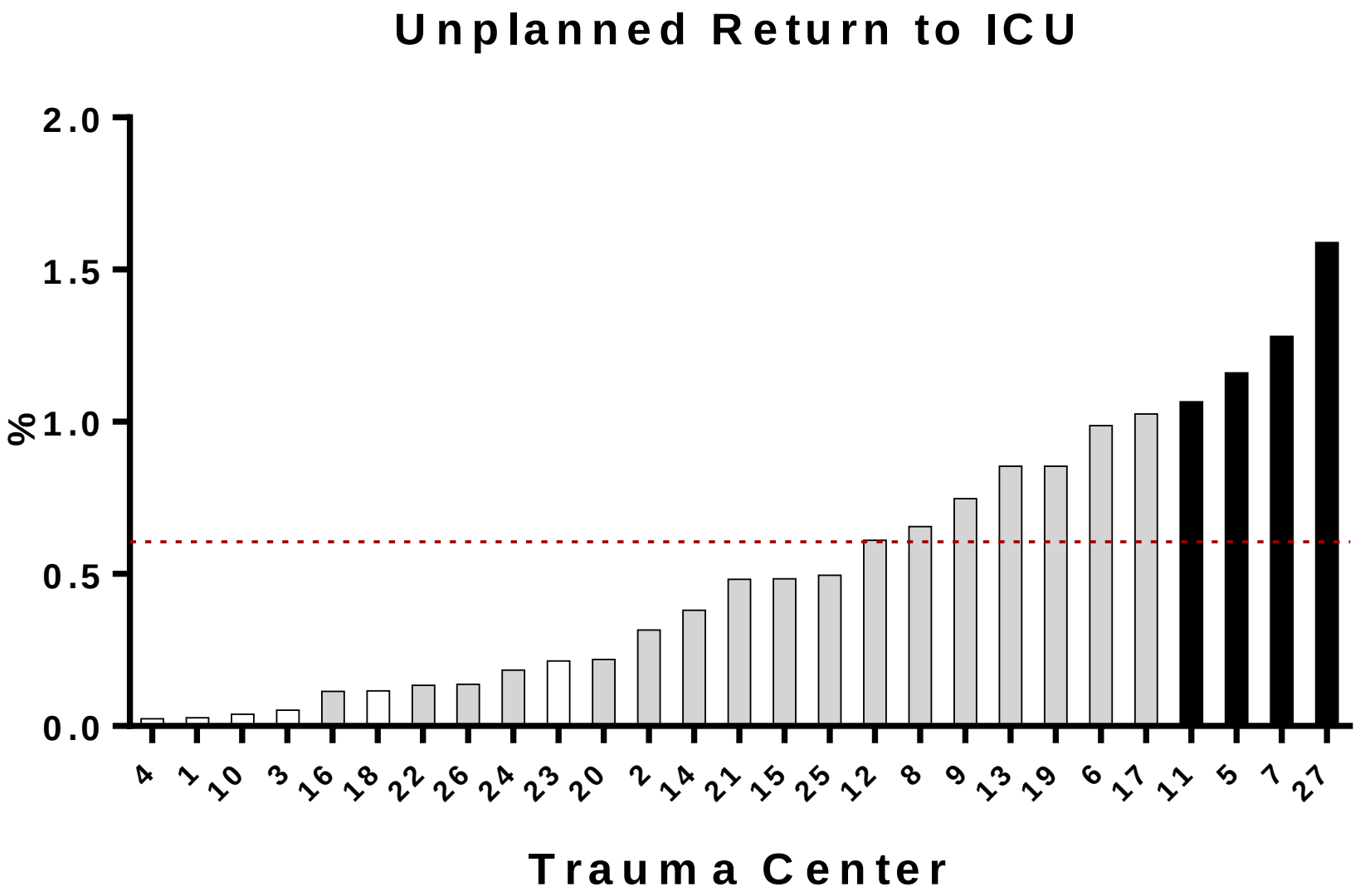
Complications Drill-Down - Unpl Return to ICU




Adjusted Ventilator Days
15
10
5
0
Days
7
25
2
12
24
21
9
26
16
13
6
14
27
19
5
15
23
22
20
18
8
11
10
1
4
3
17
Trauma Center


Unplanned Intubation
%
4
3
2
1
0
10 3 4 2 22 9 16 21 20 15 25 11 12 17 27 7 13 6 14 8 18 24 5 1 19 26 23
Trauma Center


Adjusted ICU LOS
Days
0
2
4
6
8
6 2 7 25 16 21 13 14 24 15 9 8 27 22 19 26 12 20 10 11 23 5 18 3 1 17 4
Trauma Center


Unplanned Return to ICU
2.0
1.5
1.0
0.5
0.0
%
4 1 10 3 16 18 22 26 24 23 20 2 14 21 15 25 12 8 9 13 19 6 17 11 5 7 27
Trauma Center

Administrative

- Patient Information
  - Name, MRN, DOB
  - Drill down
- Validation
  - Deleted case
  - Registry change log
  - Trauma ICD9 death list

Administrative

- ACS-TQIP and ACS-COT
  - North Carolina > March COT Meeting
  - Mike Chang, Hasan Alam
  - Ronny Stewart (UM visit)
  - 2004 to Present
  - Future
    - State collaborative contract
    - ? Other states
    - Taxonomy
  - Questions

Conclusion

- Evaluations
  - Fill out and turn in