

The Michigan Trauma Quality Improvement Program

Ypsilanti, MI
October 11, 2018



Disclosures

- ◆ Salary Support for MTQIP from BCBSM/BCN
 - Mark Hemmila
 - Judy Mikhail
 - Jill Jakubus
 - Anne Cain-Nielsen

No Photos Please



Introductions

- ◆ Bryant Oliphant, MD
 - Michigan Medicine, DMC
 - Assistant Professor
- ◆ James Goulet, MD
 - Michigan Medicine
 - Professor
- ◆ Riley Frenette, BA
 - Michigan Medicine
 - Research Assistant in Orthopaedic Surgery

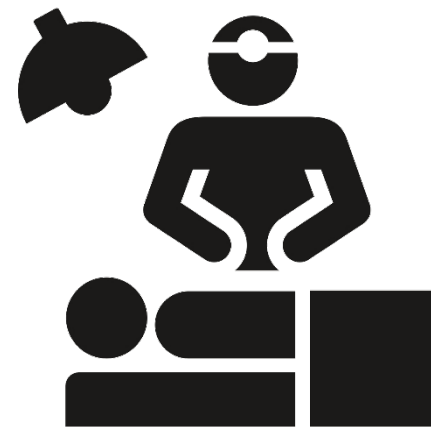
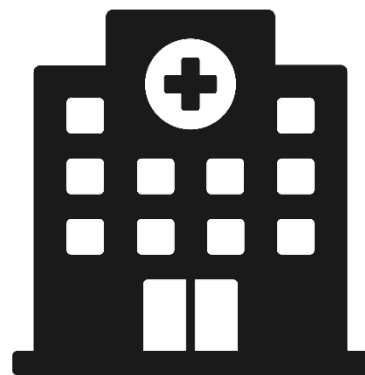
New MTQIP Trauma Center

- ◆ University of Minnesota Medical Center - Fairview
 - Chris Tignanelli, MD
 - Julie Ottosen, MD, TMD
 - Lisa Pearson, TPM
- ◆ Why?
 - Diversify
 - New ideas
 - Train future leaders
 - See if a regional collaborative can occur elsewhere

Data Submission

- ◆ Data submitted August 3, 2018
 - This report
 - 3 week turnaround
- ◆ Data submitted October 5, 2018
 - Pending
- ◆ Next data submission
 - December 7, 2018

Welcome



Objectives

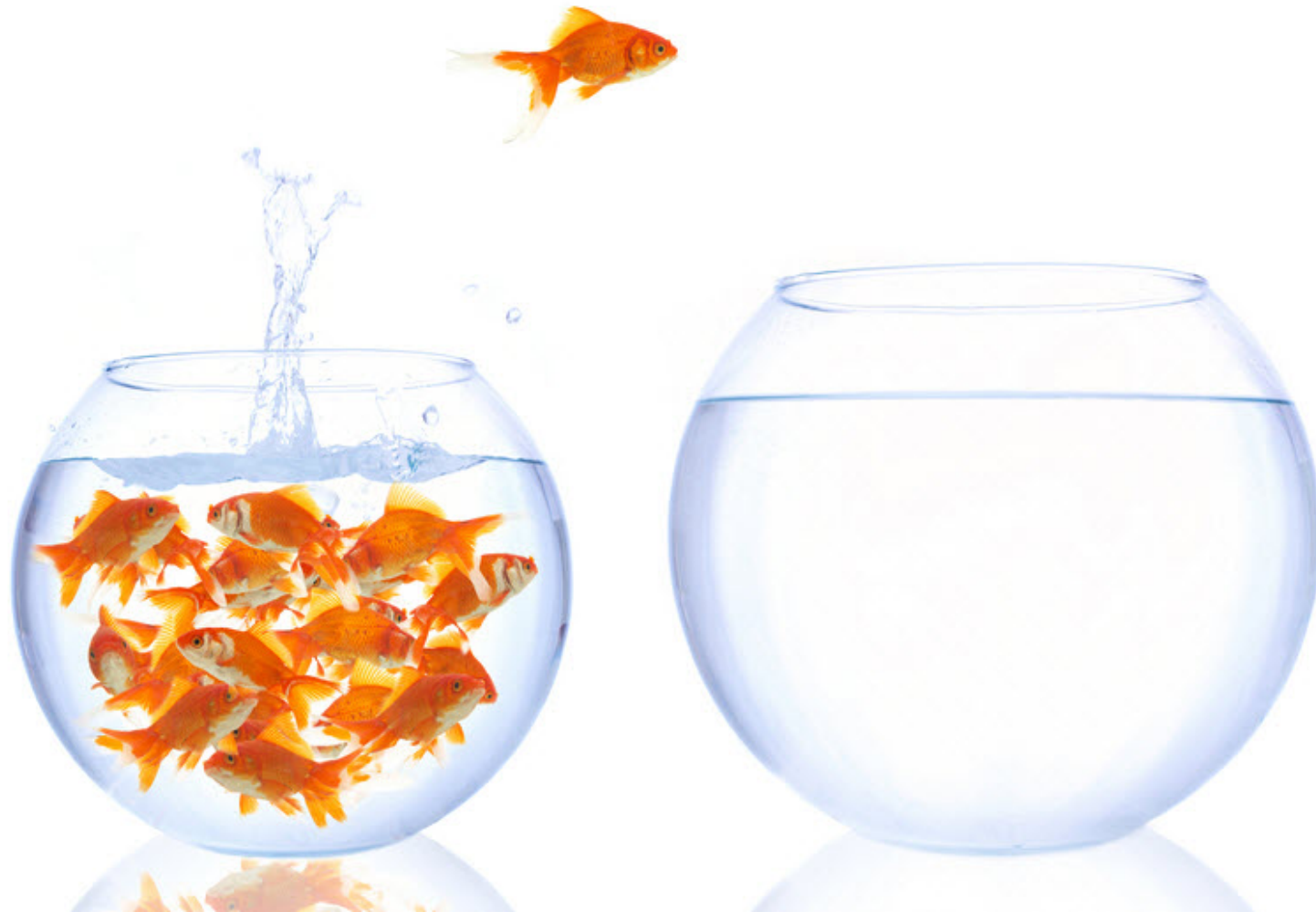
- ◆ Information
 - Who we are
 - What do we do
- ◆ How can we help you and your patients
 - Data
 - Analysis
 - Projects
- ◆ Suggestions
 - Better, Optimize, Ideas

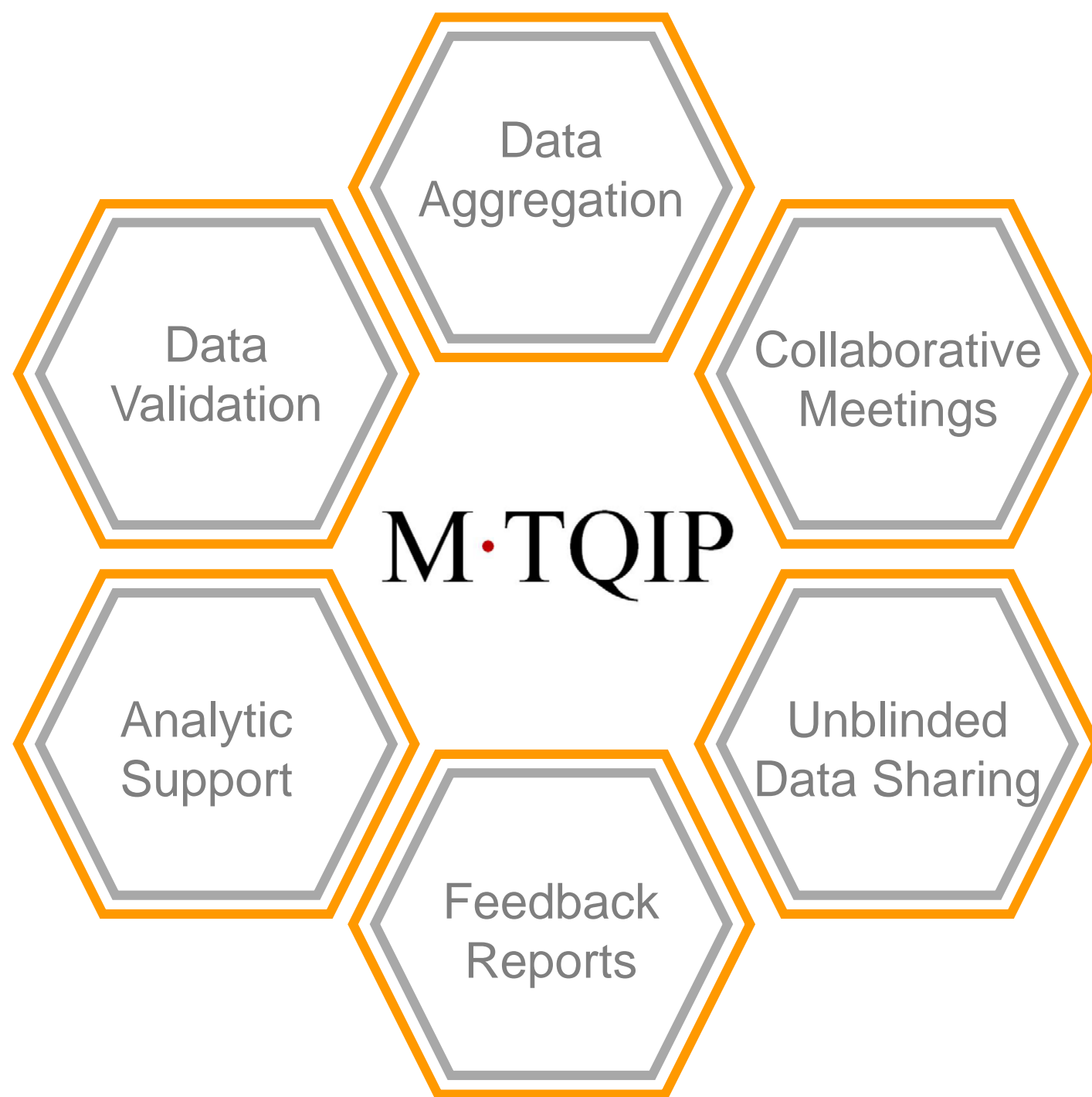
MTQIP Overview

Jill Jakubus, PA-C, MHSA



The Concept



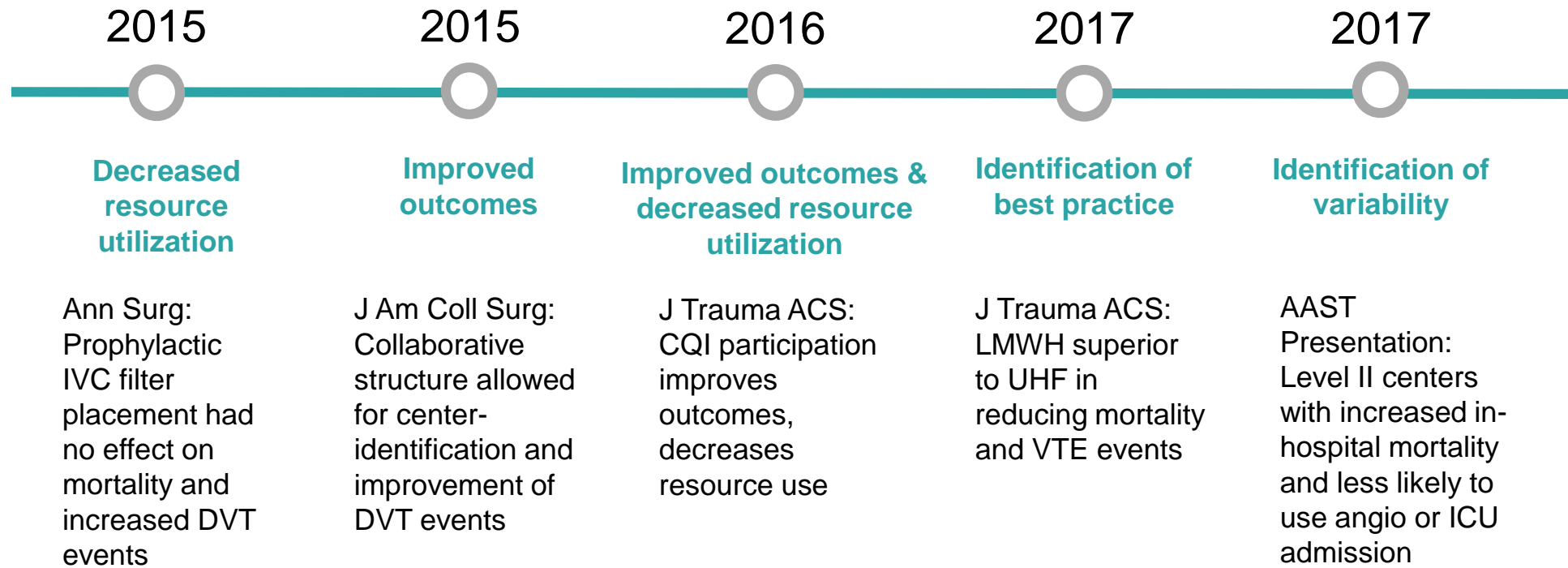




State Trauma System
Reports
Mortality
Police

What is the evidence?

The Impact



The Return on Investment

VTE Prophylaxis with LMWH
Any Complications Severe Sepsis
Urinary Tract Infection Mortality
Blood to Plasma Ratio ≤ 2.5 ICU LOS
Prophylactic IVC Filter Placement
Extended Hospital LOS Ventilator Days
VTE Prophylaxis Initiated ≤ 48 Hours Pneumonia
Serious Complications Decubitus Ulcer
Hospital LOS Venous Thromboembolism

How do you **create** change?

Create meaningful feedback

Provider Feedback

Shock Drill Down

Trauma #	Age	Mechanism	ED SBP	Lowest ED BP	ISS	4 hr PRBC/FFP	24 hr PRBC/FFP	First Intervention	Both	Time to (hrs)	Mortality	Surgeon
						4.0						Jim Harbaugh
						4.0						John Adams
						3.5						Jim Harbaugh
						3.0						John Adams
						3.0						Thomas Jefferson
						3.0						James Madison
						2.7						James Monroe
						2.5						Urban Meyer
						2.5						Jim Harbaugh
						2.0						John Adams
						1.3						Urban Meyer
						1.3						Jim Harbaugh
						1.0						John Adams
						1.0						Thomas Jefferson
						1.0						James Madison
						1.0						James Monroe
						0.2						Urban Meyer

Send clear signals

Aggregate Feedback

Outcomes/Mortality Dashboard

Outcomes	Center	MTQIP	95% CI	Mortality	Center	MTQIP	95% CI
Failure to Rescue				Dead			
Superficial SSI				Dead or Hospice			
Deep SSI				Cohort 2 (Admit to Trauma Service)			
Organ/Space SSI				Cohort 3 (Blunt Multi-System)			
Wound Disruption				Cohort 4 (Blunt Single-System)			
Abd. Fascia Left Open				Cohort 5 (Penetrating)			
Acute Lung Injury/ARDS				Age 16-24			
Pneumonia				Age 25-44			
Unpl Intubation				Age 45-64			
Pulmonary Embolism				Age 65-84			
Renal Insufficiency				Age >84			
Acute Renal Failure				White			
Urinary Tract Infection				Non-white			

Aggregate Feedback

Orthopedic Dashboard

Processes of Care	Center	MTQIP	P Value	Status
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LMWH VTE Prophylaxis <= 48 Hours
Average Time to OR (hrs)
Time to OR > 48 Hours



Complications	Center	MTQIP	P Value	Status
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Serious Complications
Any Complication
Failure to Rescue
Venous Thromboembolism



Top Collaborative Complications	Center	MTQIP	P Value	Status
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1. Unplanned Admission to ICU
2. Unplanned Intubation
3. Myocardial Infarction
4. Pneumonia
5. Catheter Associated Urinary Tract Infection

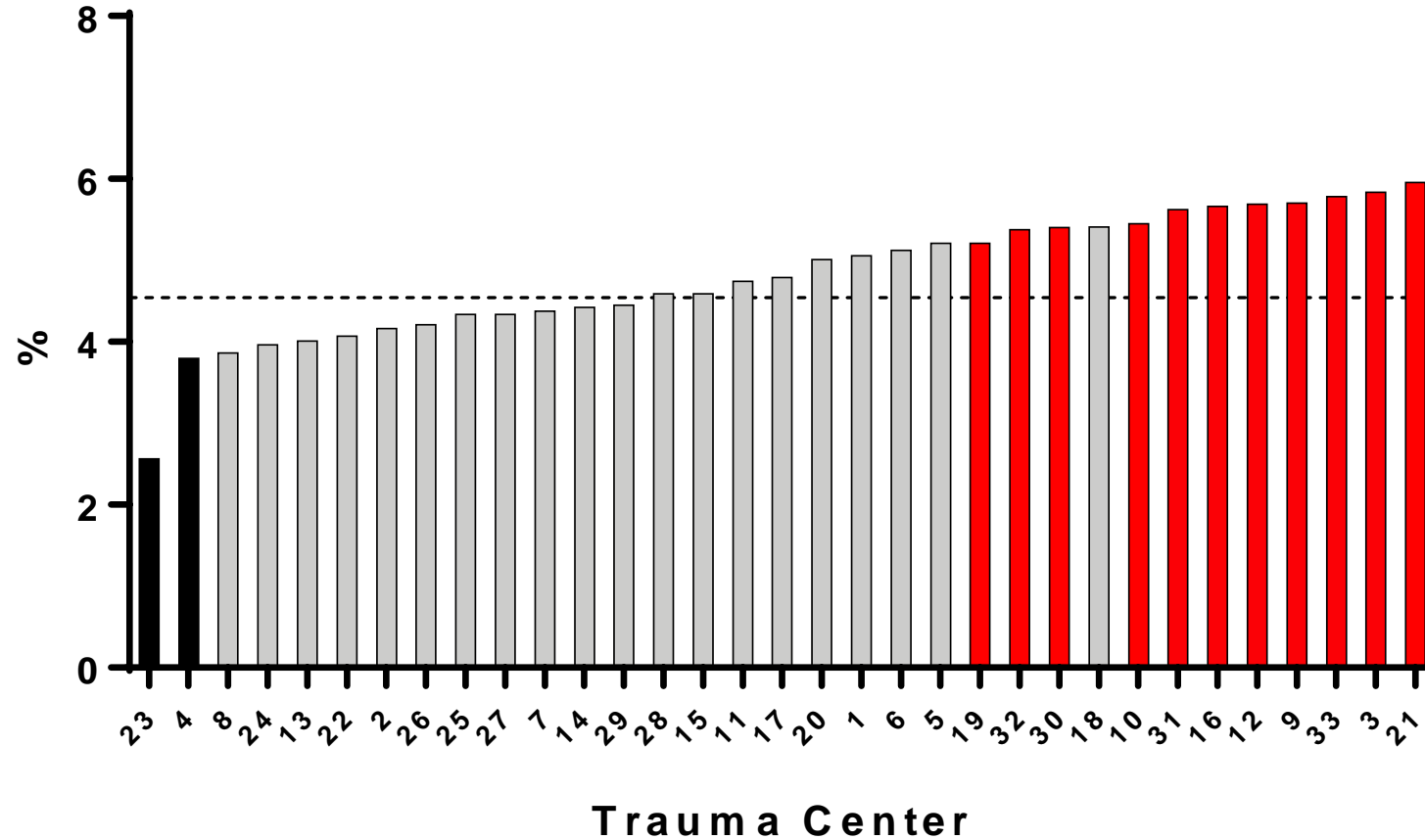


Provide opportunities for all
members to improve

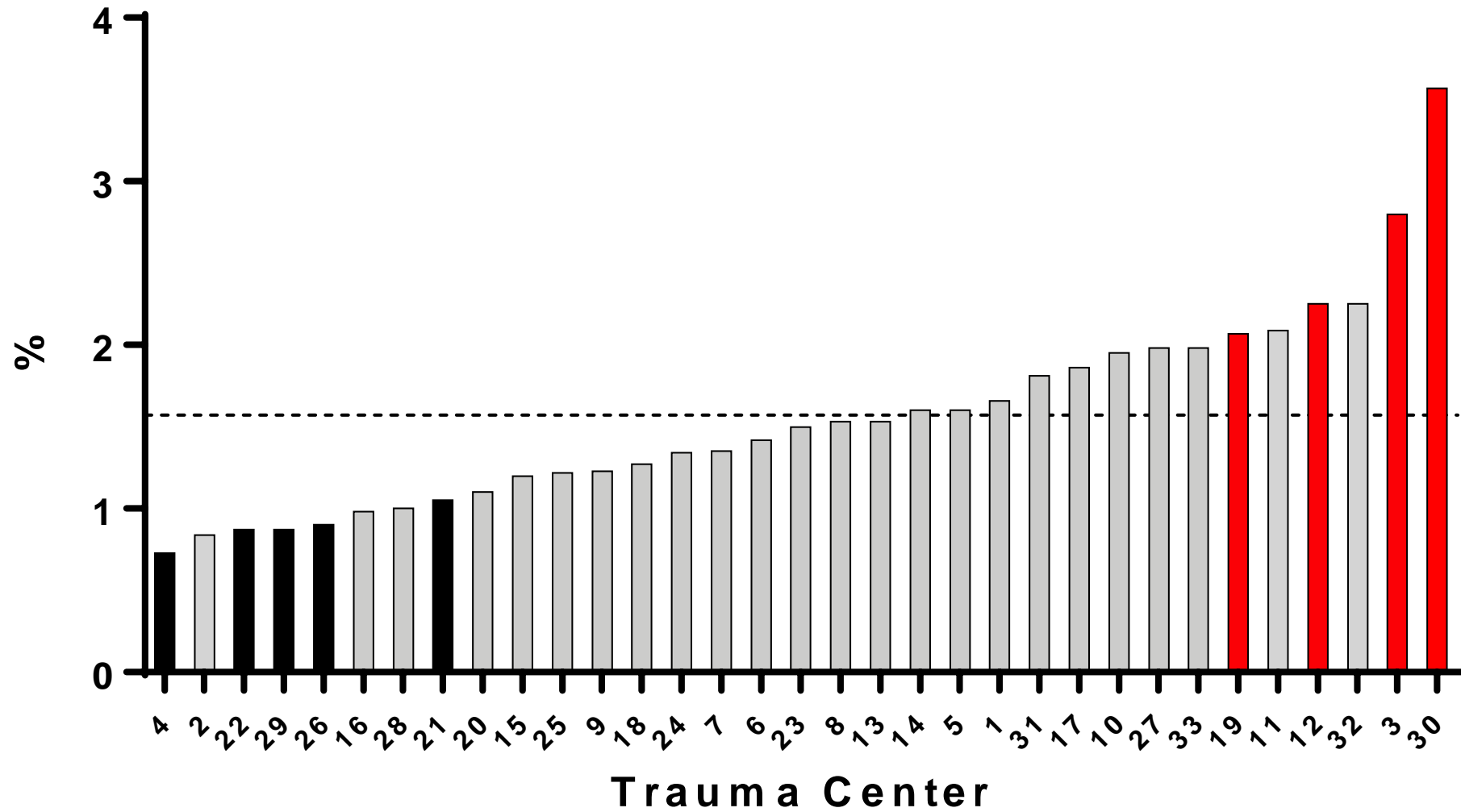
Aggregate Feedback

Meeting Report

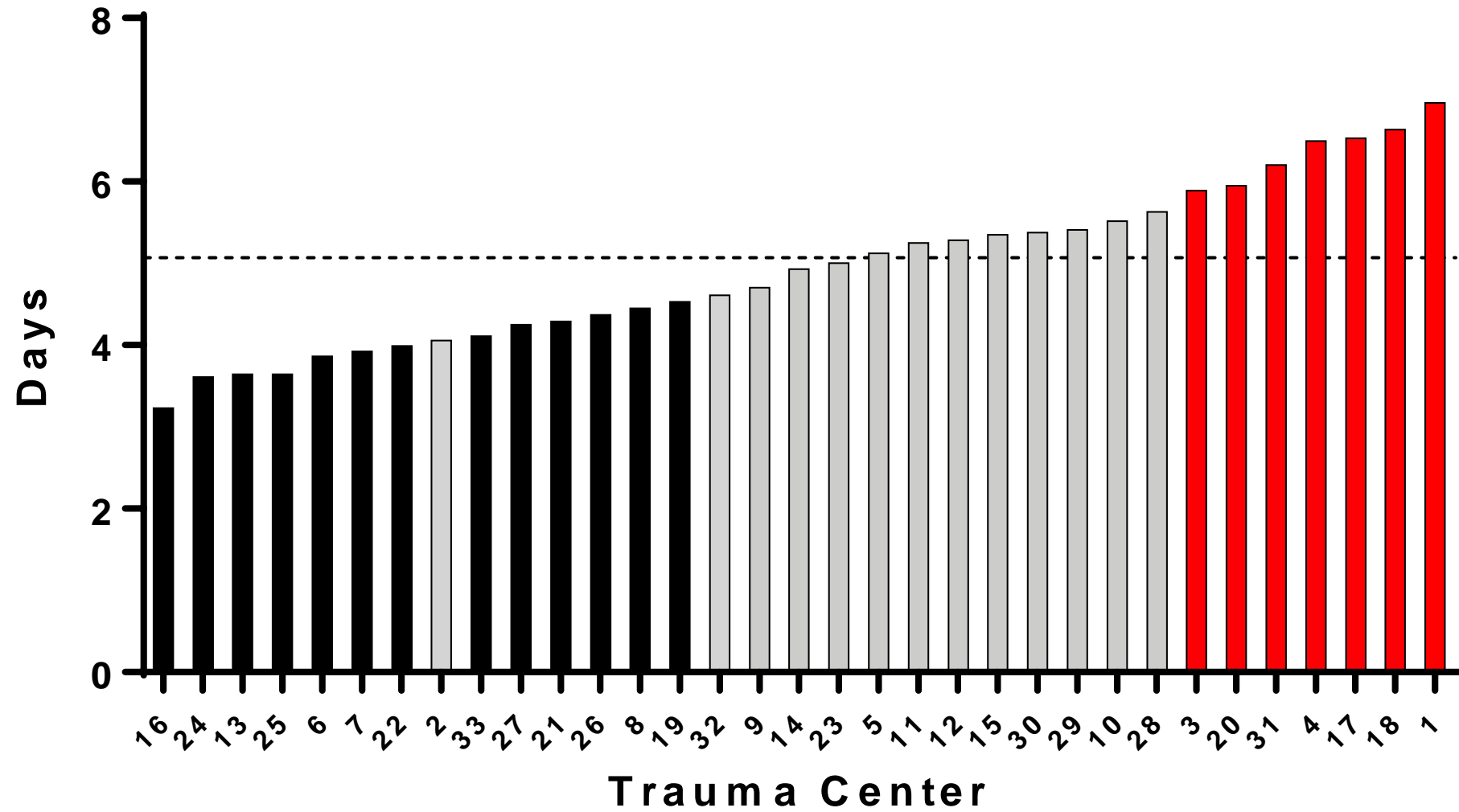
Mortality - Age ≥ 65 years



Unplanned Intubation

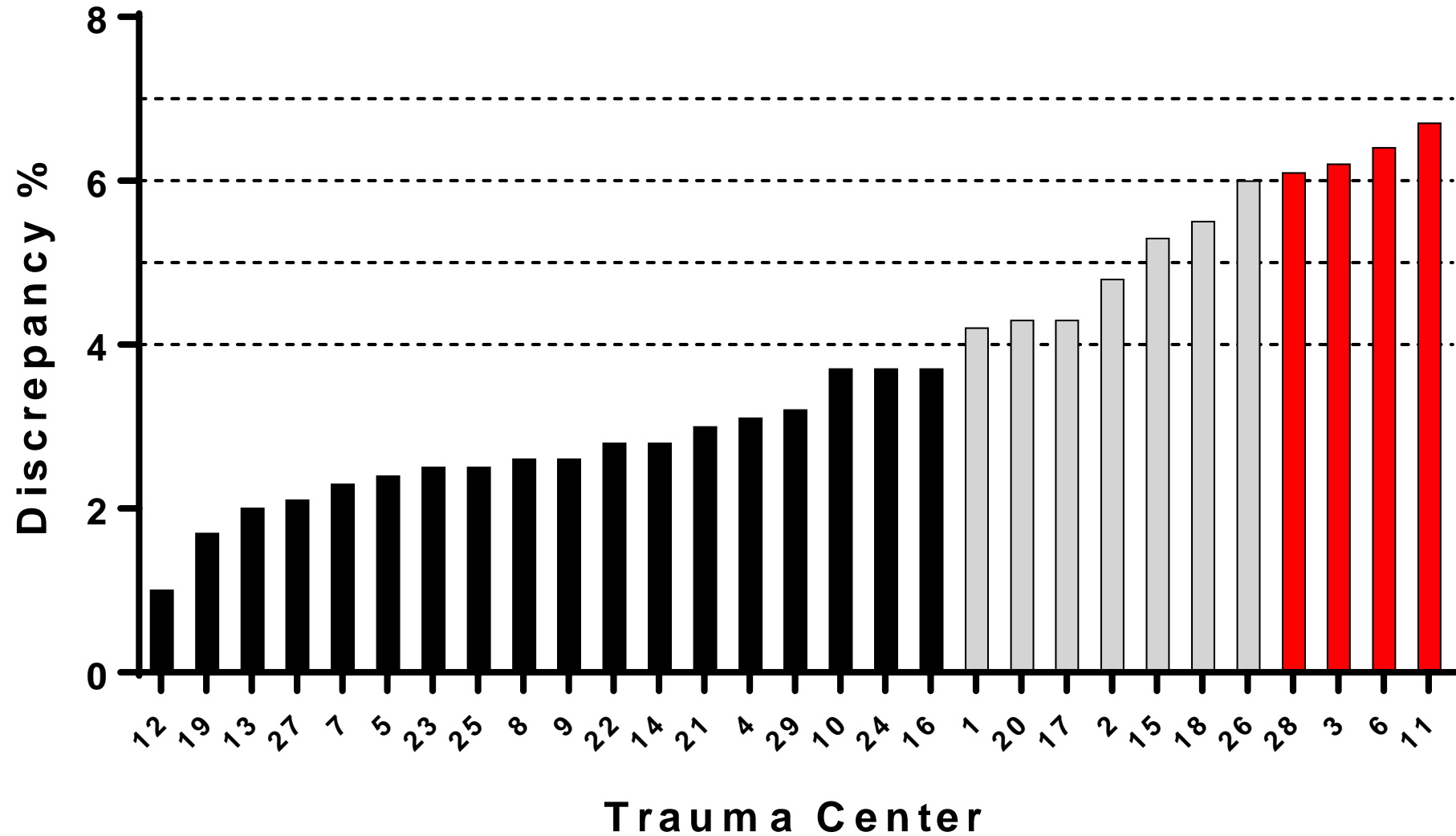


Adjusted ICU LOS



Data Validation

Last Processed Report



Make it **easy** to do the right thing

Make it **hard** to do the wrong thing

Performance Feedback

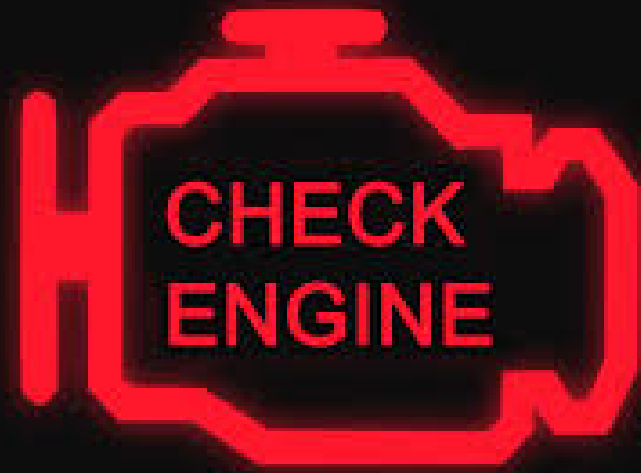
Scorecard

Michigan Medicine Michigan Trauma Quality Improvement Program (MTQIP) 2018 Performance Index January 1, 2018 to December 31, 2018						
Measure	Weight	Measure Description		Result	Points	Possible
#1	10	Data Submission (Partial/Incomplete Submissions No Points) 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
#2	10	Meeting Participation All Disciplines *Surgeon represents 1 hospital only Surgeon, and (TPM or MCR) Participate in 3 of 3 Collaborative meetins (9 pts) Surgeon, and (TPM or MCR) Participate in 2 of 3 Collaborative meetins (6 pts) Surgeon, and (TPM or MCR) Participate in 1 of 3 Collaborative meetins (3 pts) Surgeon, and (TPM or MCR) Participate in 0 of 3 Collaborative meetins (0 pts) Registrar, and/or MCR Participate in the Data Abstractor Meeting (1 pt)				9 6 3 0 1
#3	10	Data Accuracy	Error Rate			10 8 5 3 0
		5 Star Validation	0-4.0%			
		4 Star Validation	4.1-5.0%			
		3 Star Validation	5.1-6.0%			
		2 Star Validation	6.1-7.0%			
		1 Star Validation	>7.0%			

PARTICIPATION (30%)

#4	10	Venous Thromboembolism (VTE) Prophylaxis Initiated Within 48 Hours of Arrival in Trauma Service Admits with ≥ 2 Day Length of Stay (18 Mo's: 1/1/17-6/30/18) $\geq 55\%$ $\geq 50\%$ $\geq 40\%$ $< 40\%$			10 8 5 0	PERFORMANCE (70%)
#5	10	Low Molecular Weight Heparin (LMWH) Venous Thromboembolism (VTE) Prophylaxis Use in Trauma Service Admits (18 Mo's: 1/1/17-6/30/18) $\geq 50\%$ 37-49% 25-36% 20-24% $< 20\%$			10 7 5 3 0	
#6	10	Red Blood Cell to Plasma Ratio (Weighted Mean Points) of Patients Transfused ≥ 5 Units in 1st 4 Hours (18 Mo's: 1/1/17-6/30/18) 10 pts: Tier 1: ≤ 1.5 10 pts: Tier 2: 1.6-2.0 5 pts: Tier 3: 2.1-2.5 0 pts: Tier 4: > 2.5			10 10 5 0	
#7	10	Serious Complication Rate-Trauma Service Admits (3 years: 7/1/15-6/30/18) Z-score: < -1 (major improvement) Z-score: -1 to 1 or serious complications low-outlier (average or better rate) Z-score > 1 (rates of serious complications increased)			10 7 5	
#8	10	Mortality Rate-Trauma Service Admits (3 years: 7/1/15-6/30/18) Z-score: < -1 (major improvement) Z-score: -1 to 1 or mortality low-outlier (average or better rate) Z-score: > 1 (rates of mortality increased)			10 7 5	
#9	10	Open Fracture Antibiotic Usage (12 Mo's: 7/1/17-6/30/18) $\geq 90\%$ patients (Antibiotic type, date, time recorded) $\geq 80\%$ patients (Antibiotic type, date, time recorded) $\geq 70\%$ patients (Antibiotic type, date, time recorded) $< 70\%$ patients (Antibiotic type, date, time recorded)			10 7 5 0	
#10	10	Head CT Scan performed in ED on patient taking anticoagulation medication with head injury (12 Mo's: 7/1/17-6/30/18) $\geq 90\%$ patients (Head CT scan in ED with date and time recorded) $\geq 80\%$ patients (Head CT scan in ED with date and time recorded) $\geq 70\%$ patients (Head CT scan in ED with date and time recorded) $< 70\%$ patients (Head CT scan in ED with date and time recorded)			10 7 5 0	
		Total Points			100	

Why do I have these **results**?



Feedback does
not always
correlate with
performance



Delve into the data

MTQIP Data

Mark Hemmila, MD



Metrics for MTQIP

- ◆ Hospital = CQI Scoring Index

- 10 Measures
- End result: Hospital P4P

- ◆ Surgeon = VBR

- 3 Measures (VTE Timing, VTE Type, PRBC to Plasma ratio)
- Scoring as a group practice
- End result: Surgeon VBR in 2019

- ◆ Collaborative = Reporting to BCBSM

- 11 Measures
- Targets or Maintain

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Measure	Weight	Measure Description		Points
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#3	10	Data Accuracy	Error Rate	
		5 Star Validation	0-4.0%	10
		4 Star Validation	4.1-5.0%	8
		3 Star Validation	5.1-6.0%	5
		2 Star Validation	6.1-7.0%	3
		1 Star Validation	>7.0%	0
#4	10	Venous Thromboembolism (VTE) Prophylaxis Initiated Within 48 Hours of Arrival in Trauma Service Admits with ≥ 2 Day Length of Stay (18 Mo's: 1/1/17-6/30/18) ≥ 55% ≥ 50% ≥ 40% < 40%		10 8 5 0
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#6	10	Red Blood Cell to Plasma Ratio (Weighted Mean Points) of Patients Transfused ≥5 Units in 1st 4 Hours (18 Mo's: 1/1/17-6/30/18) 10 pts: Tier 1: ≤ 1.5 10 pts: Tier 2: 1.6-2.0 5 pts: Tier 3: 2.1-2.5 0 pts: Tier 4: >2.5		0-10
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Total (Max Points) =				100

2018 CQI Scoring Index Data



#4 VTE Prophylaxis Initiated \leq 48 hrs

- ◆ Venous Thromboembolism (VTE) Prophylaxis Initiated Within 48 Hours of Arrival in Trauma Service Admits with \geq 2 Day Length of Stay (18 Mo's: 1/1/17-6/30/18)

#4 VTE Prophylaxis Initiated \leq 48 hrs

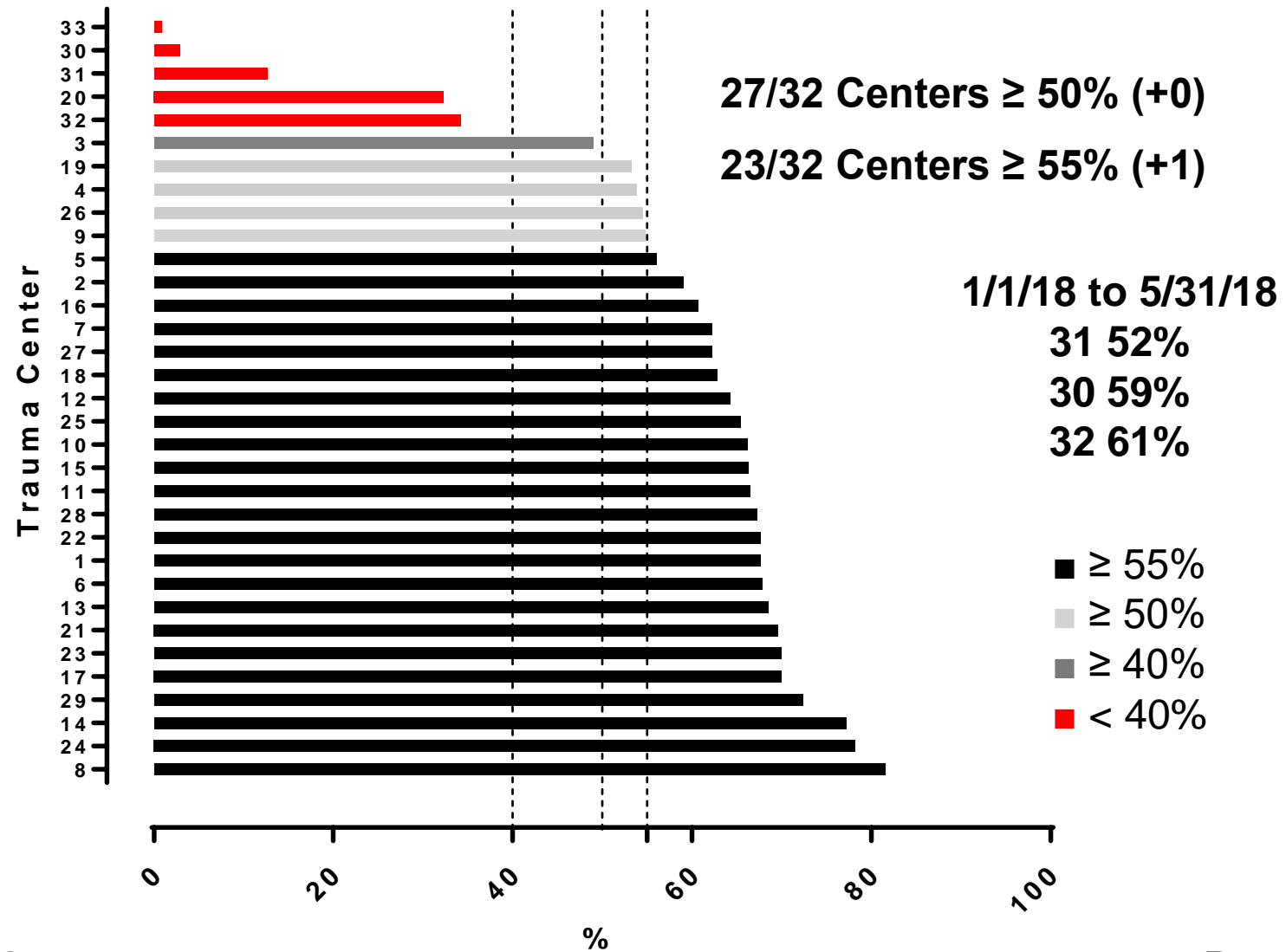
- ◆ Website

- Practices > VTE Prophylaxis Metric
- Cohort = Cohort 2 (admit to Trauma)
- No Signs of Life = Exclude DOAs
- Transfers Out = Exclude Transfers Out
- Default Period = Set for CQI Index time period

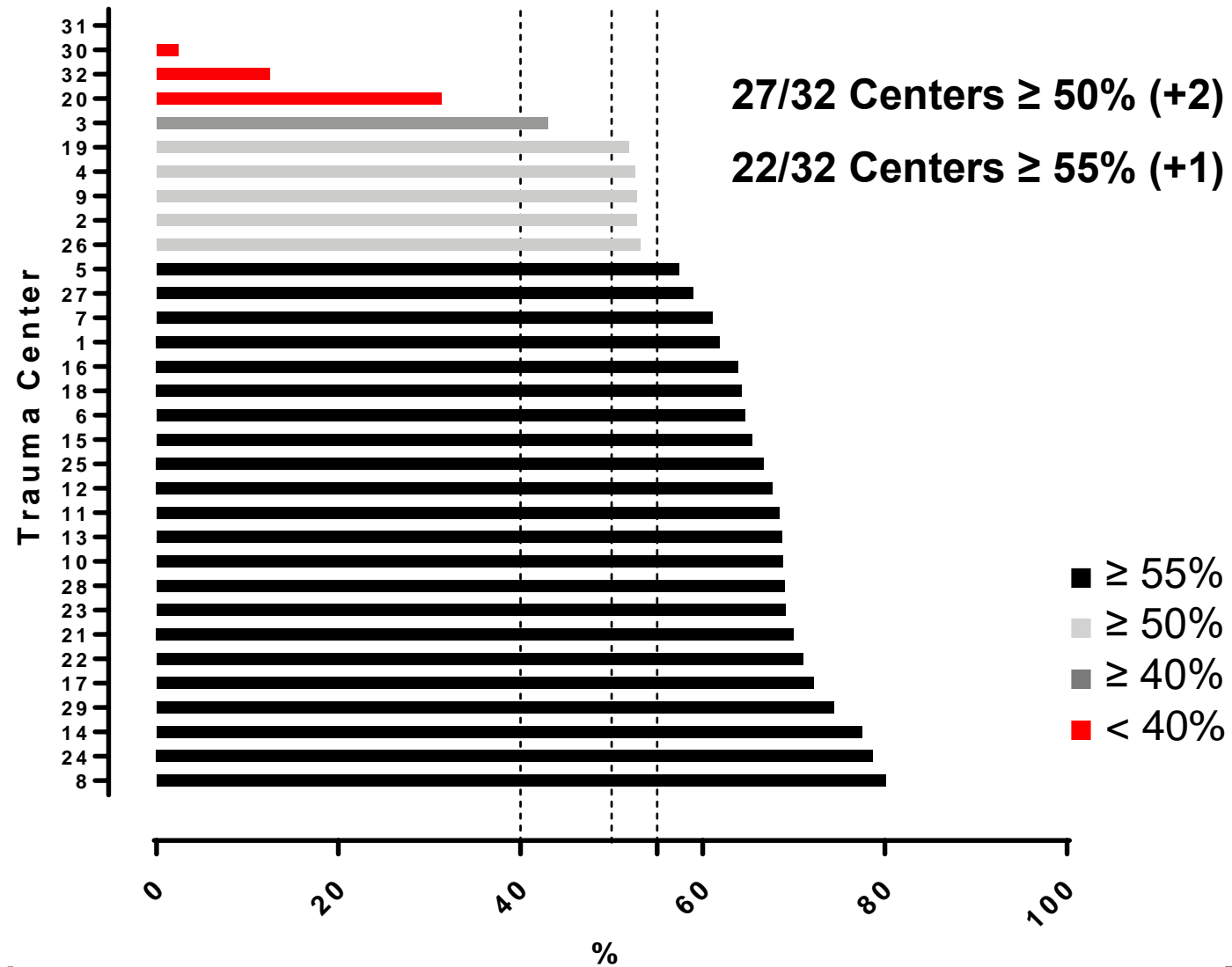
- ◆ Heparin, LMWH \leq 48 Hours

- Hospital - Unadj %

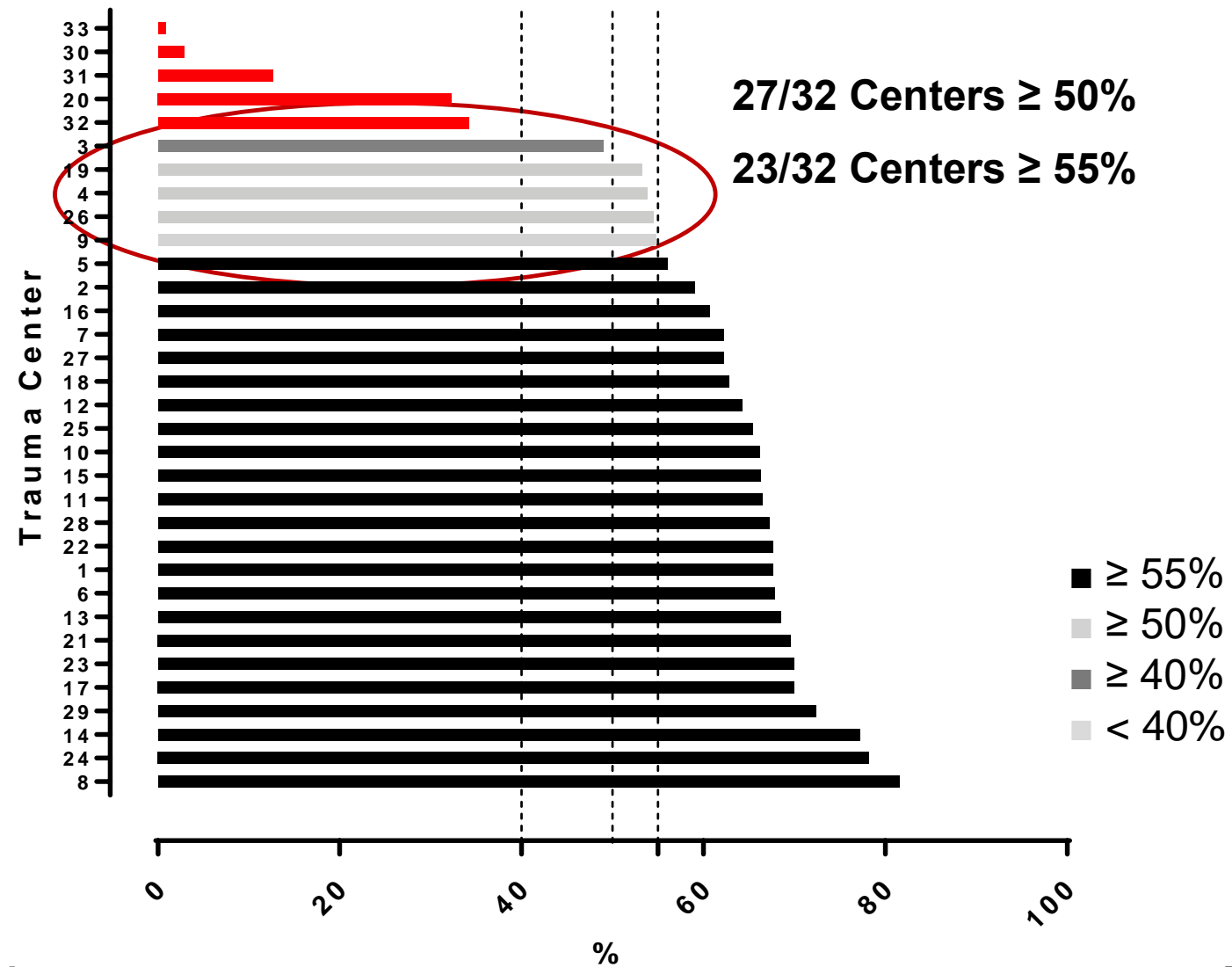
VTE Prophylaxis Timing ≤ 48 hrs
1/1/17 - 5/31/18



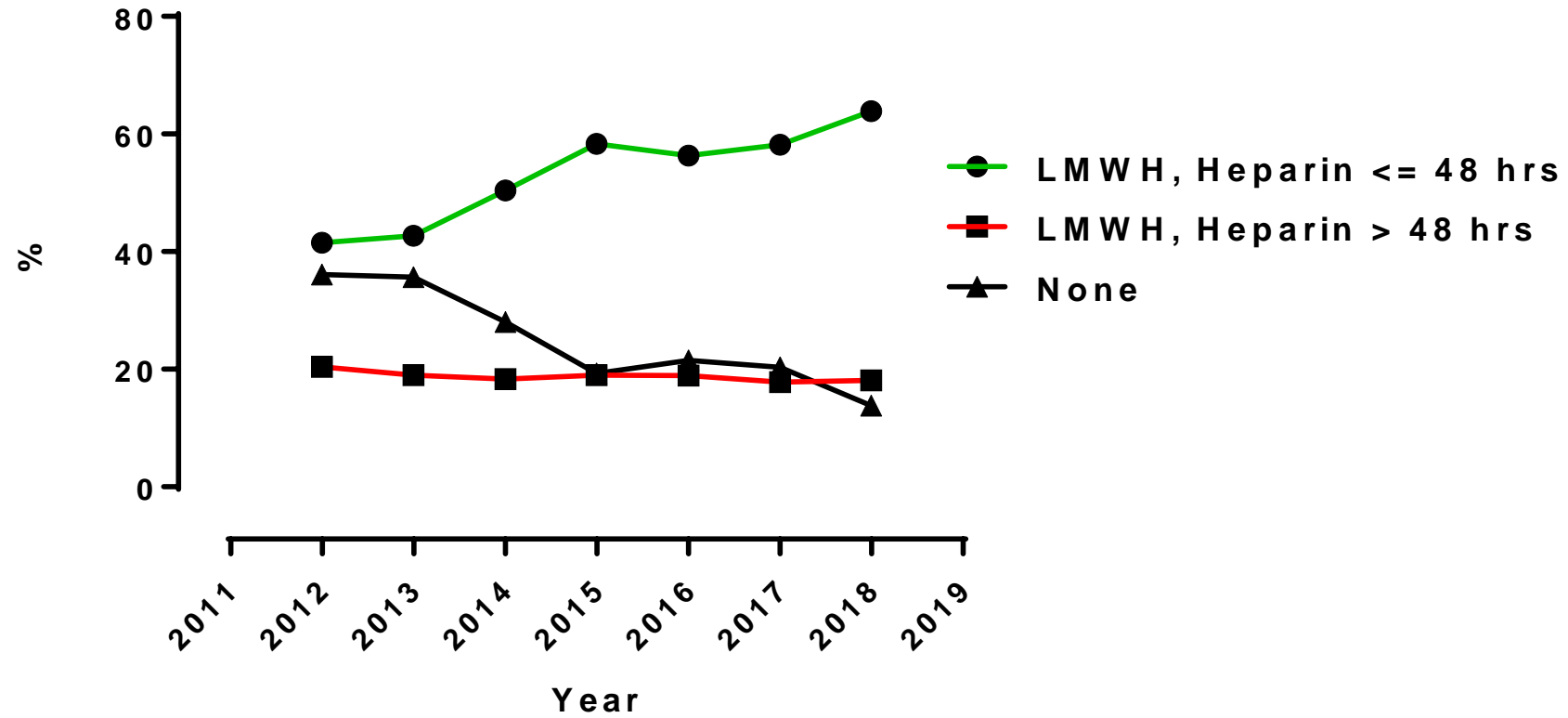
VTE Prophylaxis Timing ≤ 48 hrs 1/1/17 - 1/31/18



VTE Prophylaxis Timing ≤ 48 hrs 1/1/17 - 5/31/18

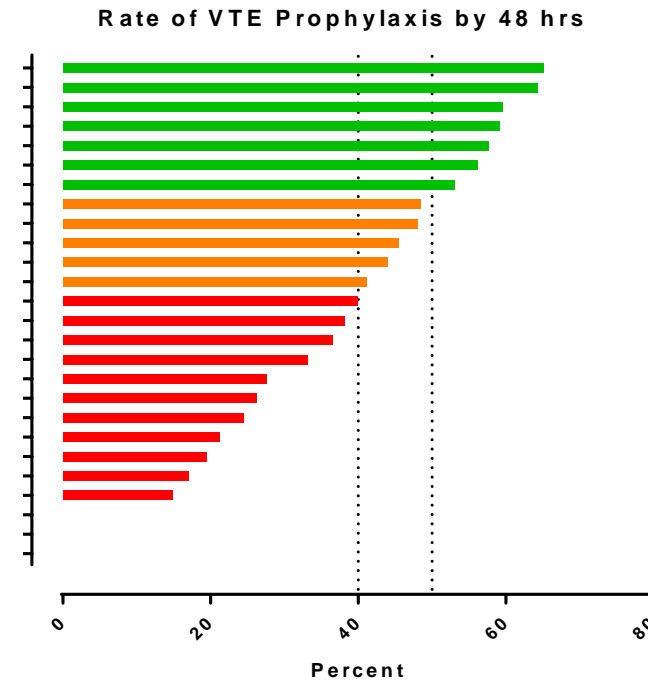


Timely VTE Prophylaxis



#4 VTE Prophylaxis Initiated \leq 48 hrs

- ◆ Hospital Target \geq 55% = 10 points
- ◆ CQI Target 75% of hospitals \geq 55%
 - 24/32 hospitals
 - Current is 23 hospitals
 - May 2014: 7 > 50%



#5 VTE Prophylaxis with LMWH

- ◆ Low Molecular Weight Heparin (LMWH)
Venous Thromboembolism (VTE) Prophylaxis
Use in Trauma Service Admits (18 Mo's:
1/1/17-6/30/18)

#5 VTE Prophylaxis with LMWH

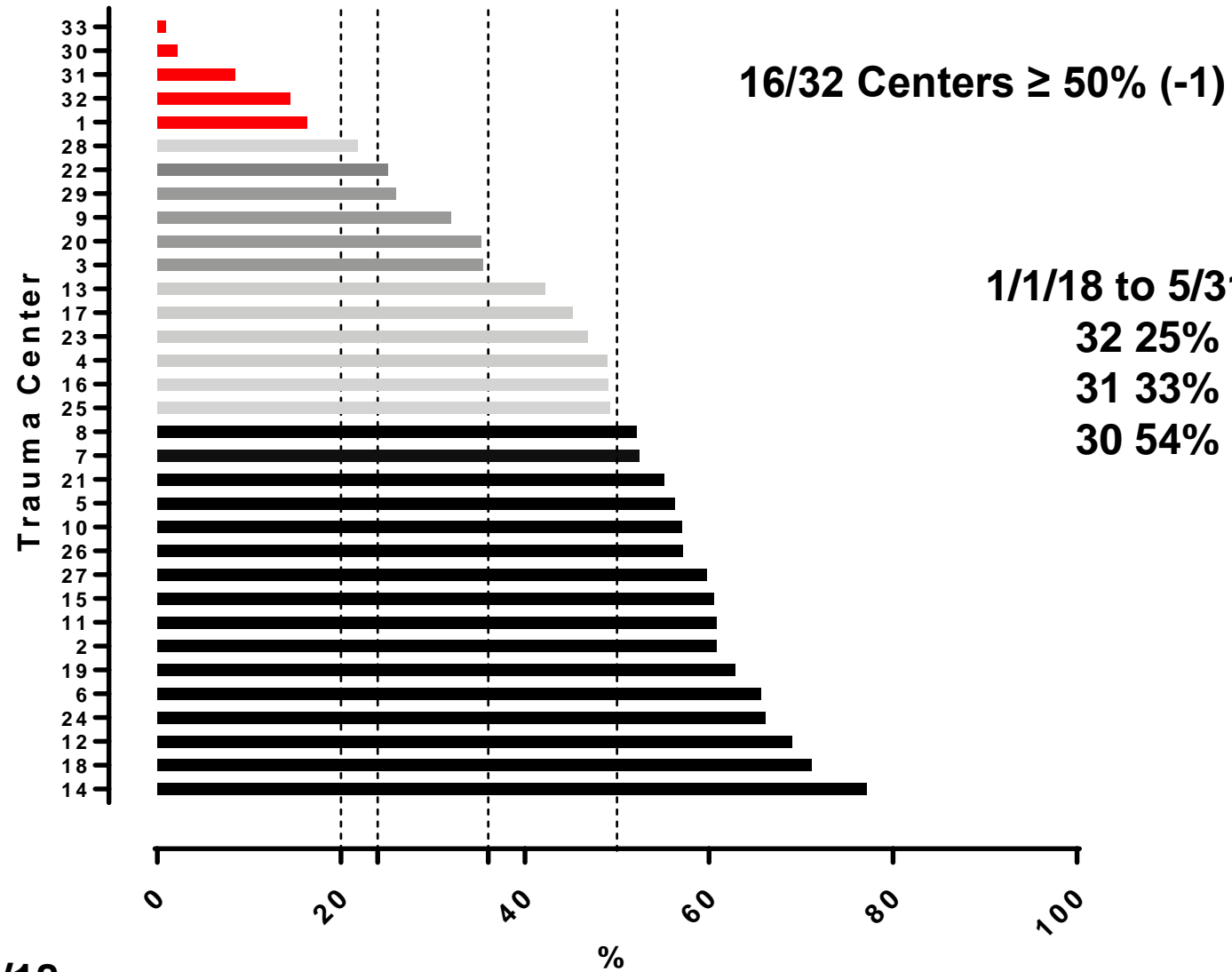
◆ Website

- Practices > VTE Prophylaxis Type
- Cohort = Cohort 2 (admit to Trauma)
- No Signs of Life = Exclude DOAs
- Transfers Out = Exclude Transfers Out
- Default Period = Set for CQI Index time period

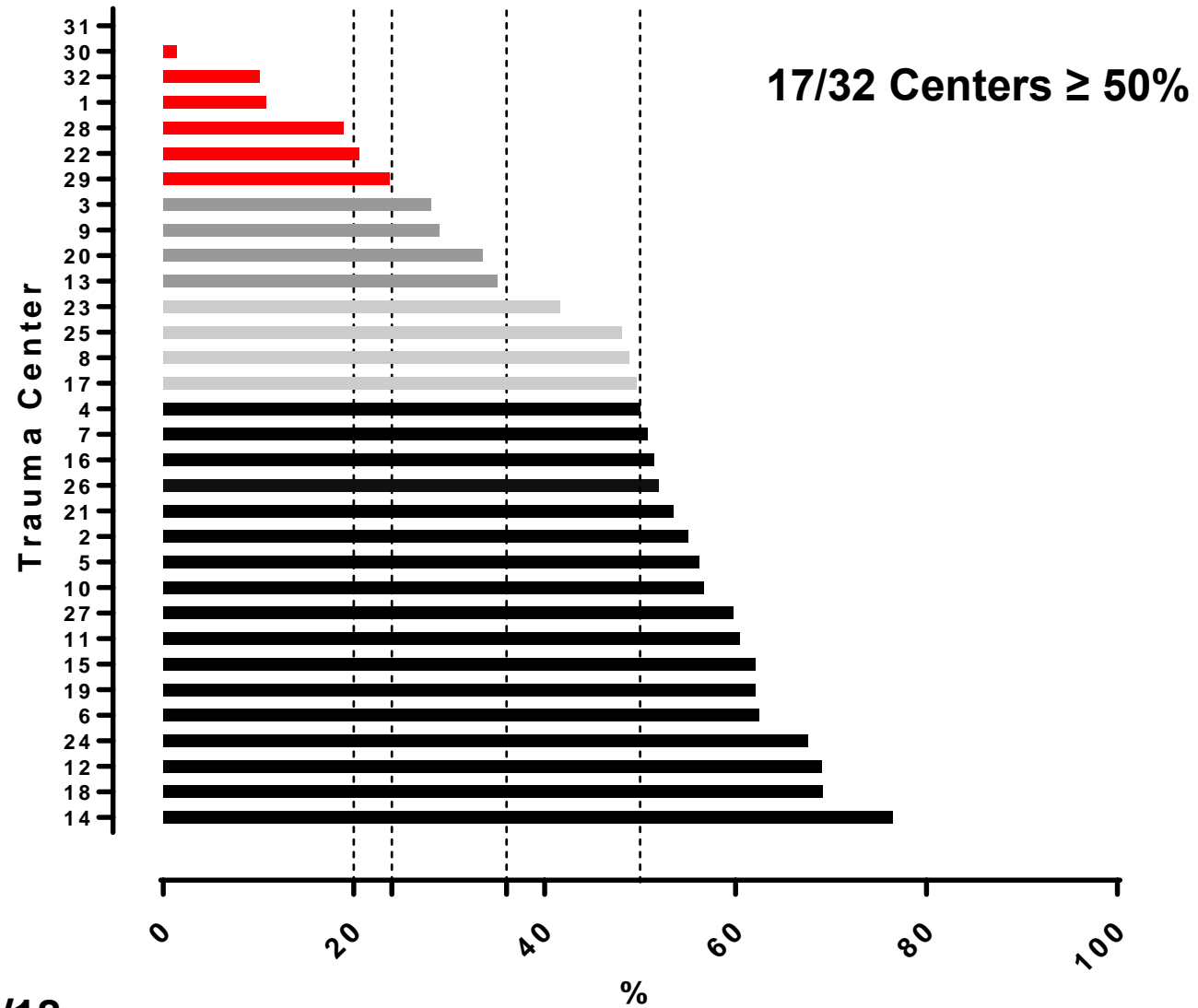
◆ LMWH (Type)

- Hospital - Unadj %

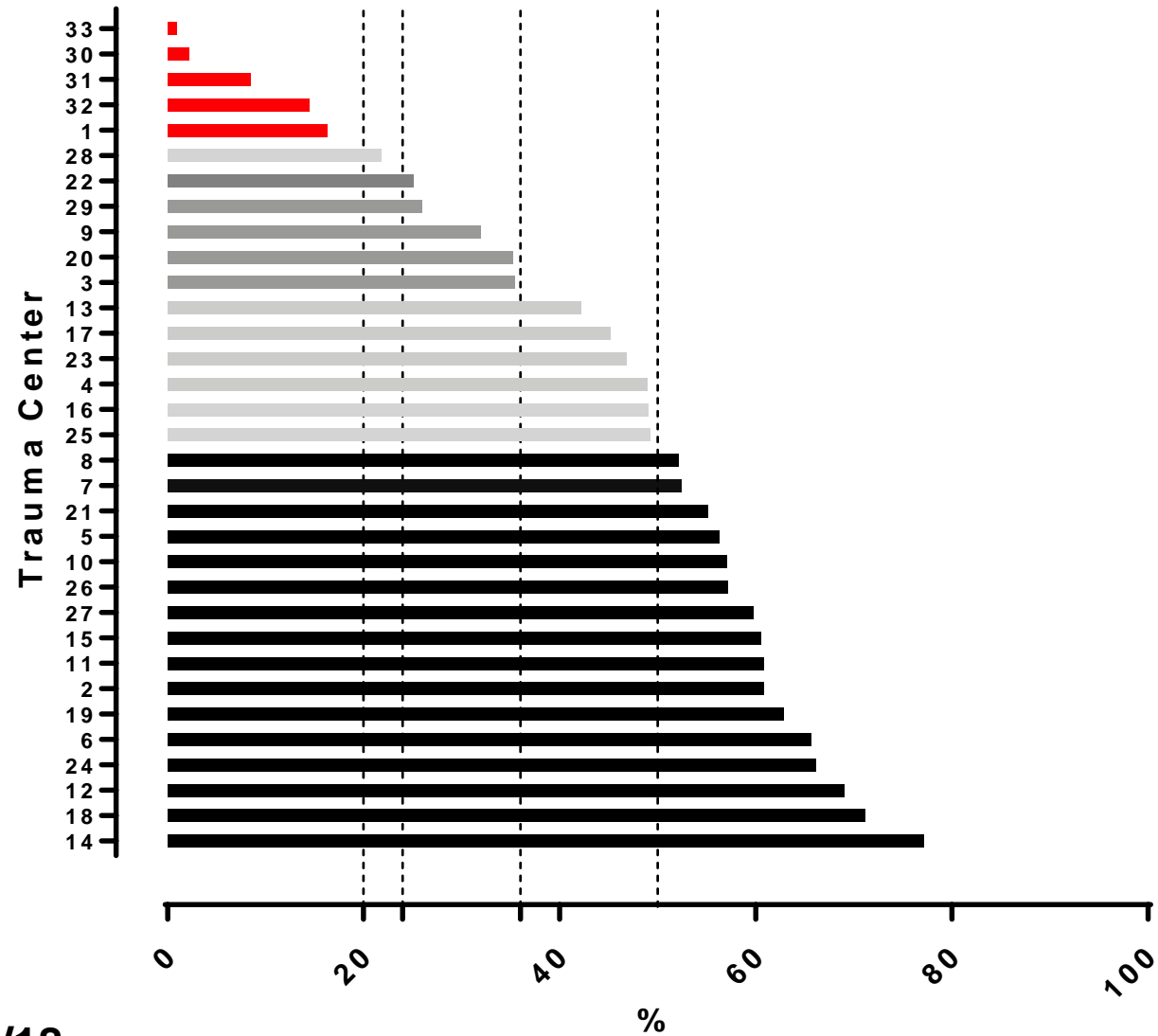
VTE Prophylaxis Type - LMWH 1/1/17 - 5/31/18



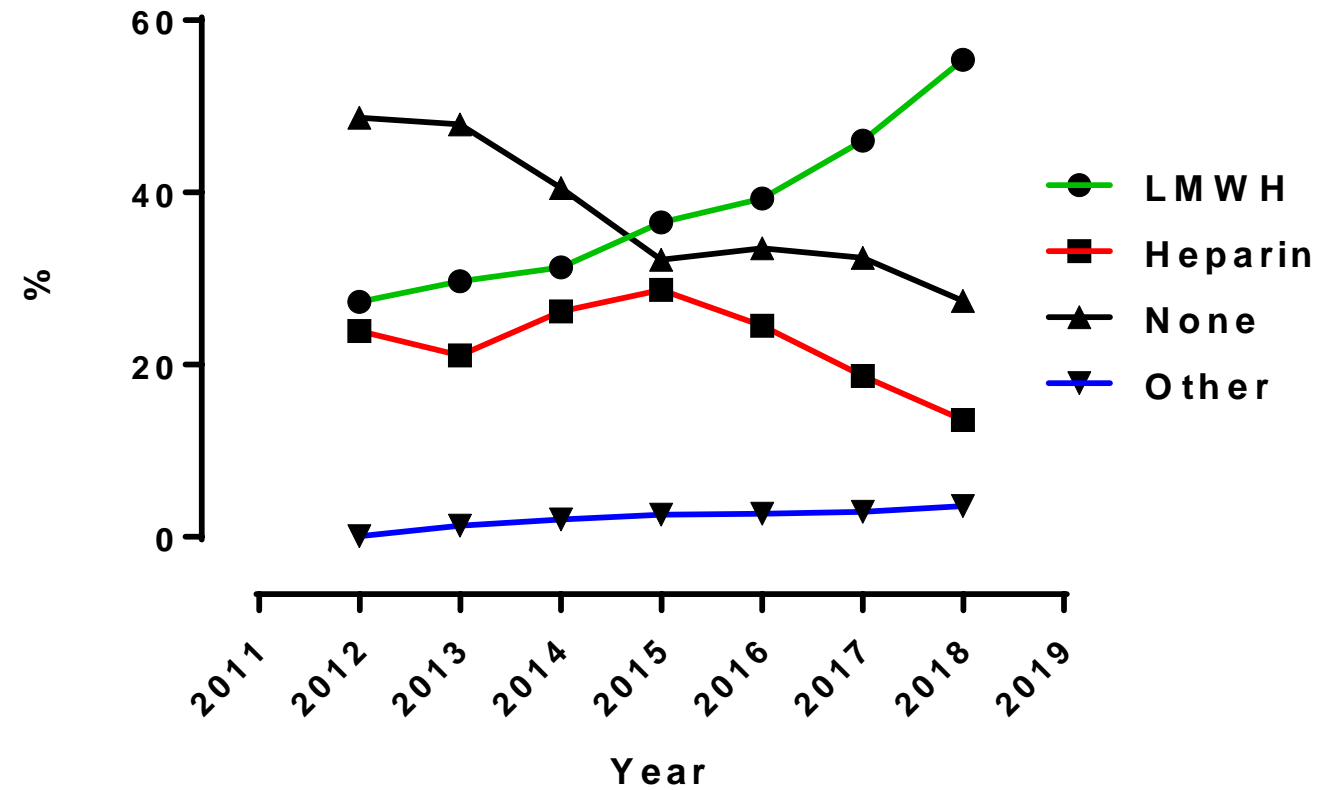
VTE Prophylaxis Type - LMWH
1/1/17 - 1/31/18



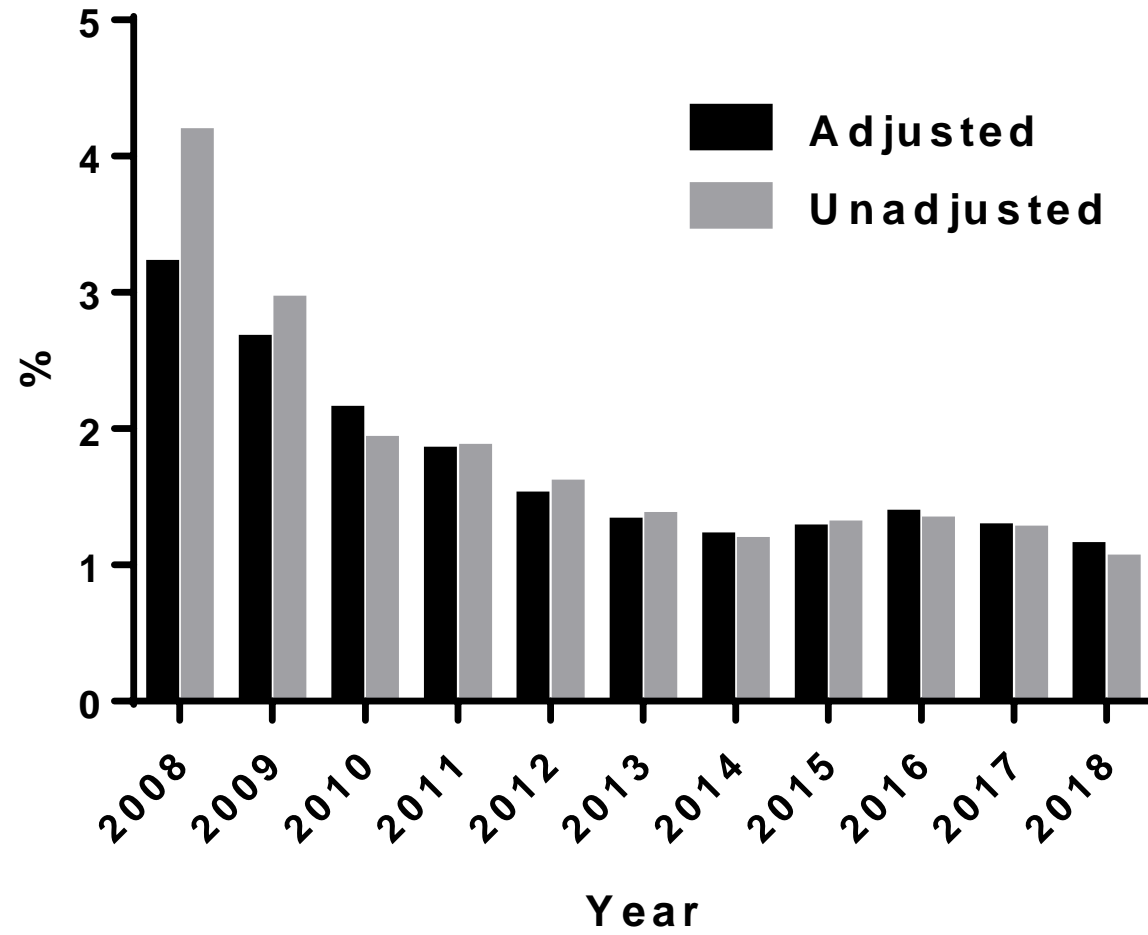
VTE Prophylaxis Type - LMWH 1/1/17 - 5/31/18



Type VTE Prophylaxis



VTE Event



#7 Serious Complications

- ◆ Serious Complication Rate-Trauma Service Admits (3 years: 7/1/15-6/30/18)

Z-score

- ◆ Measure of trend in outcome over time
- ◆ Hospital specific
 - Compared to yourself
- ◆ Standard deviation
- ◆ > 1 getting worse
- ◆ 1 to -1 flat
- ◆ < -1 getting better

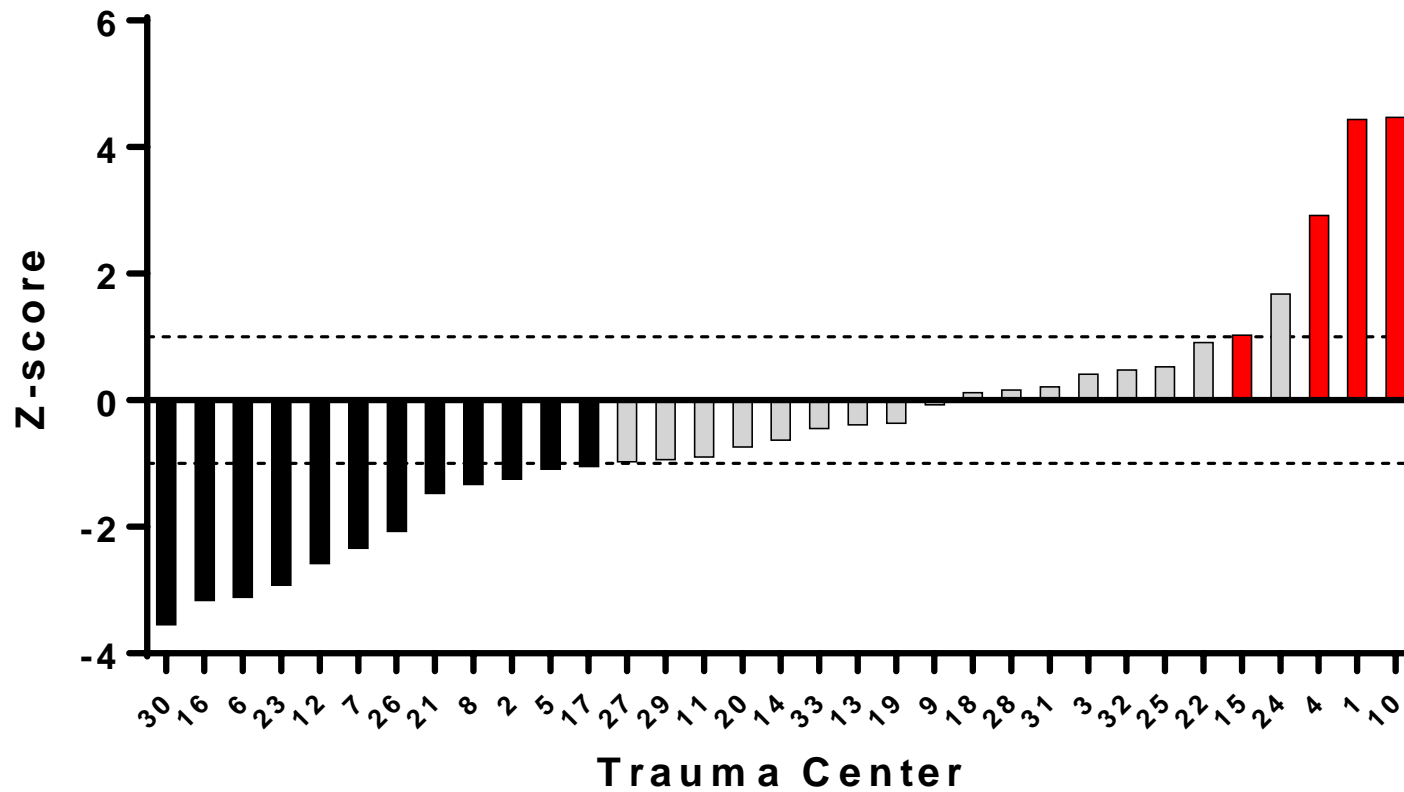
Z-score

- ◆ Time: 7/1/2015 to 1/31/18
- ◆ Cohort 2
- ◆ Exclude if no signs of life
- ◆ Exclude transfers out

#7 Serious Complication Rate (Z-score)

Z-score - Serious Complication Rate

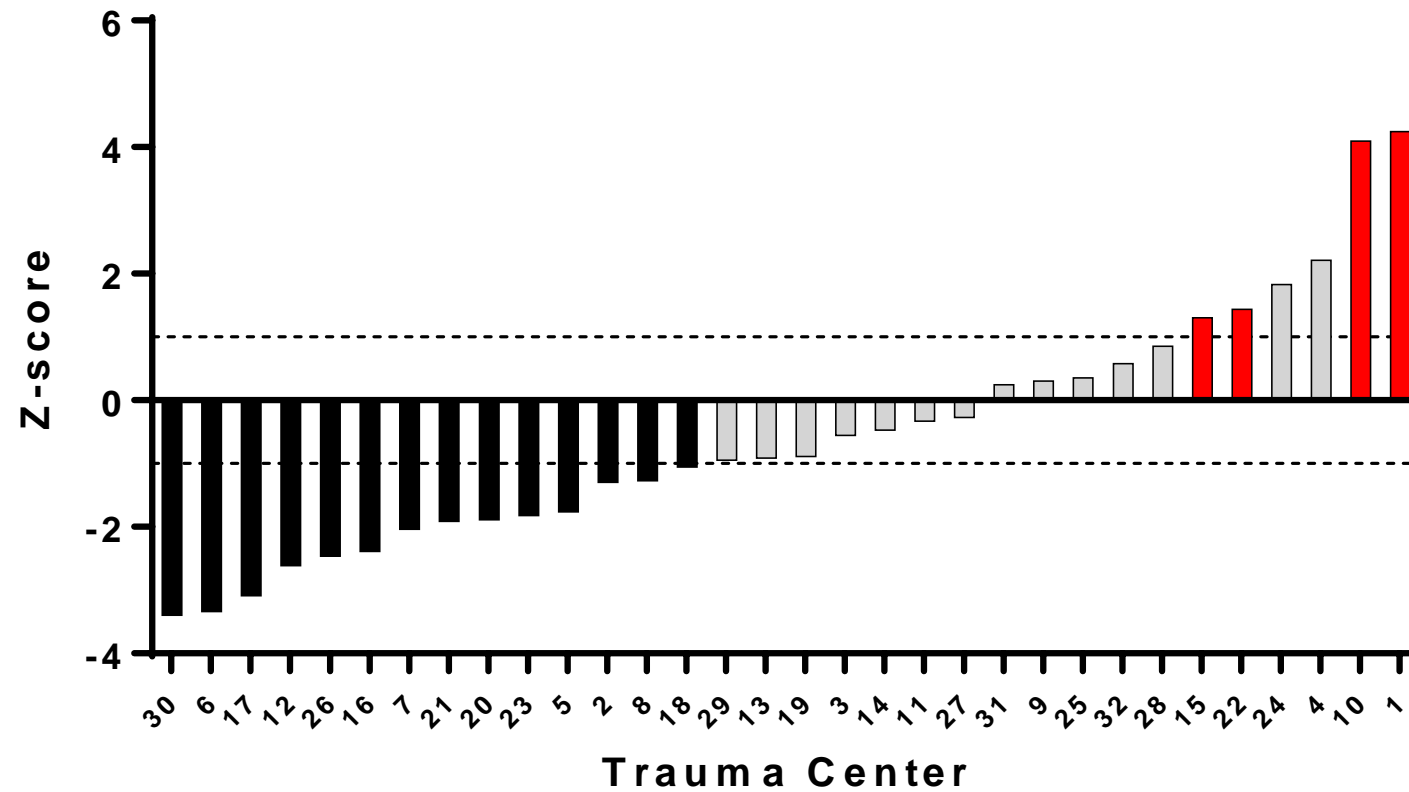
7/1/15 - 5/31/18



#7 Serious Complication Rate (Z-score)

Z-score - Serious Complication Rate

7/1/15 - 1/31/18



#9 Open Fracture Antibiotic Usage

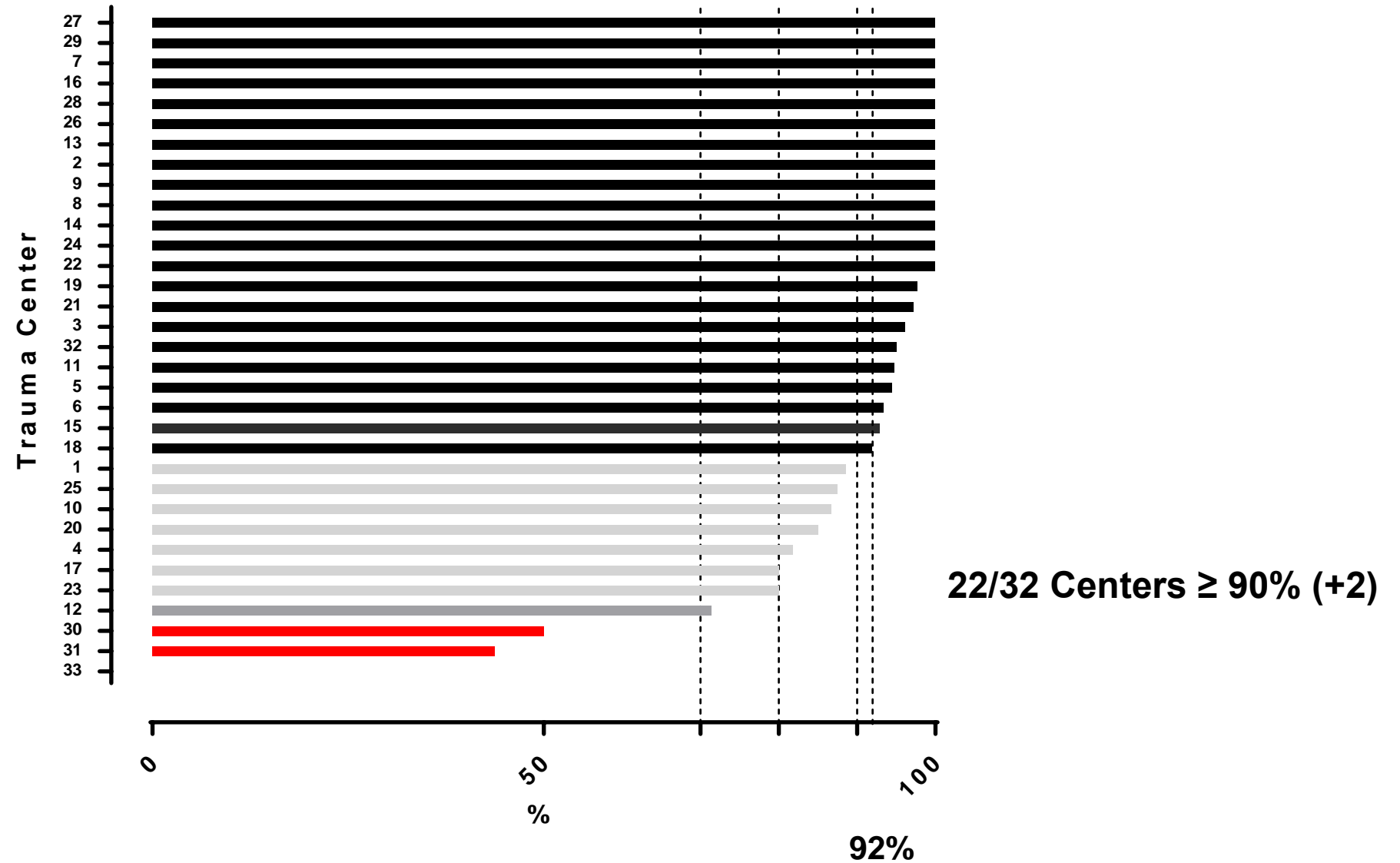
- ◆ Type of antibiotic administered along with date and time for open fracture of femur or tibia
- ◆ Presence of acute open femur or tibia fracture based on AIS or ICD10 codes (See list)
- ◆ Cohort = Cohort 1 (All)
- ◆ Exclude direct admissions and transfer in
- ◆ No Signs of Life = Exclude DOAs
- ◆ Transfers Out = Include Transfers Out
- ◆ Time Period = 7/1/17 to 6/30/18

#9 Open Fracture Antibiotic Usage

- ◆ Measure = % of patients with antibiotic type, date, time recorded
- ◆ ACS-COT Orange Book – VRC resources
 - Administration within 60 minutes
 - ◆ ACS OTA Ortho Update
 - ◆ ACS TQIP Best Practices Orthopedics

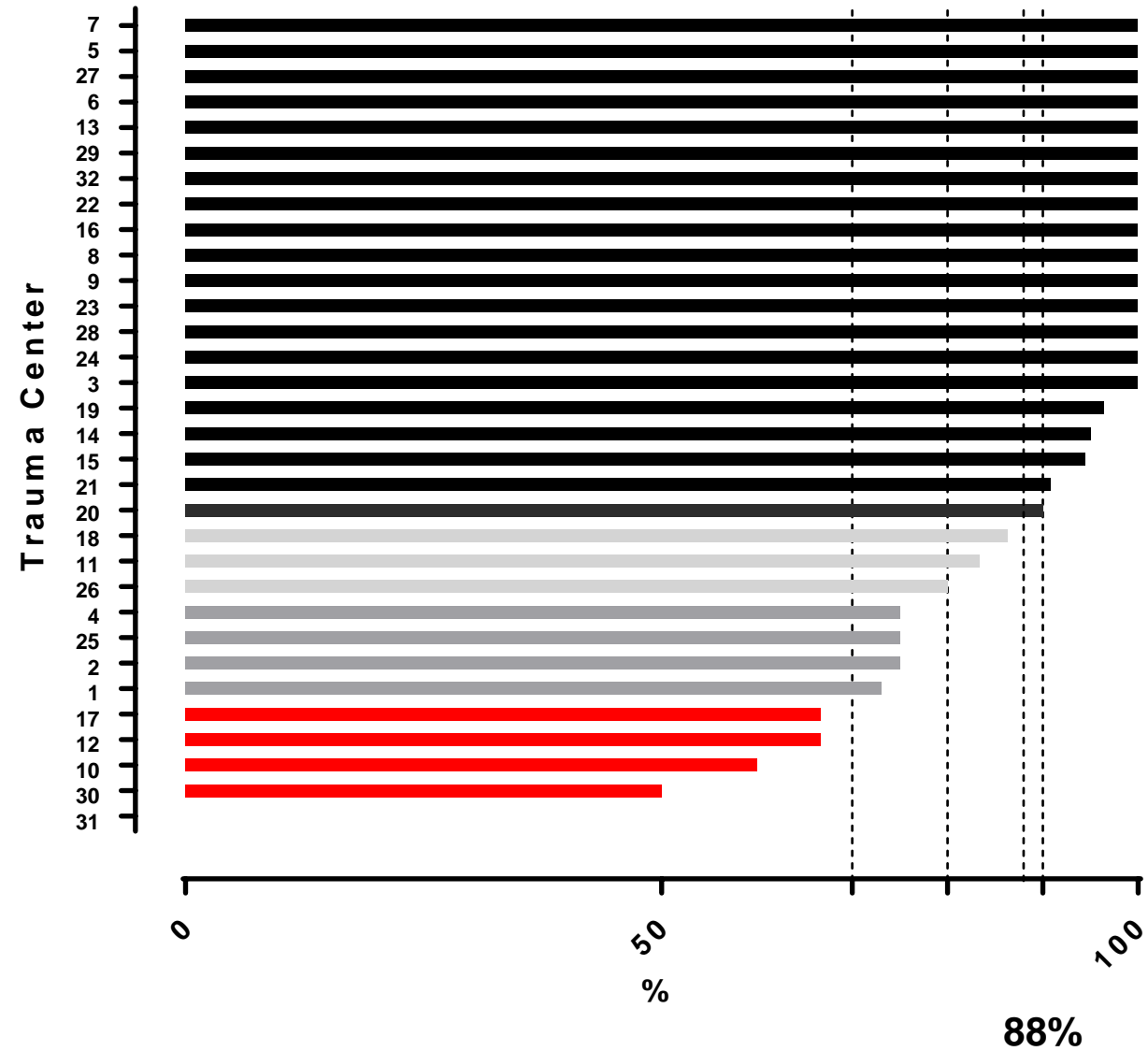
Open Fracture - Abx Type and Date/Time

7/1/17 - 5/31/18

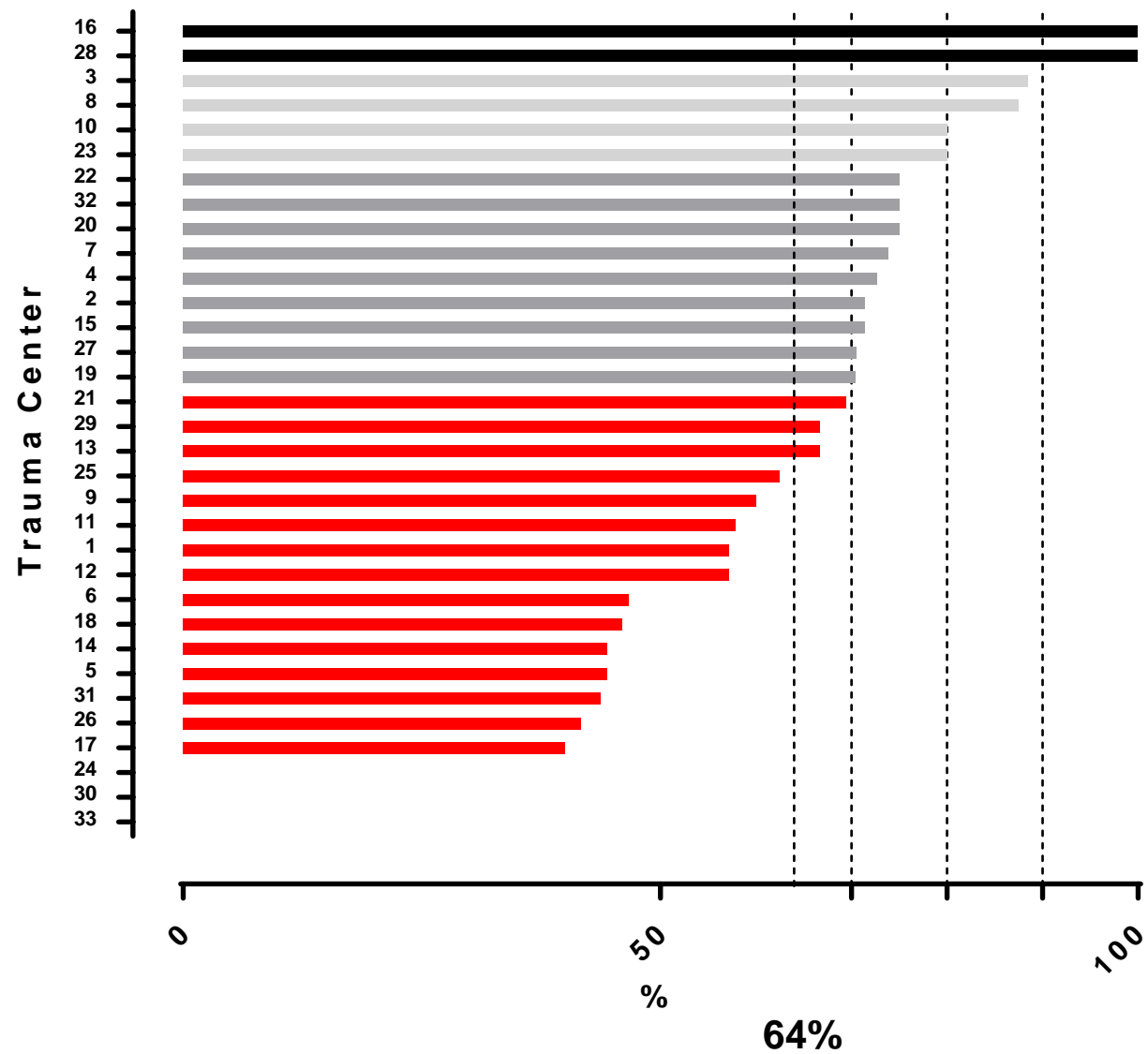


Open Fracture - Abx Type and Date/Time

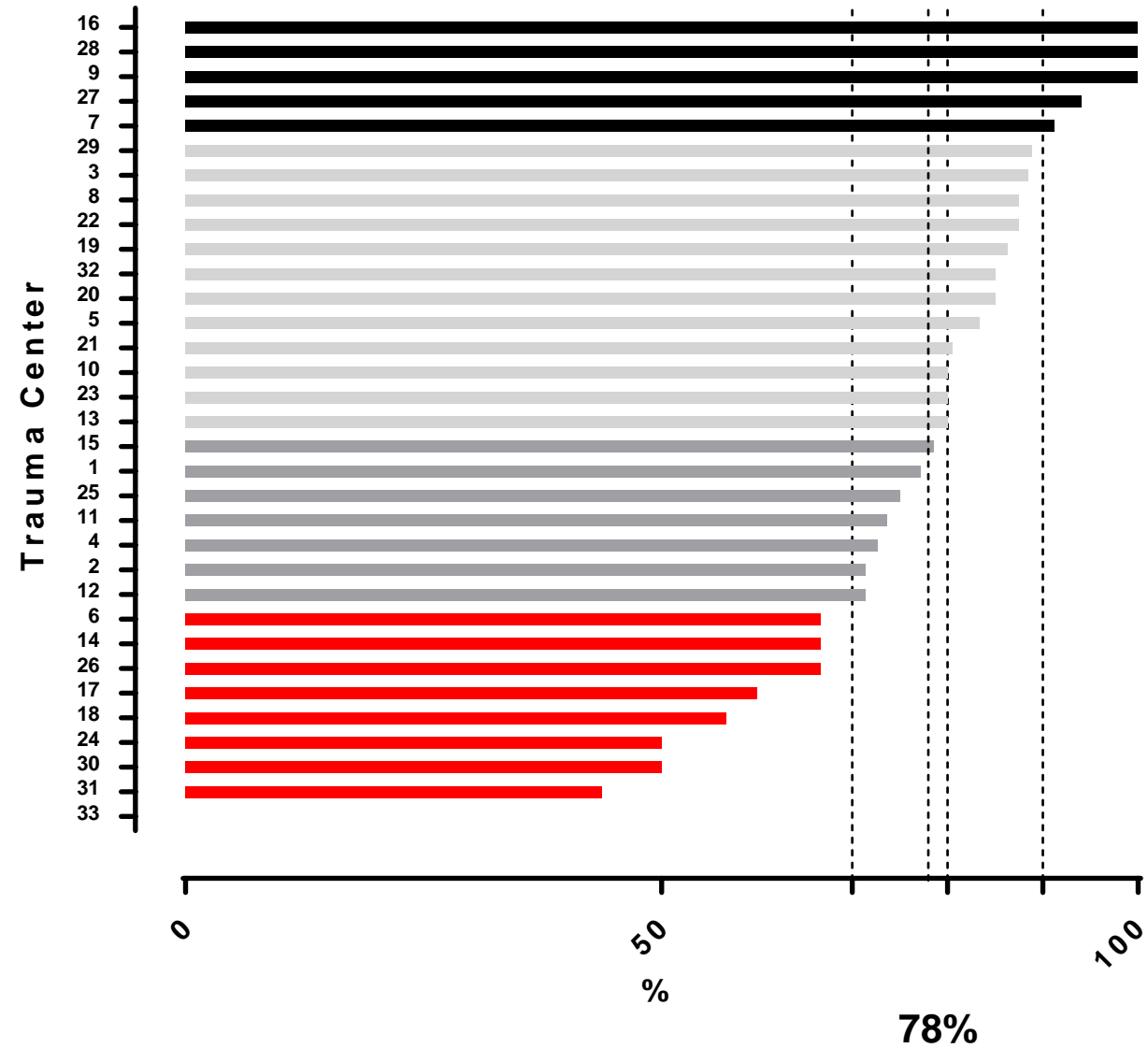
7/1/17 - 1/31/18



Open Fracture - Time to Abx \leq 60 min 7/1/17 - 5/31/18



Open Fracture -Time to Abx \leq 120 min
7/1/17 - 5/31/18



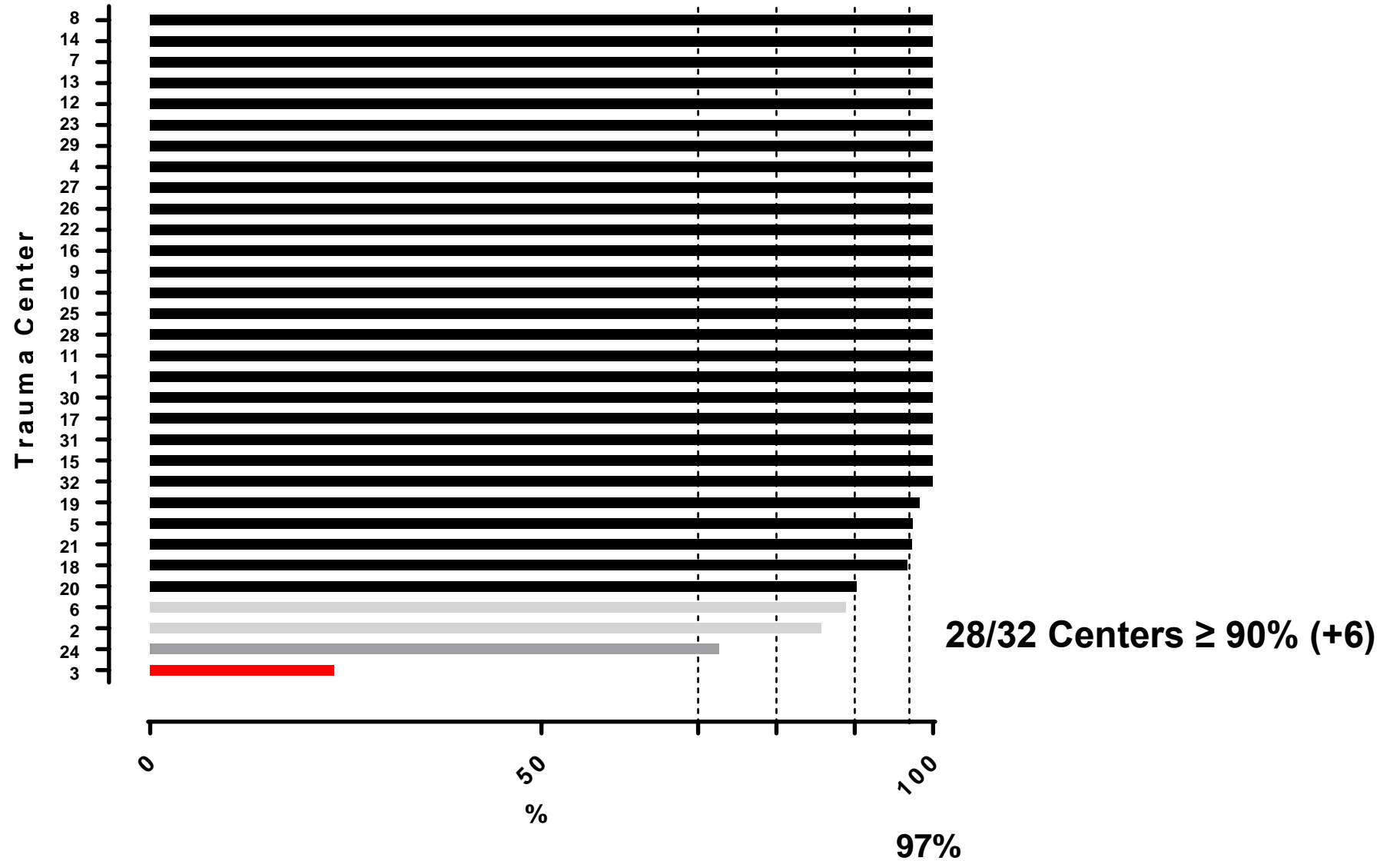
#10 Head CT Scan in ED on patient taking anticoagulation medication with TBI

- ◆ Head CT date and time from procedures
- ◆ Presence of prehospital anticoagulation or anti-platelet use
- ◆ TBI (AIS Head, excluding NFS, scalp, neck, hypoxia)
- ◆ Cohort1, Blunt mechanism
- ◆ Exclude direct admissions and transfer in
- ◆ No Signs of Life = Exclude DOAs
- ◆ Transfers Out = Include Transfers Out
- ◆ Time Period = 7/1/17 to 6/30/18

#10 Head CT

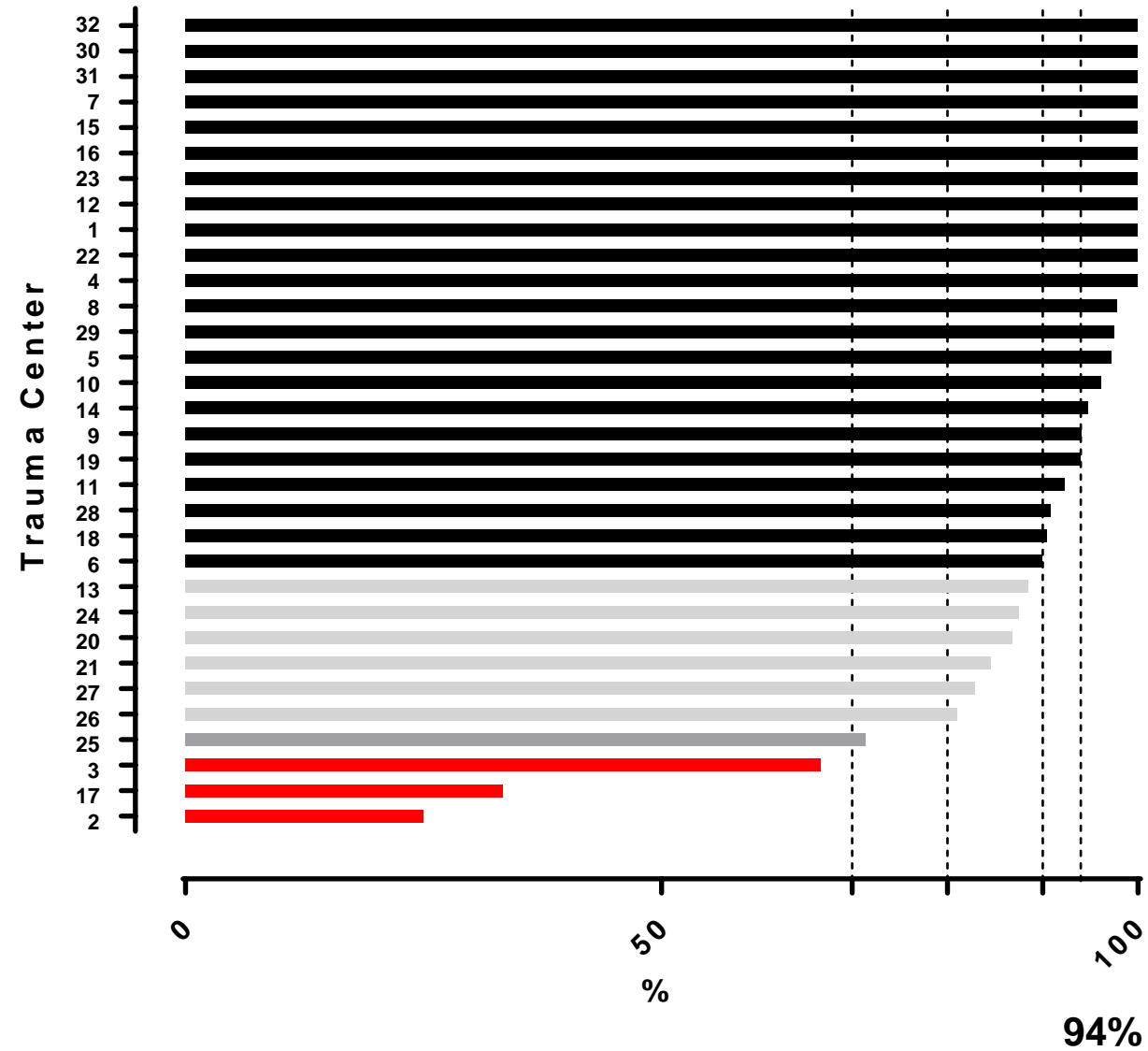
- ◆ Measure = % of patients with Head CT, date, and time
- ◆ Timing
- ◆ Treatment
 - 2018 Data

Head Injury and Anticoagulation - Head CT Date/Time 7/1/17 - 5/31/18

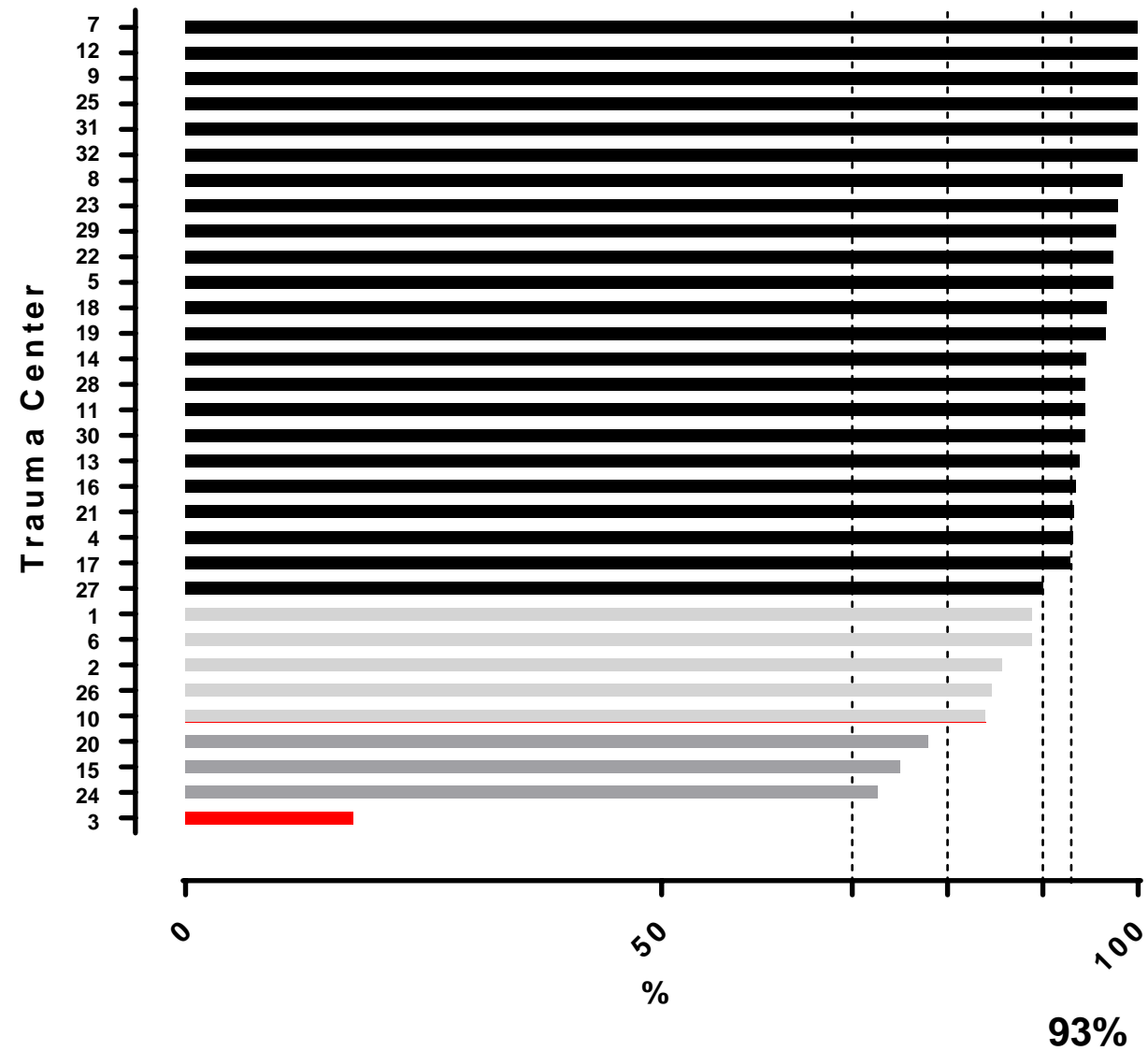


Head Injury and Anticoagulation - Head CT Date/Time

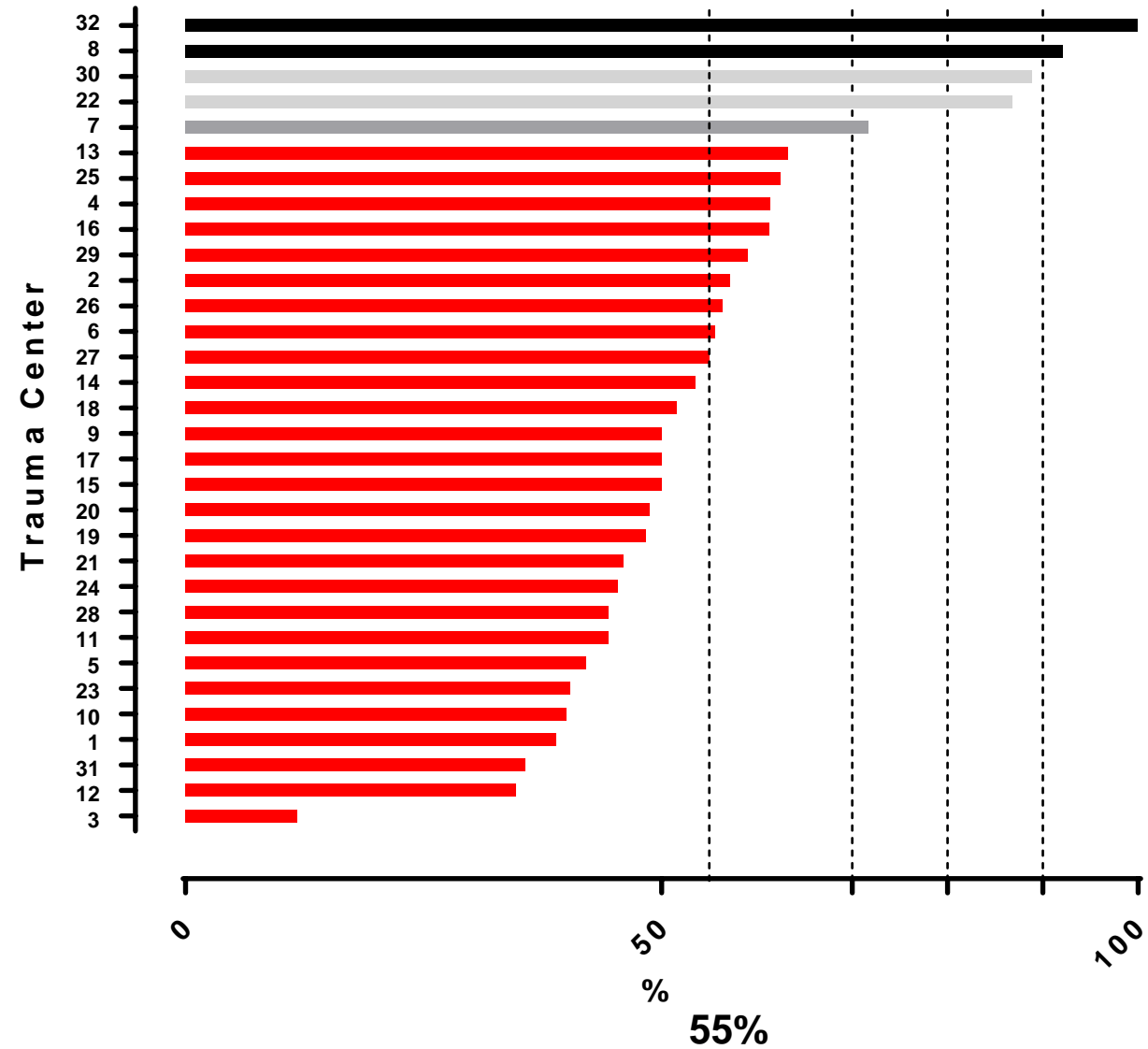
7/1/17 - 1/31/18



Head Injury and Anticoagulation - Head CT < 4 hrs 7/1/17 - 5/31/18



Head Injury and Anticoagulation - Head CT < 1 hrs 7/1/17 - 5/31/18



2019 CQI Scoring Index

		Z-score: > 1 (rates of mortality increased)	5	
#9	10	Open Fracture-Antibiotic Timeliness from ED Arrival (12 mo: 7/1/18-6/30/19)		
		≥ 90% patients (Antibiotic type, date, time recorded, and administered ≤ 120 min)	10	
		≥ 80% patients (Antibiotic type, date, time recorded, and administered ≤ 120 min)	7	
		≥ 70% patients (Antibiotic type, date, time recorded, and administered ≤ 120 min)	5	
		< 70% patients (Antibiotic type, date, time recorded, and administered ≤ 120 min)	0	
#10	10	ED Head CT Scan Performed in Traumatic Brain Injury (TBI) Patients On Anticoagulation		

- ◆ Think about changes for 2020
- ◆ Change targets
- ◆ Change criteria (Head CT/Anticoagulation)
- ◆ New measures

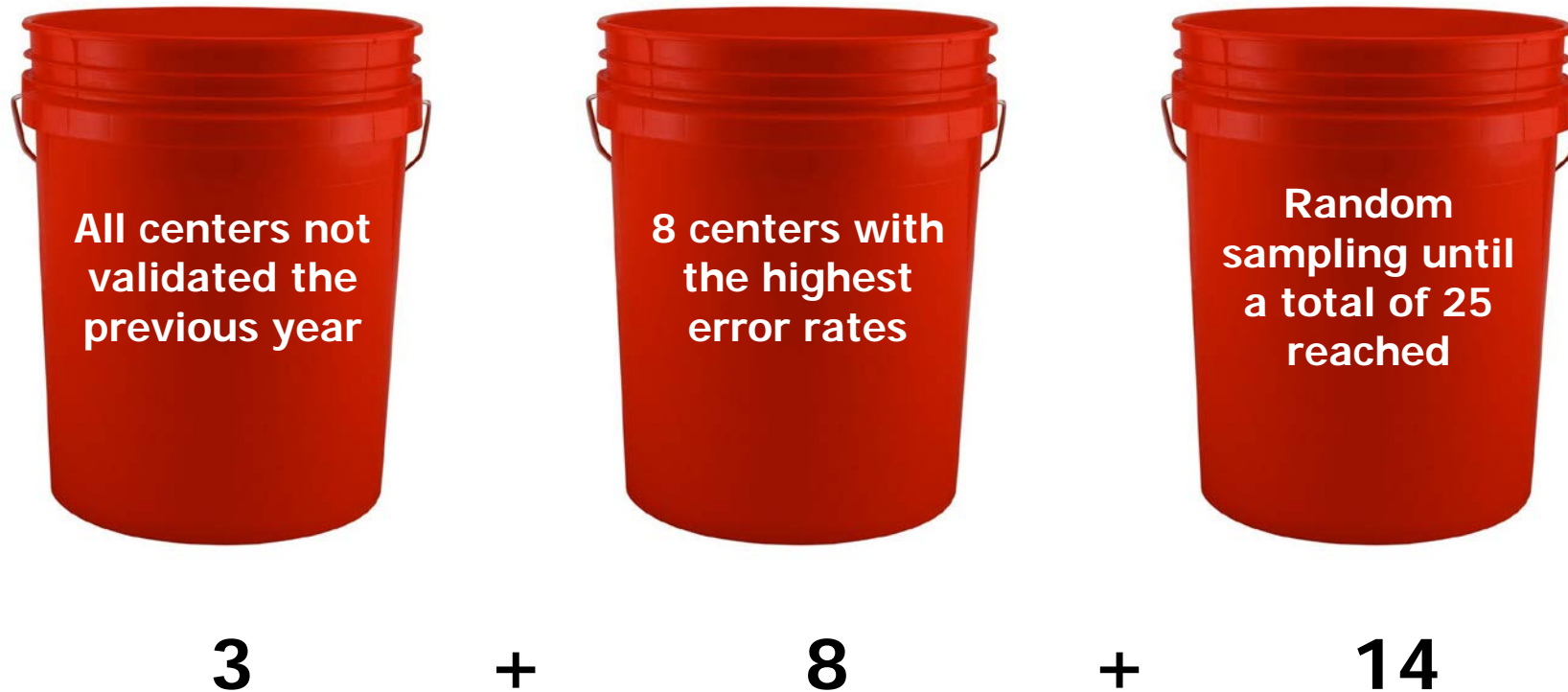
2019 Data Validation Changes



Announcements – Validation Scheduling



Announcements – Validation Scheduling



Announcements – Validation Scheduling

- Center selection/notification in Dec
- Implementation Jan 2019
- New protocol will be posted on site
- Centers not chosen will receive full points

Pelvic Fracture Treatment

Bryant Oliphant, MD MBA MSc



ACS-COT Verification Level Affects Trauma Center Management of Pelvic Ring Injuries and Patient Mortality

Bryant W. Oliphant, MD, MBA, MSc

 @BonezNQuality

Co-authors/Disclosures

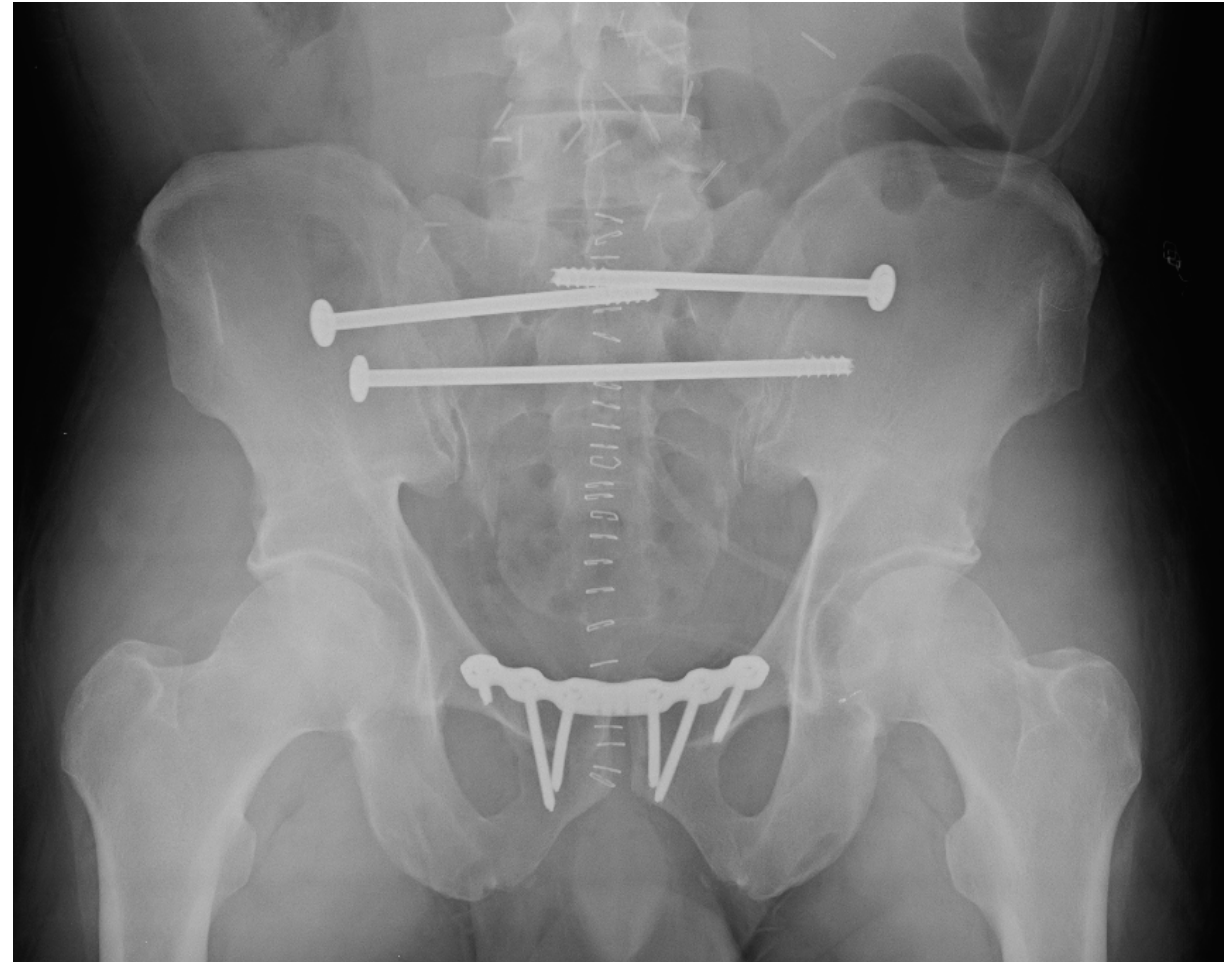
- Bryant W. Oliphant, MD, MBA, MSc – None
- Christopher J. Tignanelli, MD – None
- Lena M. Napolitano, MD – None
- James A. Goulet, MD – None
- Mark R. Hemmila, MD – Grant support for MTQIP from Blue Cross Blue Shield of Michigan, a non-profit mutual company.

Pelvic Ring Injuries

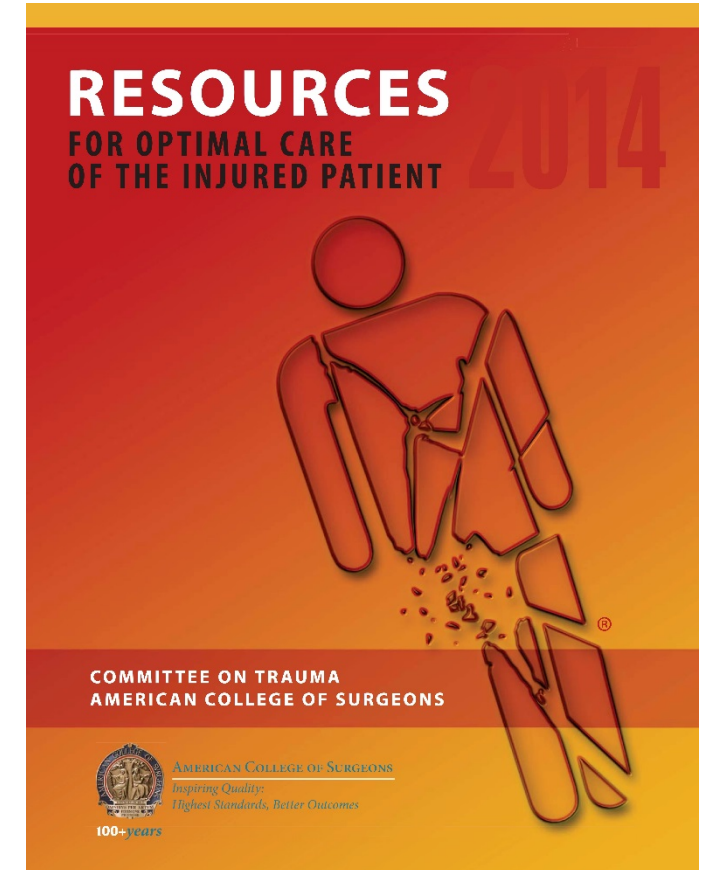
Significant morbidity/mortality

Complex injury

- Systems approach
- Multidisciplinary team
- Specific resources



“The standards for the provision of clinical care to injured patients for Level I and Level II trauma centers are identical.”

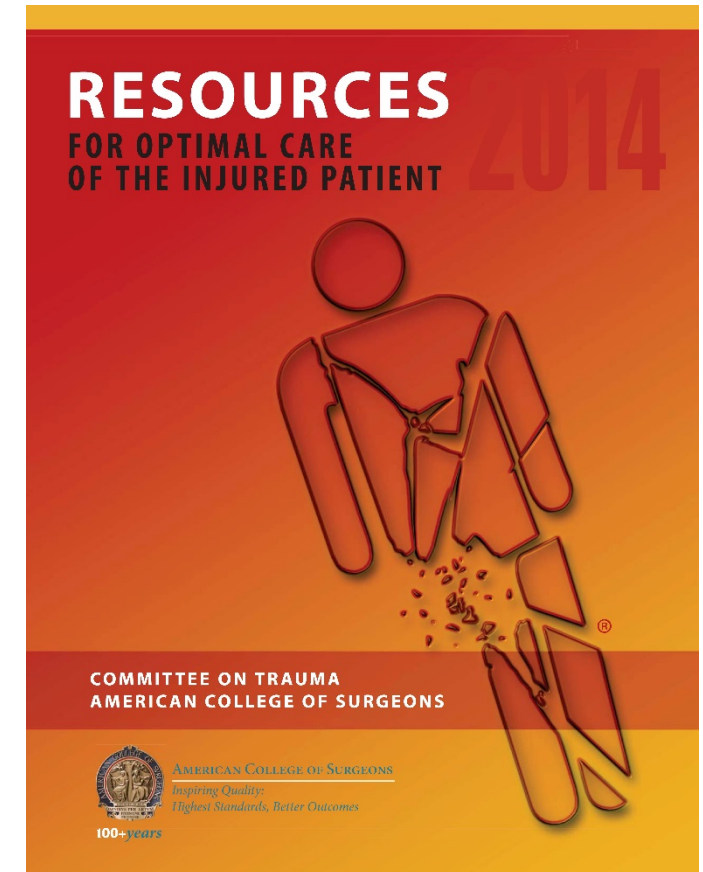


Level I

“the orthopaedic care ***must be*** overseen by an individual who has ***completed a fellowship in orthopaedic traumatology***”

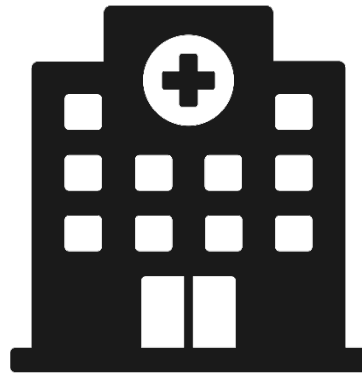
Level II

“the care of musculoskeletal trauma patients ***should be*** overseen by an orthopaedic surgeon who is ***highly experienced and devoted*** to the orthopaedic care of injured patients”



Variability in management of blunt liver trauma and contribution of level of American College of Surgeons Committee on Trauma verification status on mortality

Christopher J. Tignanelli, MD, Bellal Joseph, MD, Jill L. Jakubus, MS, Gaby A. Iskander, MD, Lena M. Napolitano, MD, and Mark R. Hemmila, MD, Minneapolis, Minnesota



Level 2

- Higher mortality
- Lower use of angiography
- Less ICU admissions

Are there differences in treatments and outcomes between level 1 and level 2 trauma centers in patients with pelvic ring injuries?



Vs.



Level 1



Level 2

Michigan Trauma Quality Improvement Program

- 29 Level 1 and 2 Trauma Centers in Michigan
- Voluntary participation
- Supported by BCBS of Michigan
- Trauma registry – National Trauma Data Standard (NTDS)
- Data validation
- Regular meetings
- Feedback reports
- Quality improvement projects



Methods

Age \geq 16 years

Injury severity score (ISS) \geq 5

January 1, 2011 and August 31, 2017

Excluded

- No signs of life at initial evaluation

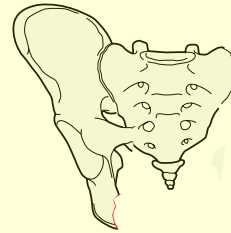
Pelvic ring injuries – Abbreviated Injury Scale 2005 codes (AIS2005)

- Not ICD9/10

Stable



Partially Stable

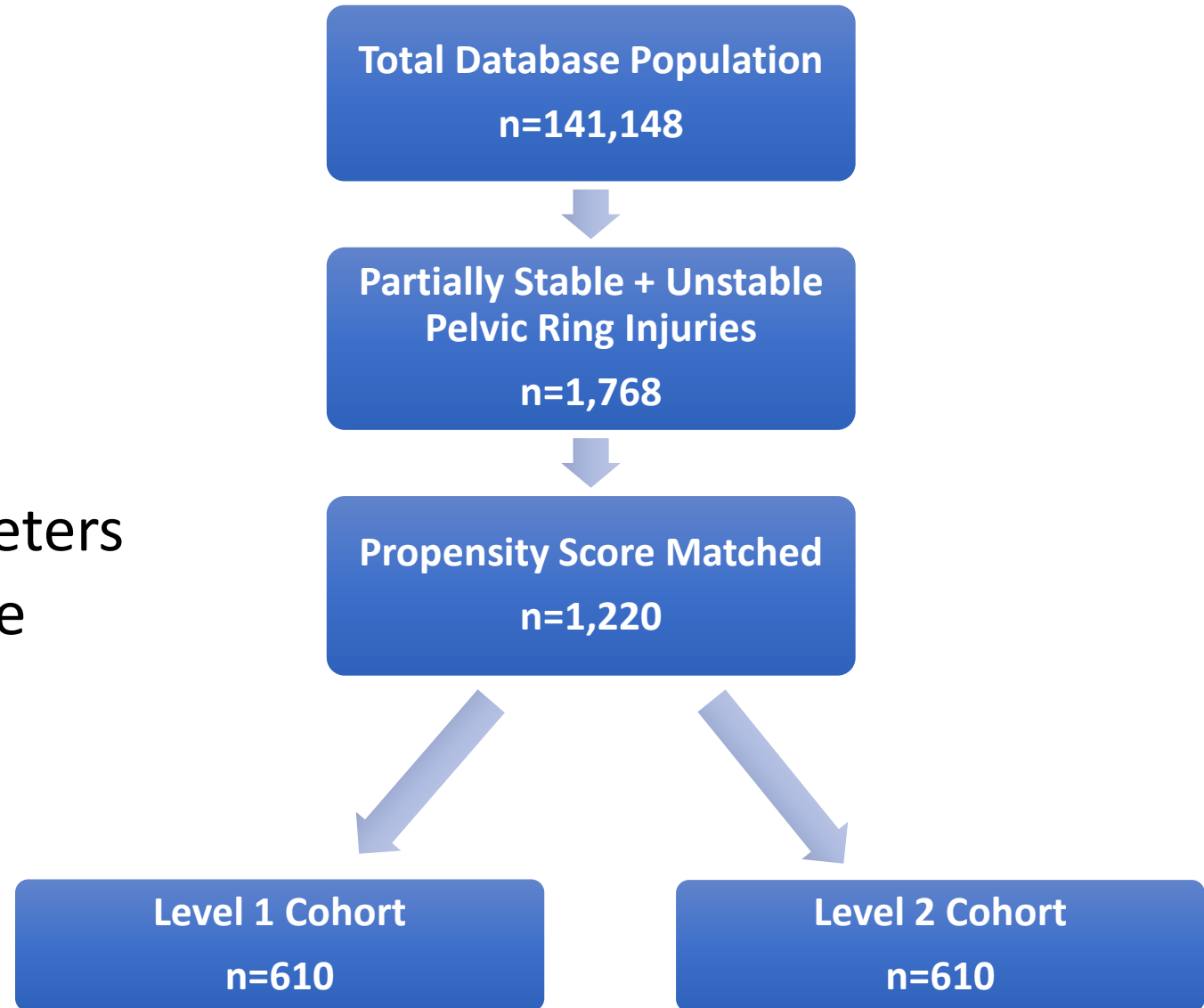


Unstable

Analytic Method

Propensity Score Matched

- Demographics
- Injury severity parameters
- Admission vital sign parameters
- Pre-injury anticoagulant use
- Transfer in status



Measures

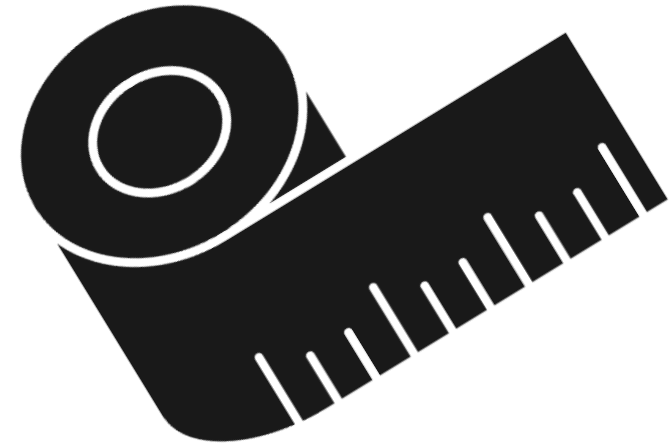
Outcomes

- Hospital mortality
- Length of stay & complications

Processes

- Initial management strategy
- ICU admission status
- Orthopaedic surgical treatment

Univariate analysis



Higher Mortality in Level 2 Centers

48 Hour



3.4% < 6.2%
Level 1 Level 2

p=0.04

Total



7.7% < 11.6%
Level 1 Level 2

p=0.02

	Level 1	Level 2	p value
Hospital Length of Stay (days)	8.1 ± 10.2	7.1 ± 8.5	0.1
ICU Length of Stay (days)	11.4 ± 11.1	10.9 ± 18.4	0.5
Any Complication	22%	25%	0.3
Major Complication	14%	16%	0.6
Failure to Rescue	17%	19%	0.6
Unplanned Intubation	1.6%	3.6%	0.03
ARDS	3.1%	1%	0.009

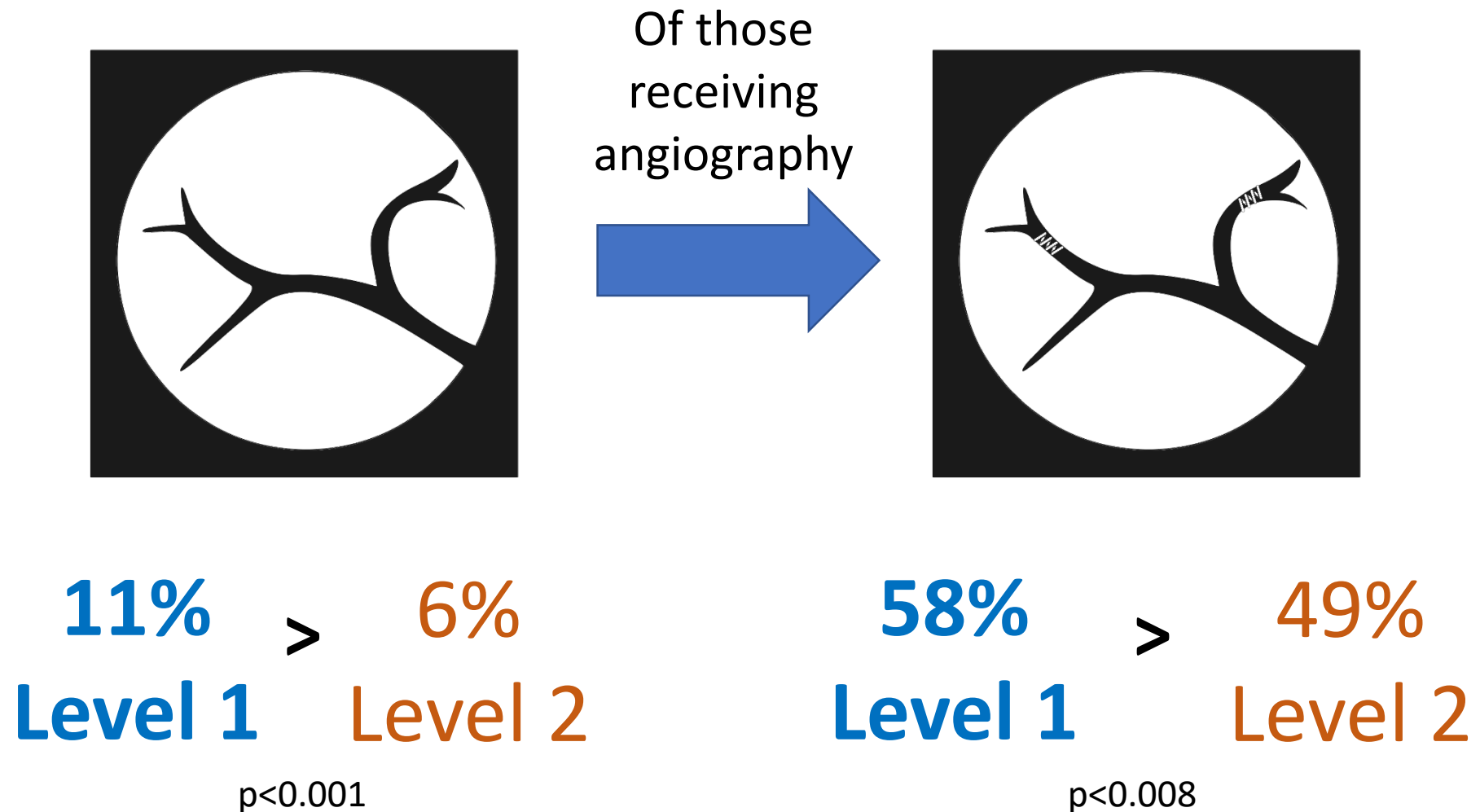
More Angiography in Level 1 Centers



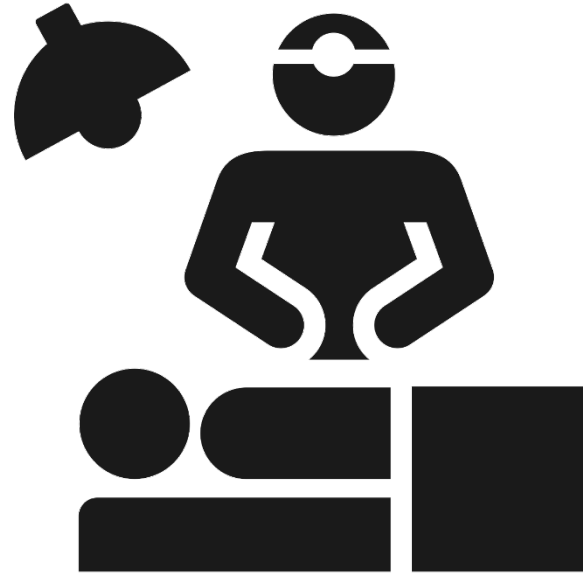
11% > **6%**
Level 1 **Level 2**

$p < 0.001$

More Embolization in Level 1 Centers



More Exploratory Laparotomy in Level 2 Centers



8% < 11%
Level 1 Level 2

$p < 0.001$

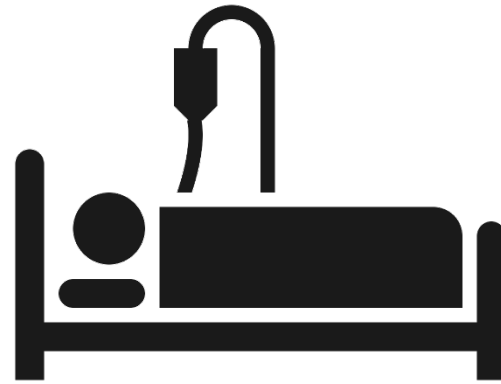
More ICU Admissions in Level 1 Centers



44% > 36%
Level 1 Level 2

$p < 0.001$

More Stepdown Admissions in Level 2 Centers



6% < 15%
Level 1 Level 2

$p < 0.001$

More Non-op and Ex-Fixes in Level 2 Centers



50% < 55%
Level 1 Level 2

p=0.003



10% < 14%
Level 1 Level 2

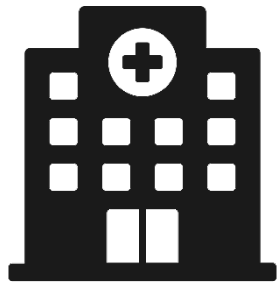
p=0.003

More ORIF/CRPP in Level 1 Centers



48% > **43%**
Level 1 **Level 2**

p=0.003



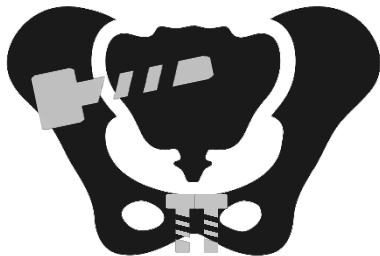
Level 1



Angiography/Embolization



ICU Admission

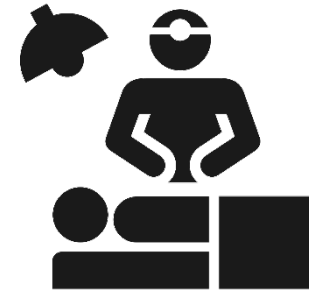


ORIF/CRPP

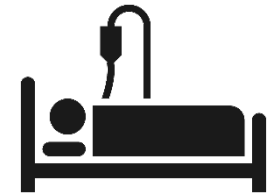


Level 2

Exploratory Laparotomy



Stepdown Admission



Non-op Treatment
External Fixation



Limitations

Retrospective study

Unmeasured confounding

Granularity of data

- Orthopaedic injury & procedure codes
- Pelvic packing

All Pelvic Ring Injuries

Type of Injury	Number	Percent
Unspecified	1,072	15.87
Stable (Tile A)	3,915	57.96
Partially Stable (Tile B)	1,426	21.11
Unstable (Tile C)	342	5.06
Total	6,755	100

APC2 (Operative)

LC1 (Non-operative)



Pelvic ring fracture (AIS2005):
Incomplete disruption of posterior arch

Conclusion

Level 1 centers have decreased mortality

Level 1 centers utilize more aggressive treatments

Orthopaedic data and staffing needs further examination

Process and system improvement requires an integrated approach

Thank you

Bryant Oliphant, MD, MBA, MSc

bryantol@med.umich.edu

 @BonezNQuality

Questions/Discussion

Experience

- History of ortho trauma in the state

Staffing

Volume

Transfer

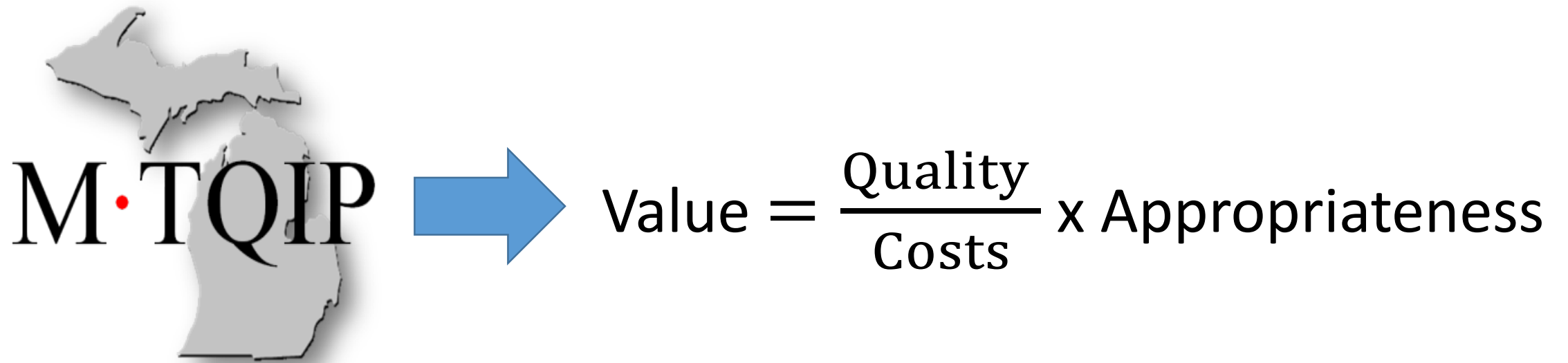
Adjuncts



Administrative Update

Judy Mikhail, PhD, MBA, RN
MTQIP Program Manager

Value Proposition



BCBSM Annual 4 MTQIP EVAL Questions

(1=strongly disagree to 5=strongly agree)

1. I find value in MTQIP
2. Our hospital can only participate in MTQIP with \$ support from BCBSM
3. MTQIP's coordinating center (*Mark/Jill/Judy*) is a valued partner
4. BCBSM/BCN has been a reliable partner in MTQIP's quality efforts

- Included in post meeting evaluation
- Sent electronically after the meeting



MTQIP AIS 2015

Advanced Planning Discussion

- Goal
 - Migrate MTQIP centers as a group to AIS 2015 in a planned manner?
- Training
 - Offer AIS 2015 courses throughout chosen year prior to Jan 1 start date?
 - Enough courses to train multiple participants per center?
 - MTC assistance?
- Vendors
 - Reached out
 - No one ready
- Cost
 - Minimal cost to centers for training → MTC
 - Unclear for registry update

State of Michigan

◆ Status

■ Level 1 and 2

- ◆ Data submission - Active
- ◆ Reporting: Center, Region, State - Active
- ◆ Education - June

■ Level 3

- ◆ Data submission - Active, 5 Hospitals
- ◆ Reporting, provision 2x/year - Active
- ◆ Education - June

State of Michigan

◆ Status

■ Level 2

- ◆ Data submission - Active
- ◆ Reporting, provision 2x/year, Region, State - Active
- ◆ Education - June

■ Level 3

- ◆ Data submission - Active, 5 Hospitals
- ◆ Reporting, provision 2x/year - Active
- ◆ Education – June
- ◆ Data Validation Visit – 5 Hospitals

Lunch

Back at 1:00 pm



Hip Fracture Management

Jim Goulet
Riley Frenette
Mark Hemmila



Hip Fractures: Improving Quality of Care in Michigan With MTQIP

James A Goulet, MD

Professor, Department of Orthopaedic Surgery

Michigan Medicine

Disclosures

- Steering committee – “Own the Bone” (recent)
- Board memberships –
 - Michigan Orthopaedic Society
 - Orthopaedic Trauma Association (recent)
- Royalties – Zimmer

Femoral Neck Fractures

- 360,000 annually in USA
 - Will double by 2040
- \$13.7 billion for care of hip fxs
 - 43% of cost of all fx care — Nat'l Osteoporosis Foundation



Why the Focus on Hip Fractures?

Relatively small advances in management of hip fractures over past 30 years

Some traditional methods of hip fracture management do worse than previously thought

Focus on hip fractures in other countries (Great Britain and Sweden) are proving that lowering costs are possible – outcomes may be better



Hip Fracture Economics

- Hip fracture incidence worldwide increasing from 1.6 million/year in 1990 to 6.3 million/year by 2050
- Disability adjusted life-years lost due to hip fractures ranks in top 10 of all-cause disability globally

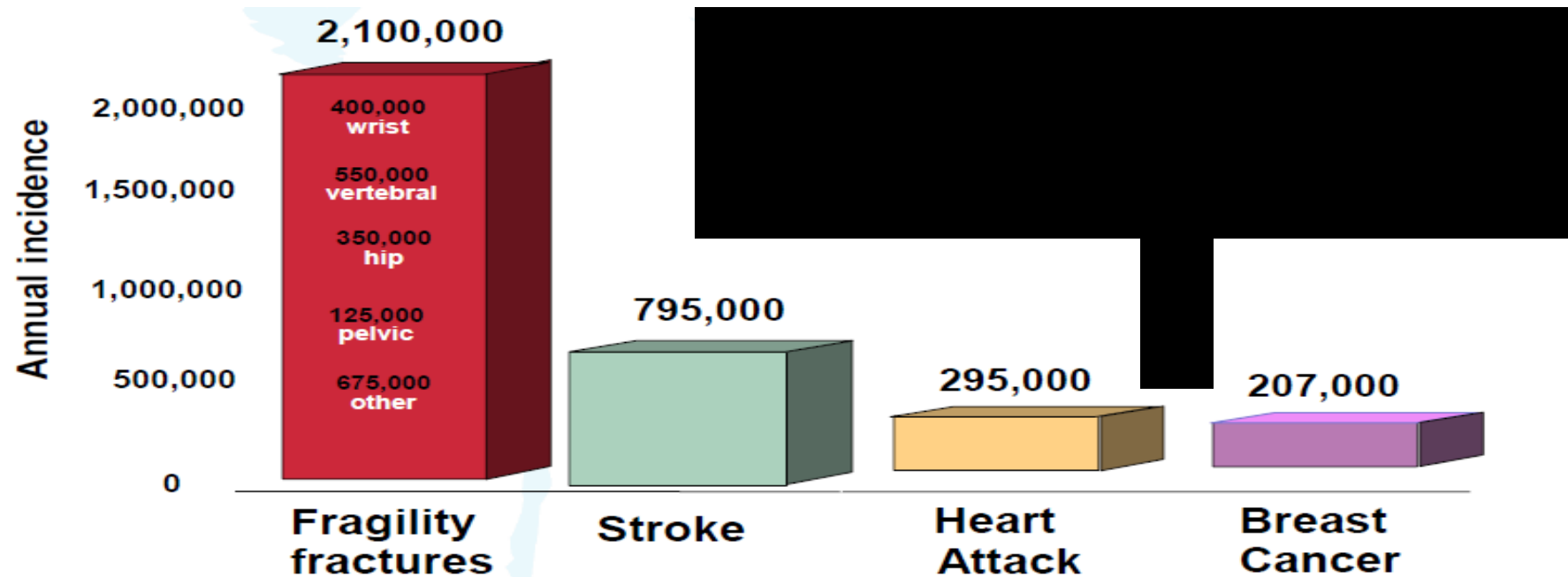


Agenda

- Advances in management of hip fractures
 - Clear trend toward orthopaedic surgeon's responsibility for perioperative as well as operative care of these patients
- Existing Quality Improvement Initiatives
- Initial steps through MTQIP
 - Current state
 - Potential for incremental improvement
 - Outcomes
 - Expenditures

Effects of Our Aging Population

Osteoporosis-Fracture Occurrence vs. Other Diseases



Sources: American Cancer Society. *Cancer Facts & Figures 2010*. Atlanta: American Cancer Society; 2010.
Heart Disease and Stroke Statistics — 2009 Update, American Heart Association.
JOURNAL OF BONE AND MINERAL RESEARCH
Volume 22, Number 3, 2007
Published online on December 4, 2006; doi: 10.1359/JBMR.061113

Early involvement of orthopaedic surgeons greatly increases likelihood that patients with fragile bone will be assessed and treated

Michigan – How do we compare

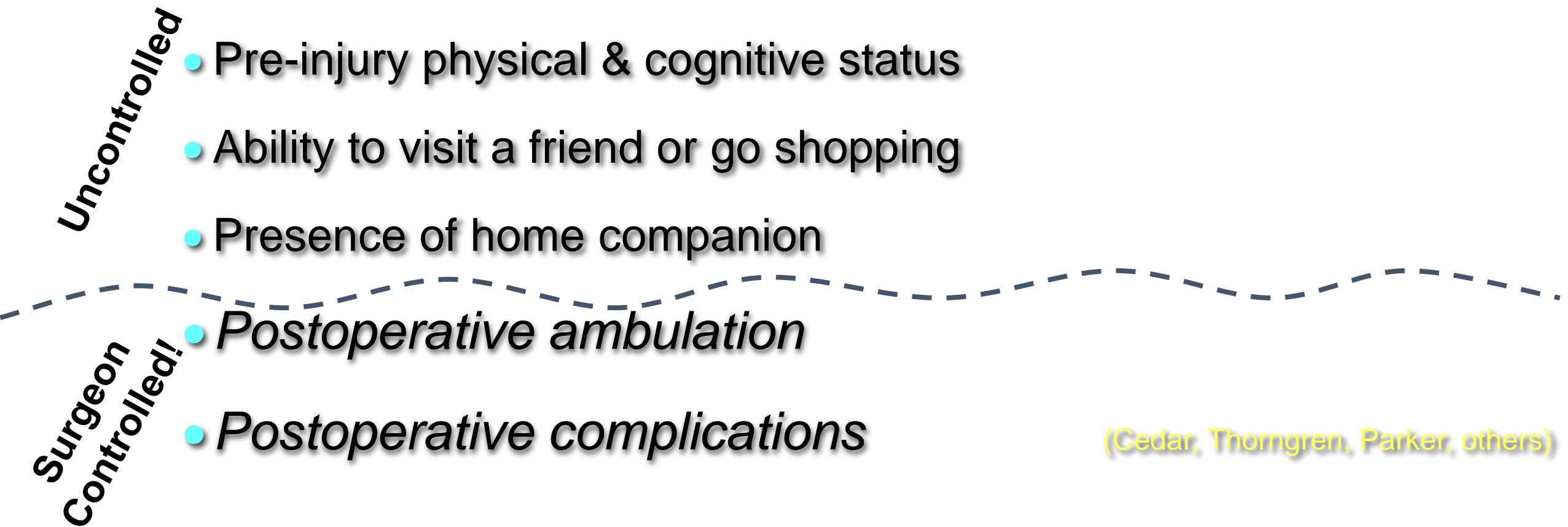
- More dedicated bone health programs than any other state

Geriatric Hip Fracture Perioperative Management

Hip Fracture Patients - Orphans



Hip Fracture *PATIENT* Outcome Predictors



Preoperative Management

the evidence suggests:

- “Tune up” correctable comorbidities
- Operate within 48° ; avoid night surgery

Zuckerman, JBJS(A) '95

Co-Managed Care

Steve Kates

- Co-management
- Early operative clearance
- Early time to OR
- Avoid delirium
 - Minimal narcotics
 - Local block on admission
- Discharge as soon as stable
- Manage post-discharge status



Key Allies

- Emergency Department
- Hospitalists/Geriatricians
- Anesthesia Department
- Critical Care Services
- Bone Health Program
- Hospital Administration



Benefits of Co-Managed Hip Fracture Service

- Improved care for hip fracture patients
- Reduced rates of complications
- Reduced length of stay
 - 1 to 2 day reduction in LOS in first year
- Reduced costs of stay
- Better long term outcomes?



Efforts in Michigan – MTQIP



Dedicated to improving
the quality of care
delivered to trauma
patients in Michigan

MTQIP

Newly Sponsored Orthopaedic Limb 2017

- Friendly and collegial atmosphere
- Non-competitive use of data
- Evidence-based practices
- Use of actionable data to focus on effectiveness of care
- Encourage all members to participate and make a contribution



Nonprofit corporations and independent licensees
of the Blue Cross and Blue Shield Association

MTQIP

- 16,177 patients with hip fractures from 2008 to 2016
- 52 % treated surgically within 24 hours
- 36% treated surgically between 24 to 48 hours
- 12% treated surgically later than 48 hours
- Average length of stay 5.4 days
- All patients treated at all hospitals followed until discharge



Data Collection and Evaluation for Hip Fractures

- Better than what we expected
- Lots of room for improvement
- QI should be directed by physician input and oversight
- Watch carefully



Areas of Interest

- Outcome predictors
 - BMI
 - Residency program
- CMS TJR model match
- Financial potential

Financials

- Financial linkage of patient encounters to cost of treatment is our next area of interest
- Have had difficulty identifying a source willing to share their financial information



Thank You

Hip Fracture Patients

- ◆ Volume
- ◆ Dashboard
- ◆ ASPIRE, MARQI
 - Pain Management
 - ◆ Pre OR
 - ◆ Discharge
 - Anesthetic
- ◆ Discharge disposition
- ◆ Long term outcomes

Isolated Hip Fracture Patients

- ◆ Mechanism = Fall
- ◆ Exclude patients with no signs of life
- ◆ AIS 2005 Codes
 - Proximal femur
 - Femoral head
 - Femoral neck
 - Trochanteric or subtrochanteric
- ◆ All other injuries in AIS external body region
- ◆ Time = 3/1/2016 to 7/31/2018

Operations




- ◆ Exclude negative or missing time
- ◆ Exclude if > 21 days to OR
- ◆ Based on ICD10 procedure codes

Dashboard




Isolated Hip Fracture Dashboard
Michigan Medicine








Admit Service	Center	MTQIP	n
Trauma			
Orthopedics			
Others			

Status Key
Low-outlier (better performance) 
Non-outlier (average performance) 
High-outlier (worse performance) 

Processes of Care	Center	MTQIP	P Value	Status
LMWH VTE Prophylaxis <= 48 Hours				
Average Time to OR (hrs)				
Time to OR > 48 Hours				

Complications	Center	MTQIP	P Value
Serious Complications			
Any Complication			
Failure to Rescue			
Venous Thromboembolism			

Top Collaborative Complications	Center	MTQIP	P Value
1. Unplanned Admission to ICU			
2. Unplanned Intubation			
3. Myocardial Infarction			
4. Pneumonia			
5. Catheter Associated Urinary Tract Infection			

Dashboard

Resource Utilization	Center	MTQIP	P Value
----------------------	--------	-------	---------

Length of Stay (days)			
-----------------------	--	--	--

Mortality	Center	MTQIP	P Value
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Isolated Hip Fracture Mortality			
Mortality or Hospice			

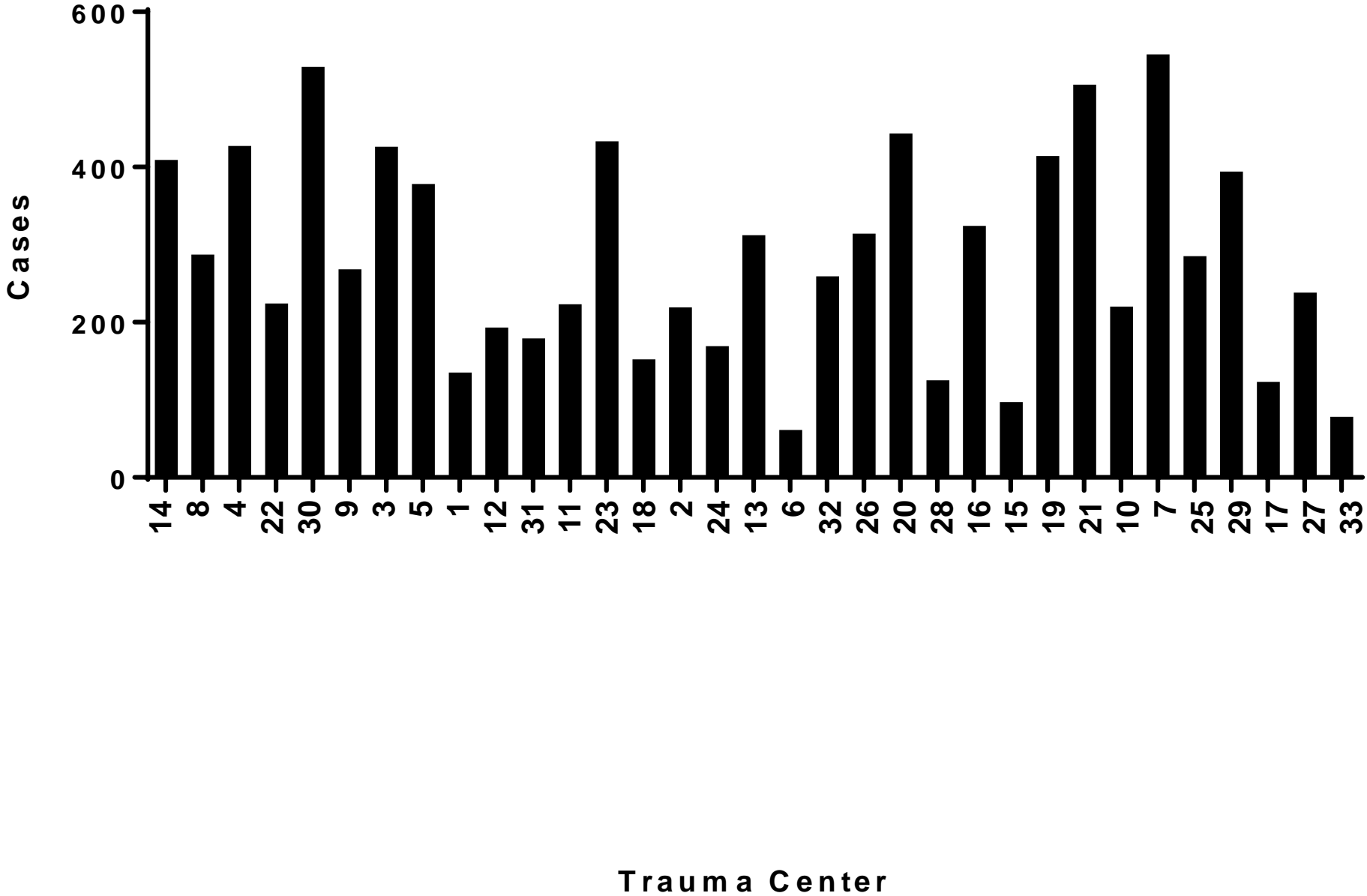
Disposition	Center	MTQIP	n
-------------	--------	-------	---

Home			
SNF			
Rehab			
Other			

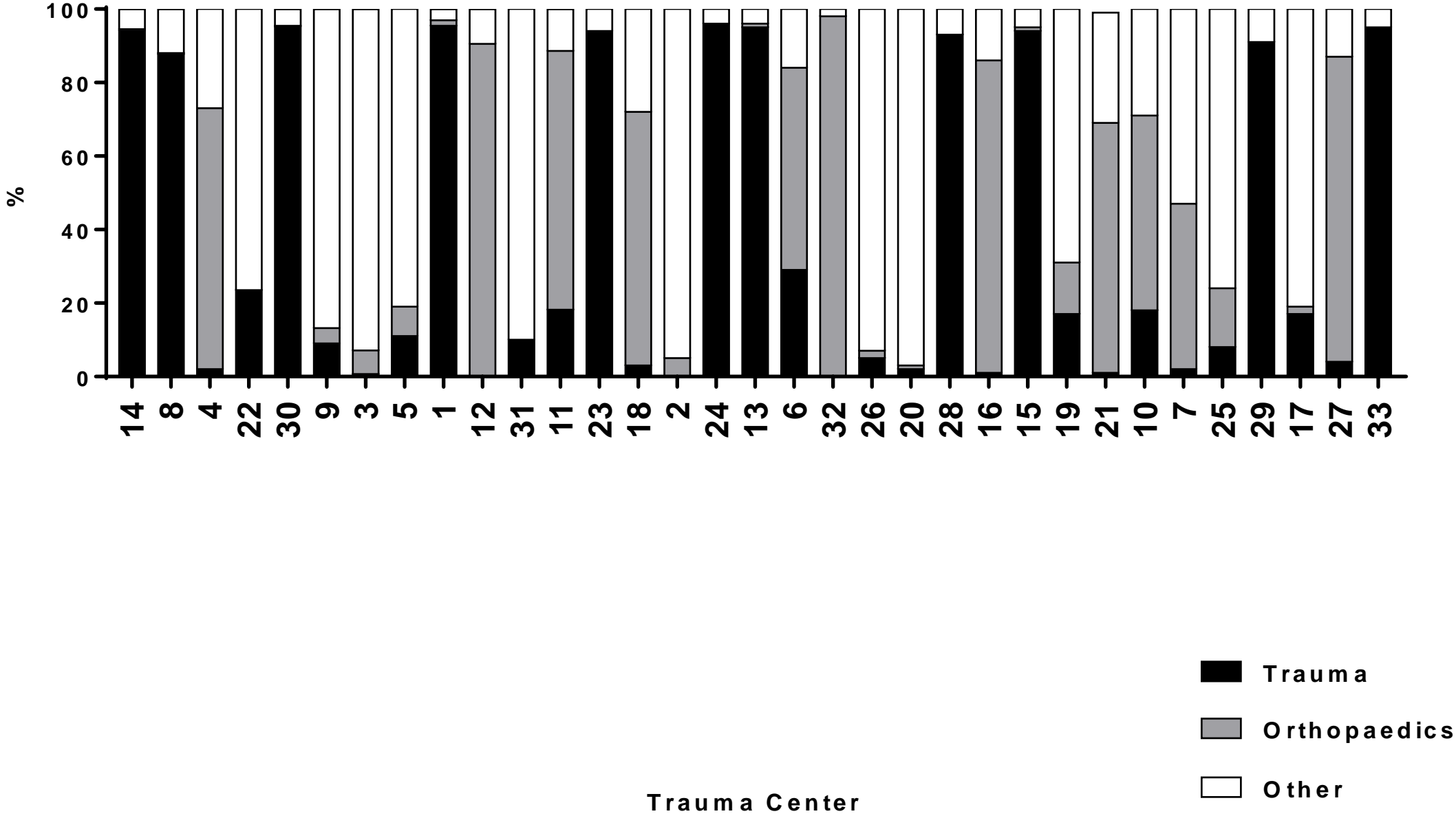
Criteria

- | |
|--|
| 1) Cohort 8 (Isolated Hip Fracture) |
| 2) Excluding DOA |
| 3) eCode = Fall |
| 4) AIS 05 fracture codes = proximal femur, femoral head, femoral neck, trochanteric or subtrochanteric |
| 5) All other injuries must be in AIS external body region (i.e., bruise, abrasion or laceration) |
| 6) Interval 3/1/16 - 7/31/18 |

Isolated Hip Fracture Volume 3/2016 to 7/2018

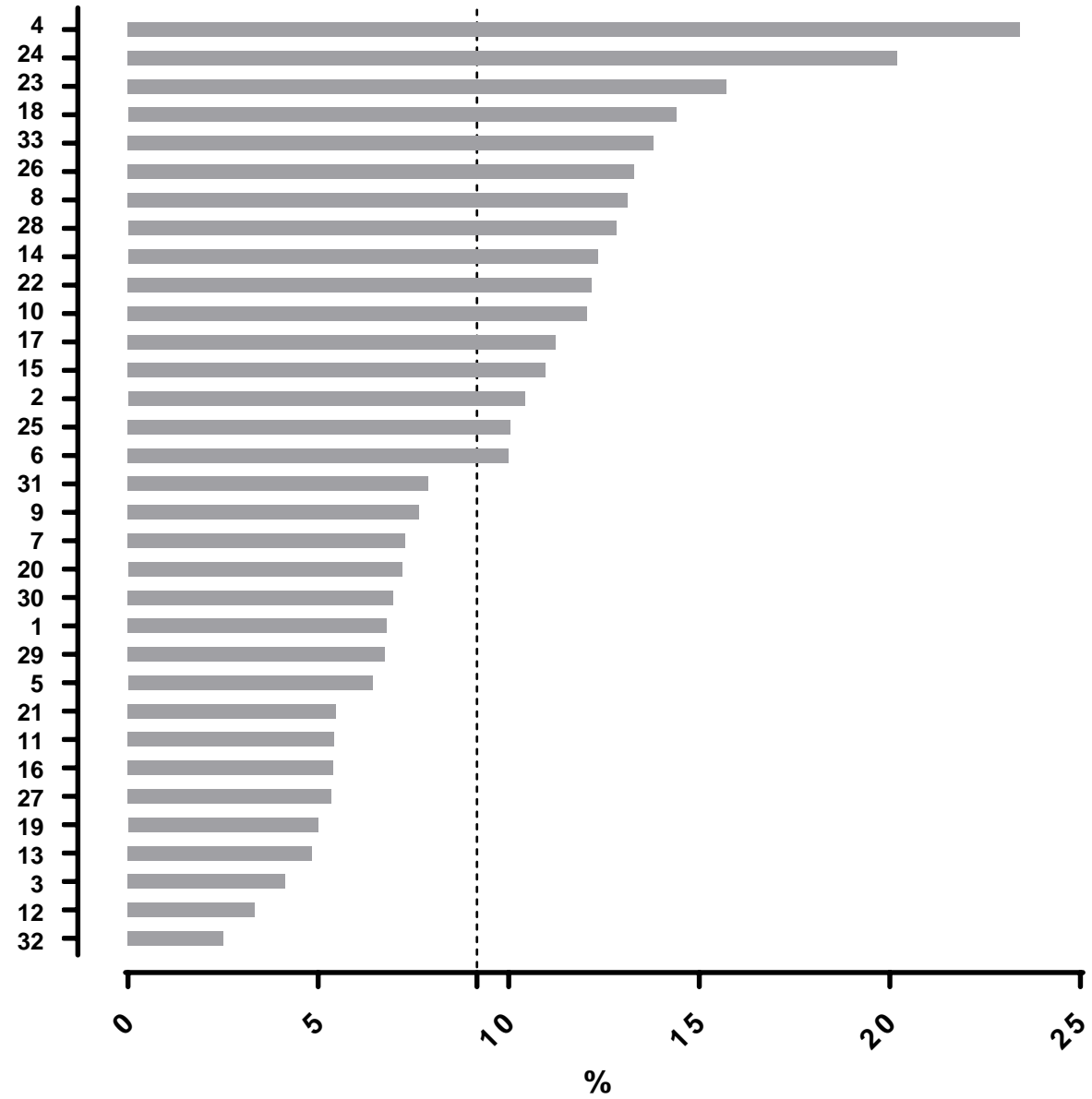


Admission Service

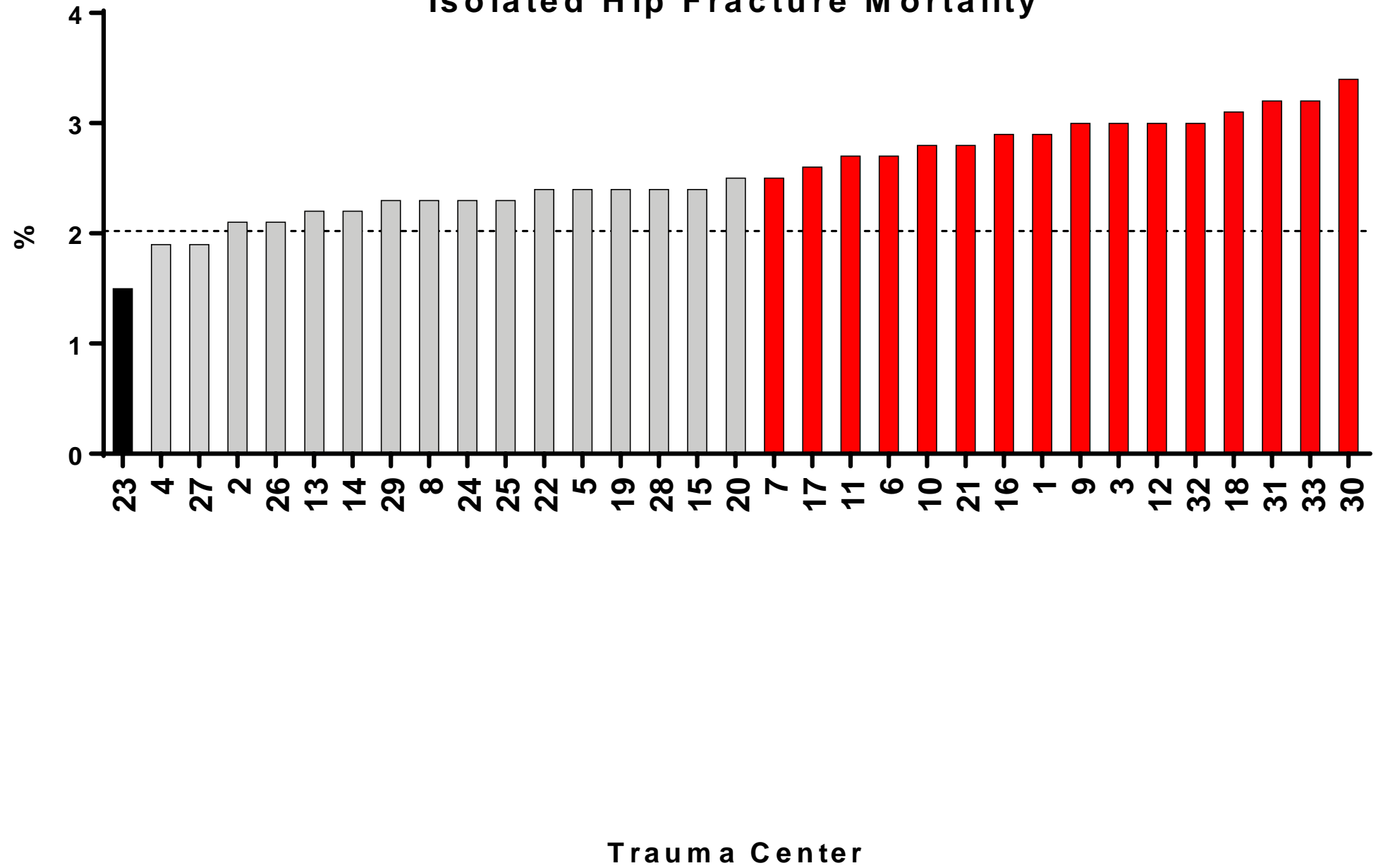


Trauma Center

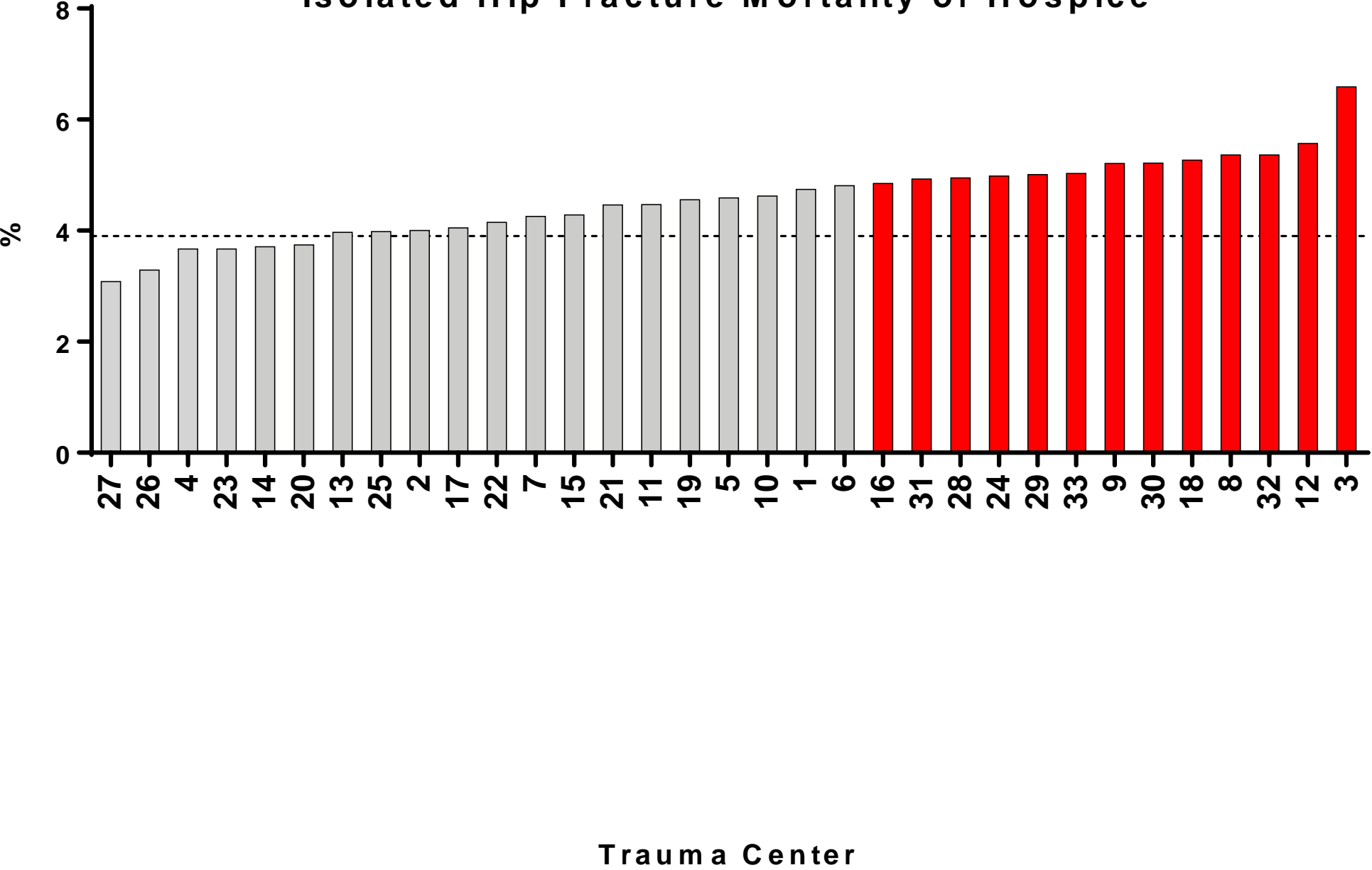
Time to OR > 48 hours

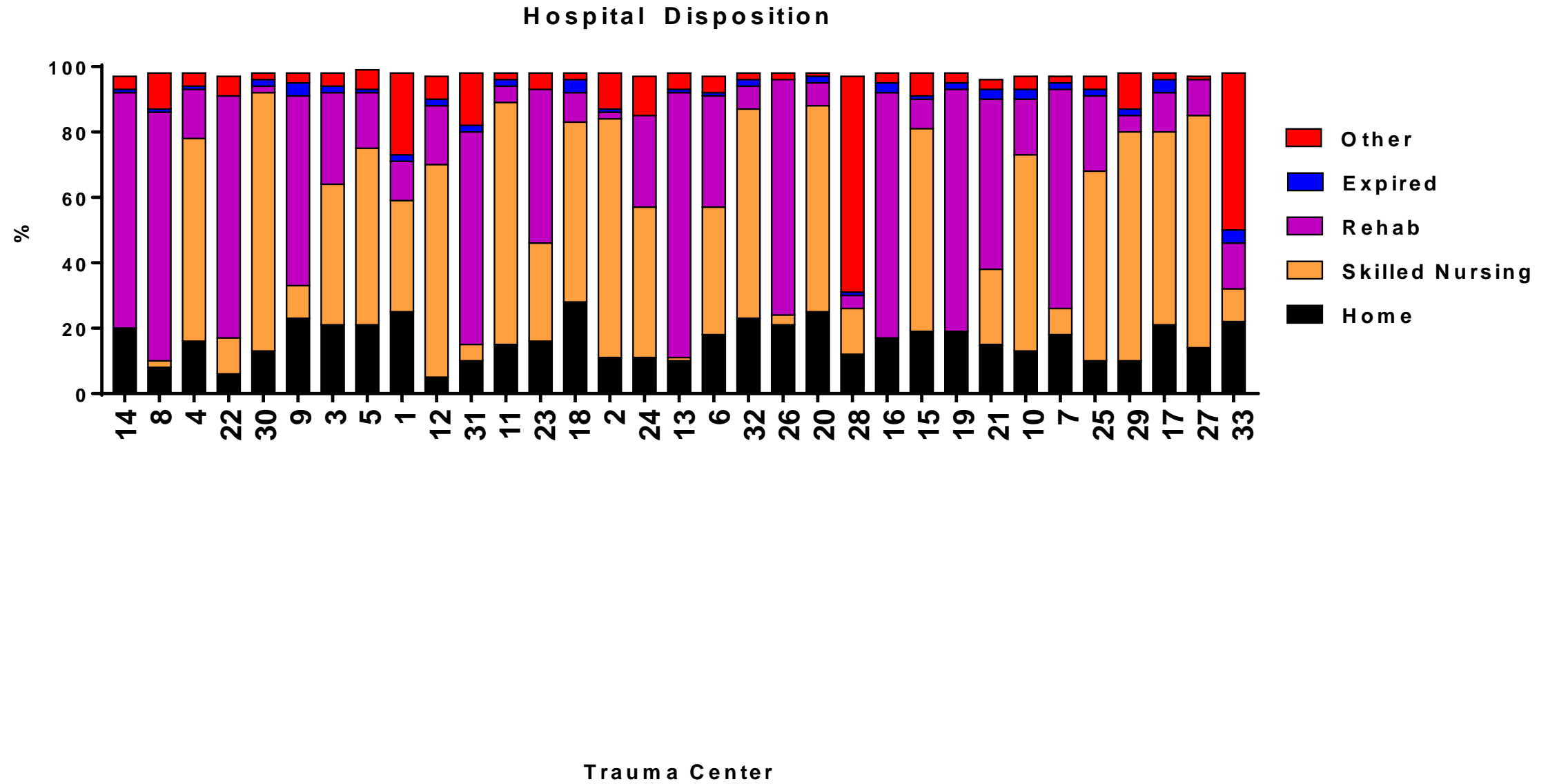


Isolated Hip Fracture Mortality



Isolated Hip Fracture Mortality or Hospice





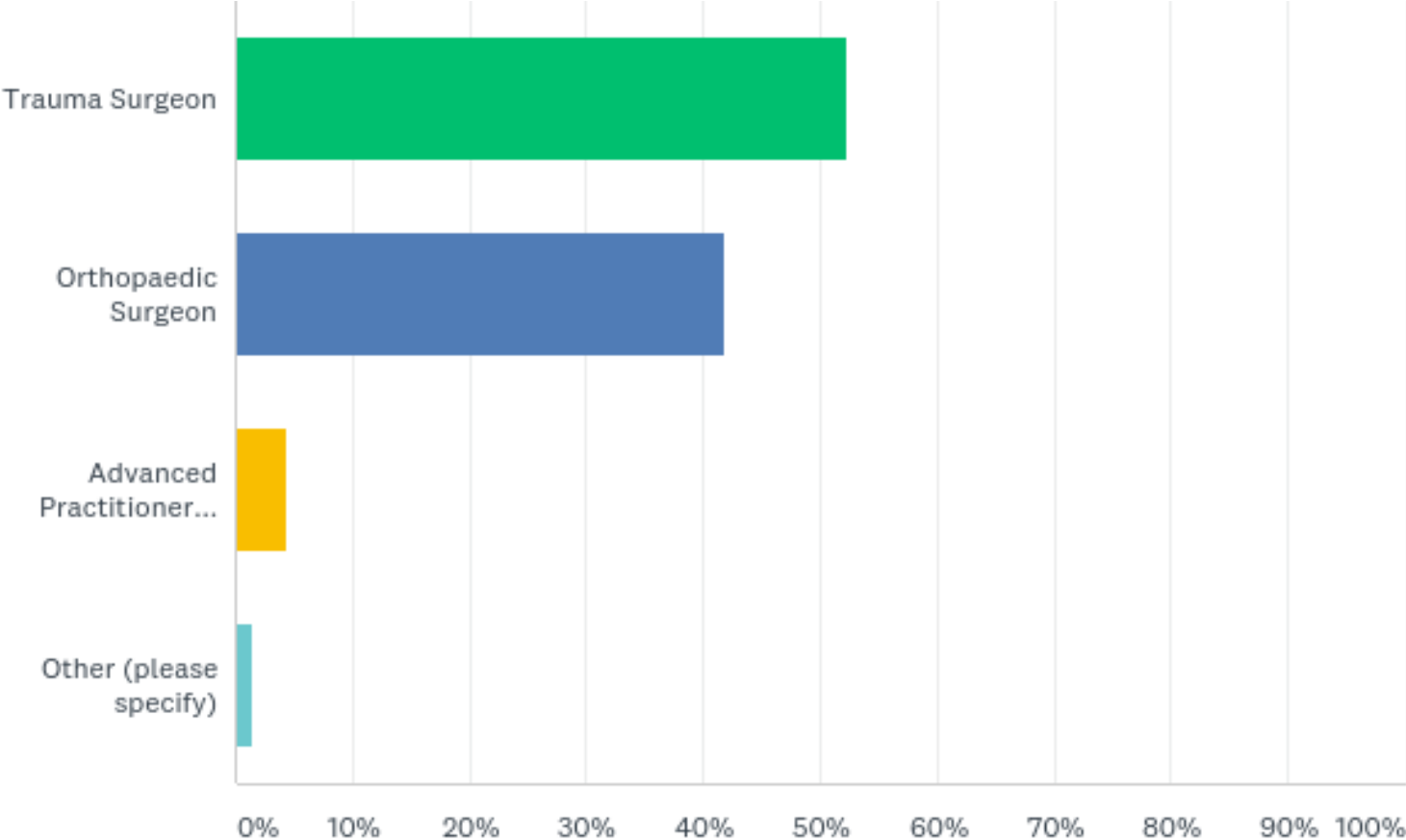
Opioids in Trauma

Judy Mikhail, PhD
Mark Hemmila, MD



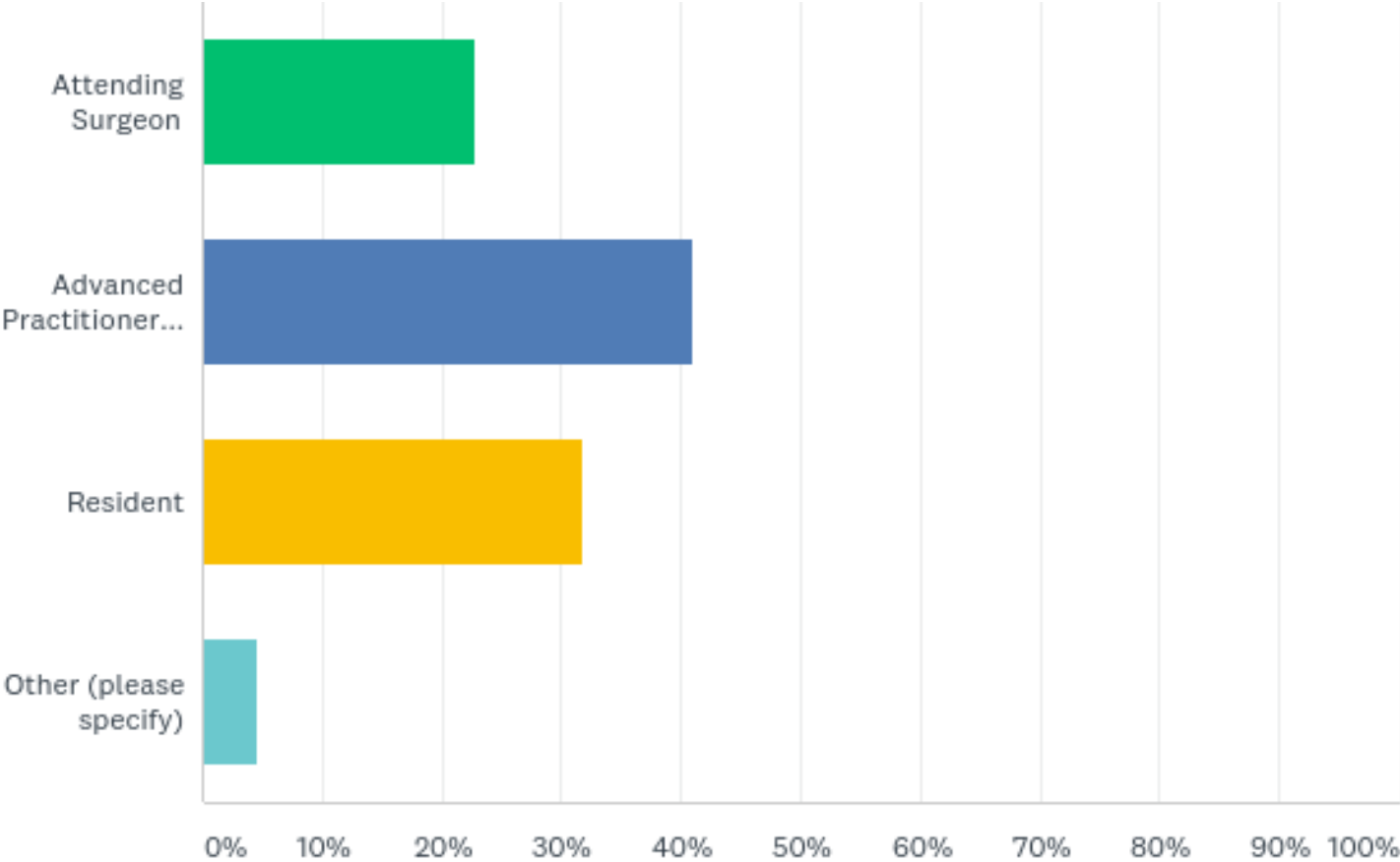
Q1: What is your role/specialty?

Answered: 67 Skipped: 0

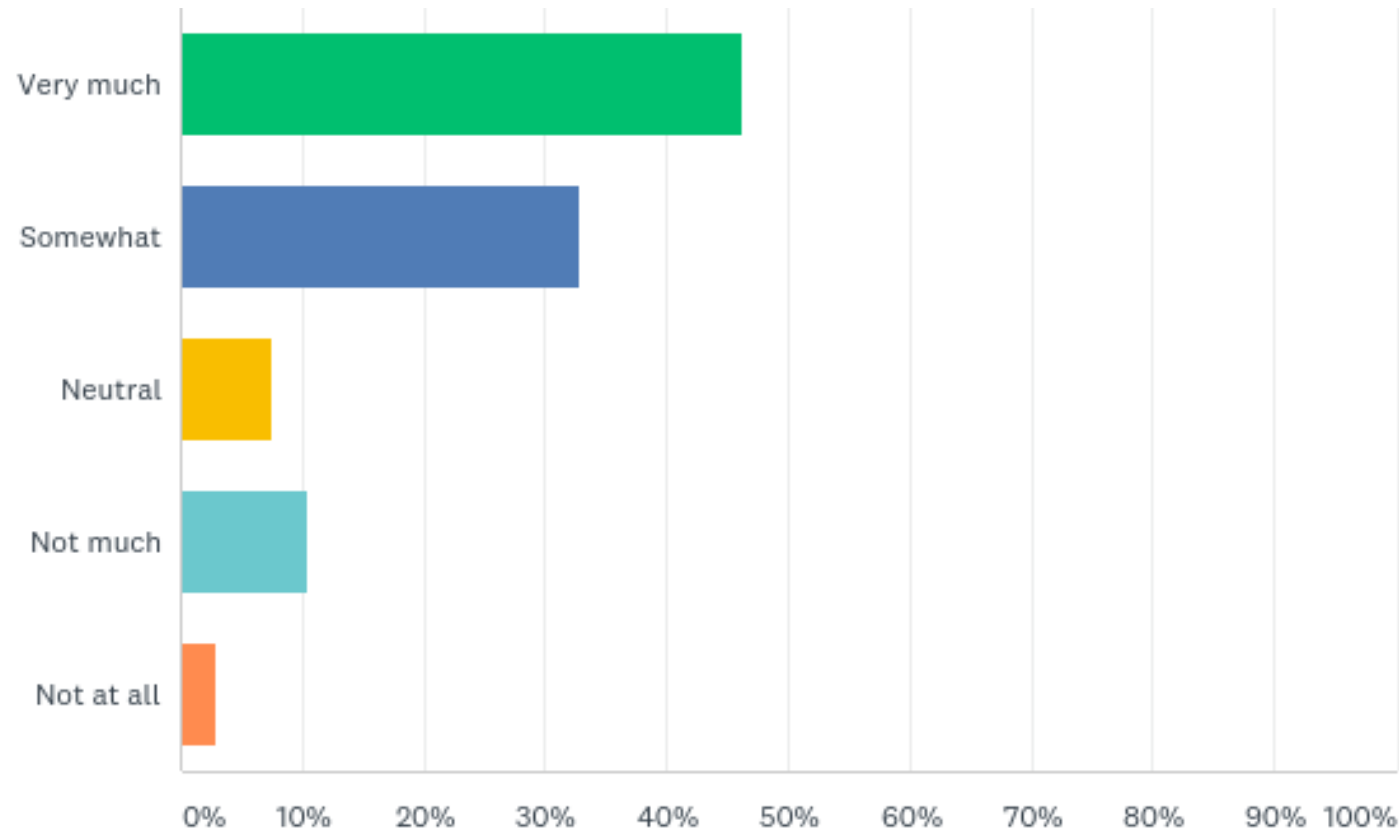


Q2: Who handles pain medication prescribing at patient discharge from your hospital?

Answered: 66 Skipped: 1

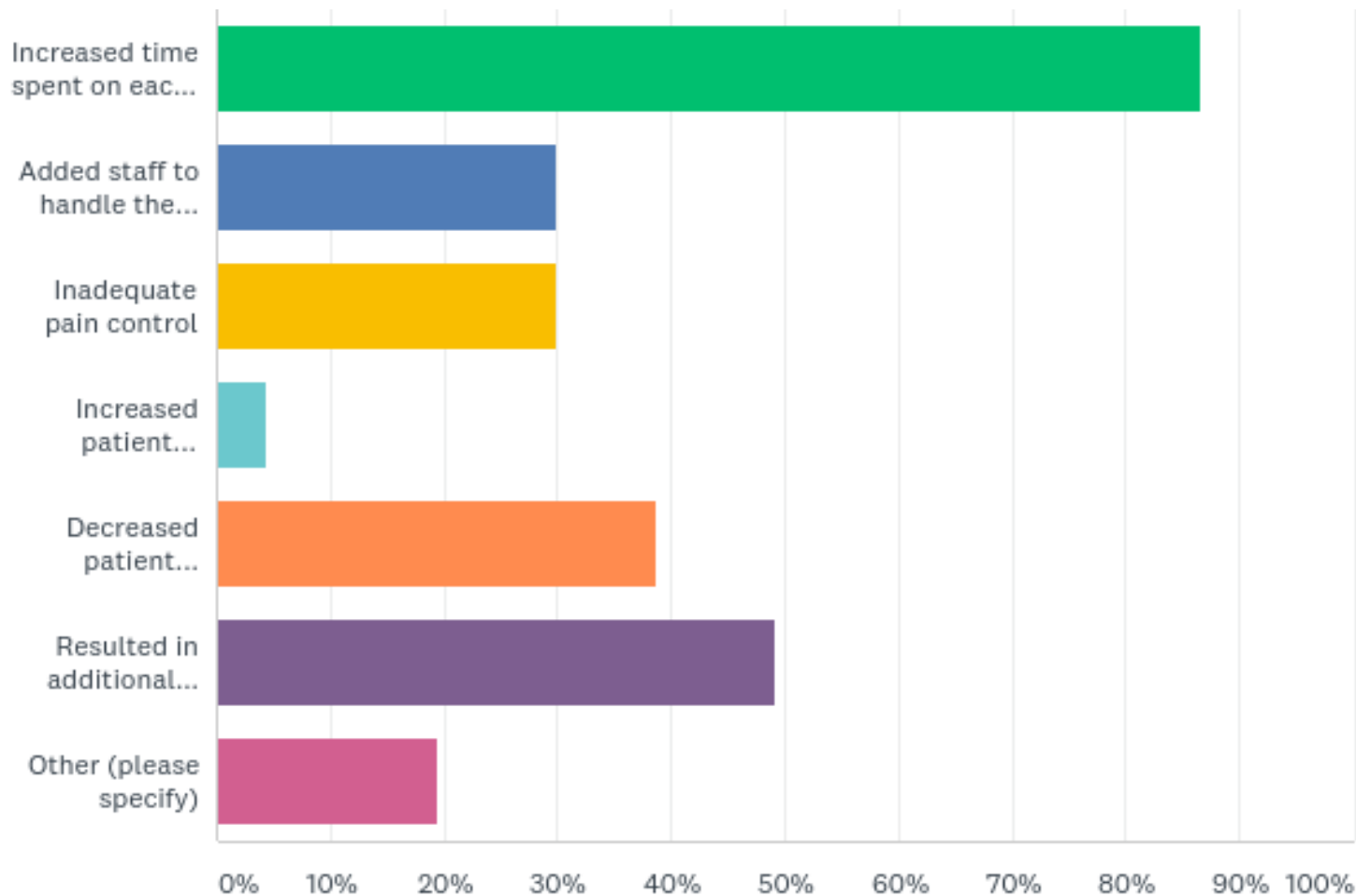


Q3: Do you feel that the new opioid laws (Mandatory MAPS checks, 7-day maximum medication supply, pain counseling, etc.) are significantly impacting your practice?



Q4: How are the new laws affecting your practice? (Check all that apply)

Answered: 67 Skipped: 0

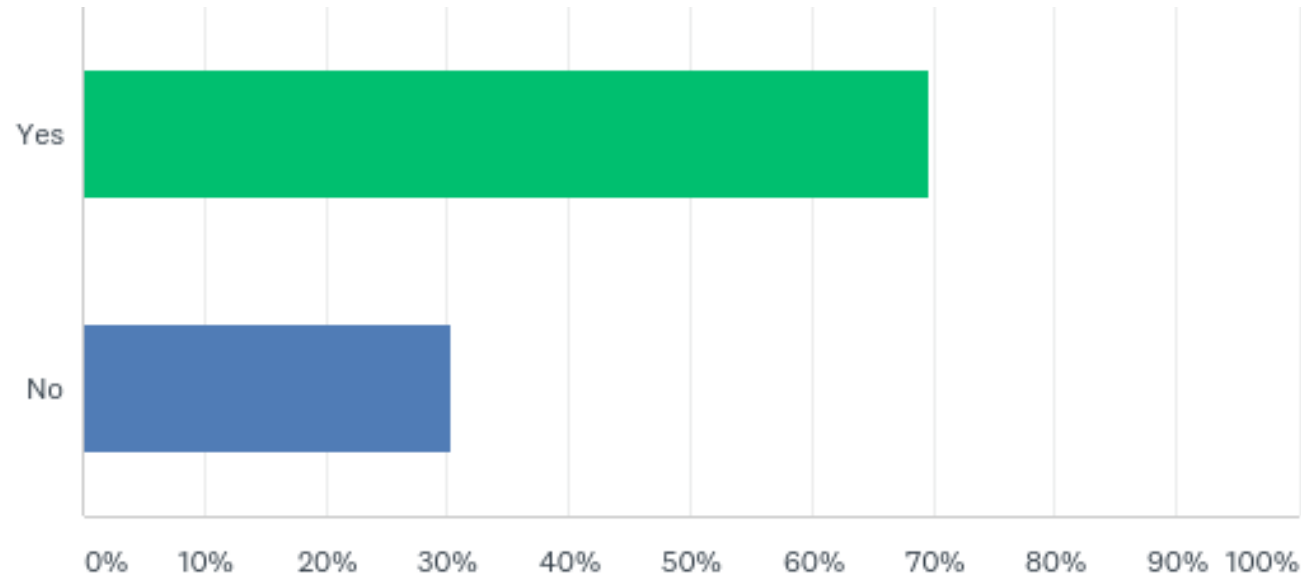


Q5: Rank the burden level of each aspect of the new laws with 1 being the lowest burden and 3 being the highest burden.

Answered: 67 Skipped: 0

	LOWEST BURDEN	MEDIUM BURDEN	HIGHEST BURDEN	TOTAL	WEIGHTED AVERAGE
Mandatory MAPS checks	25.00% 14	46.43% 26	28.57% 16	56	2.04
7-day maximum medication supply	30.00% 18	28.33% 17	41.67% 25	60	2.12
Pain counseling	39.06% 25	31.25% 20	29.69% 19	64	1.91

Q6: Do you think that your patients have to utilize other systems/providers, such as primary care clinics, urgent care, or emergency departments to help manage their pain needs?

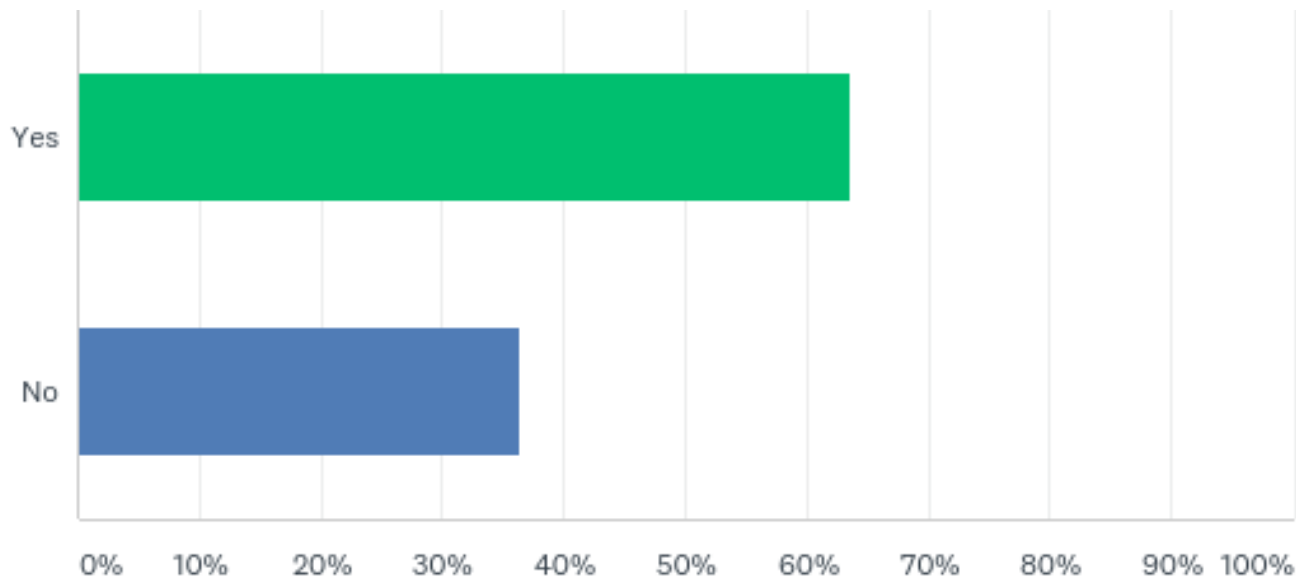


Comments

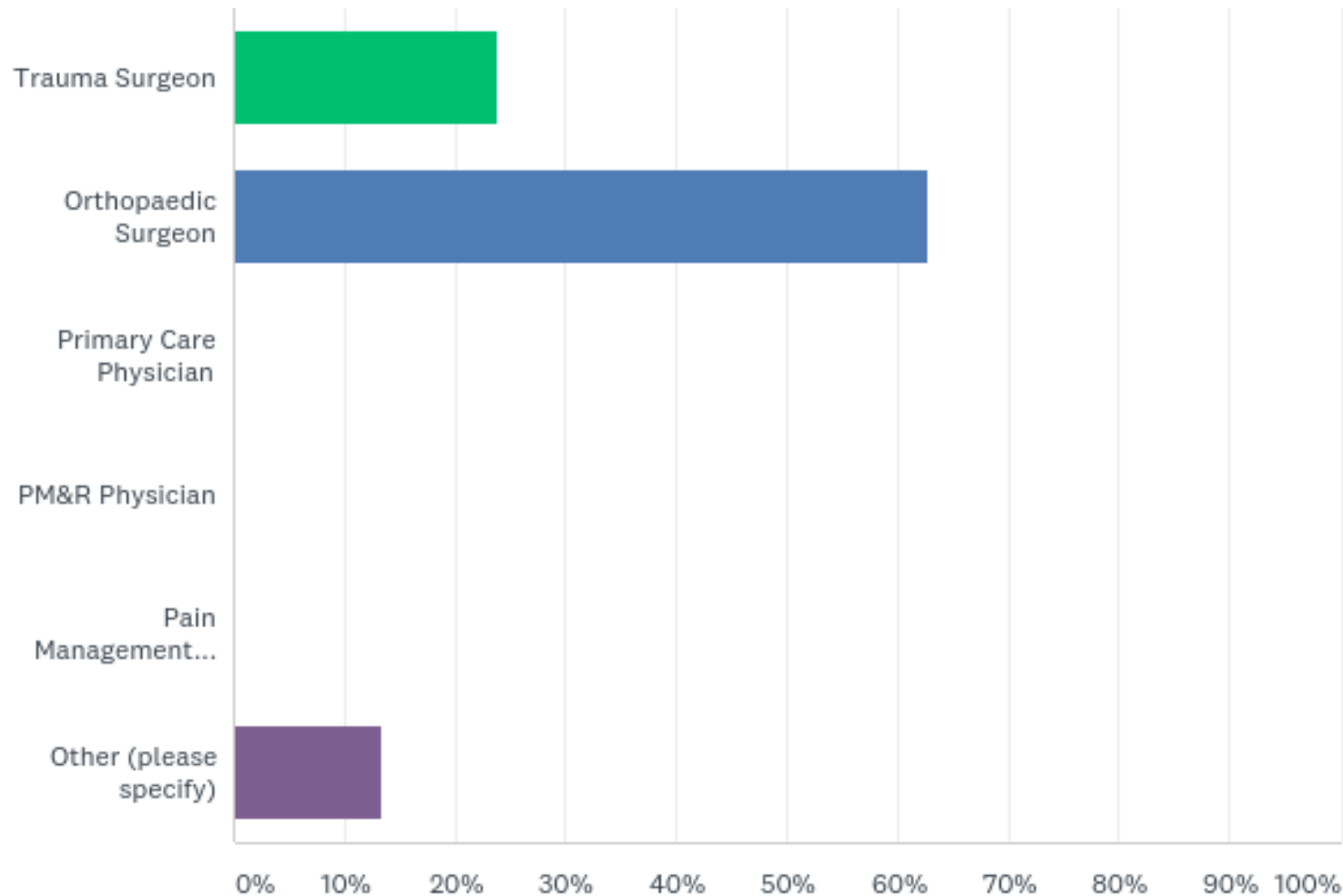
- ◆ Patients on long term opioids are continued to be managed by PCP. We do not get involved.
- ◆ More primary care visits
- ◆ Need to better utilize PCPs. Too often PCPs don't want to get involved.
- ◆ Biggest problem is patients that were on pain meds before surgery. Very hard to manage.

Q7: Do you feel that trauma patients (i.e., those with significant complex injuries) should be exempt from the 7-day supply rule?

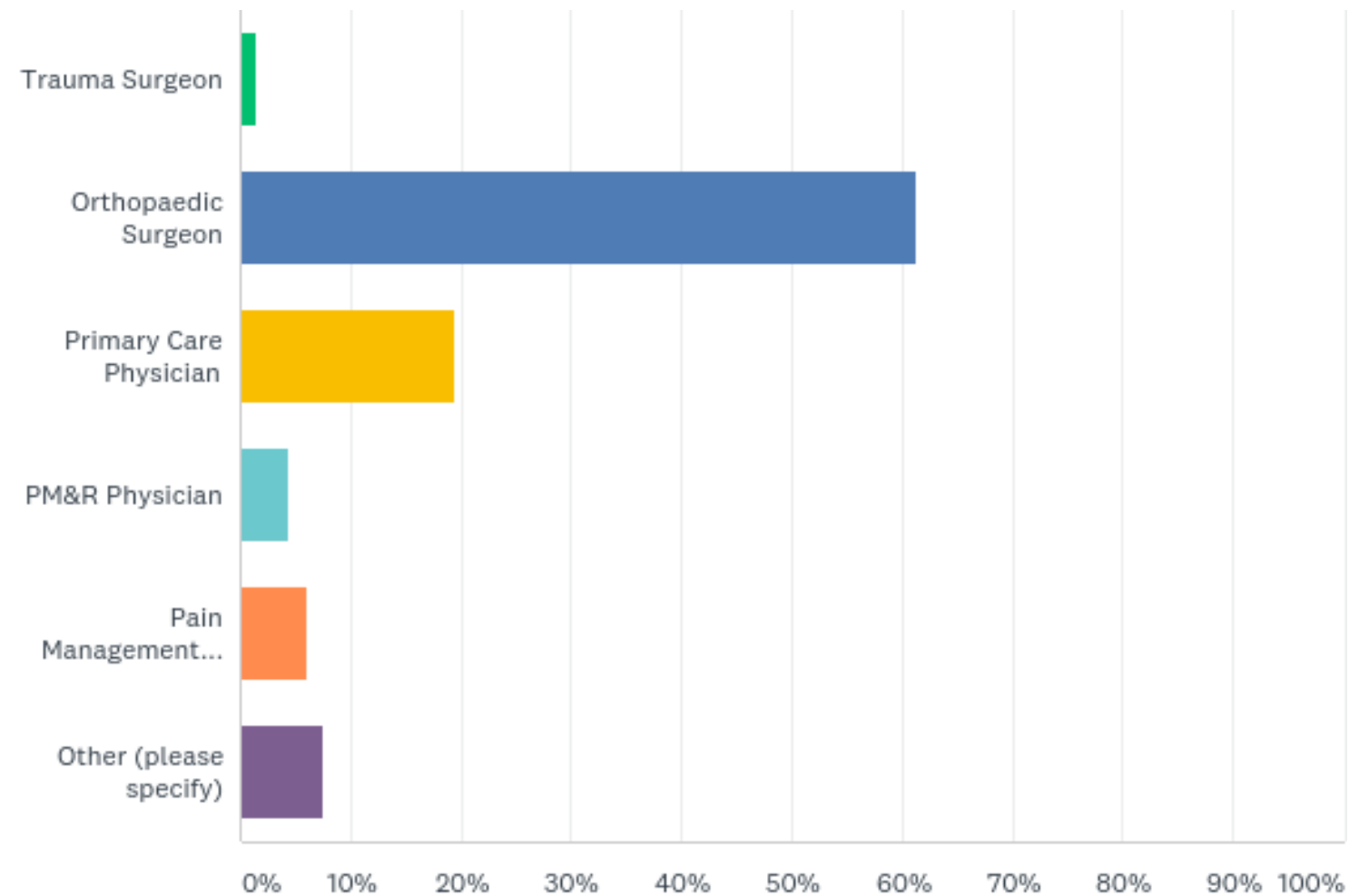
Answered: 66 Skipped: 1



Q8: In your opinion, who is responsible for managing an orthopaedic trauma patient's short-term (0 to 14 days) pain medication at discharge from the hospital?

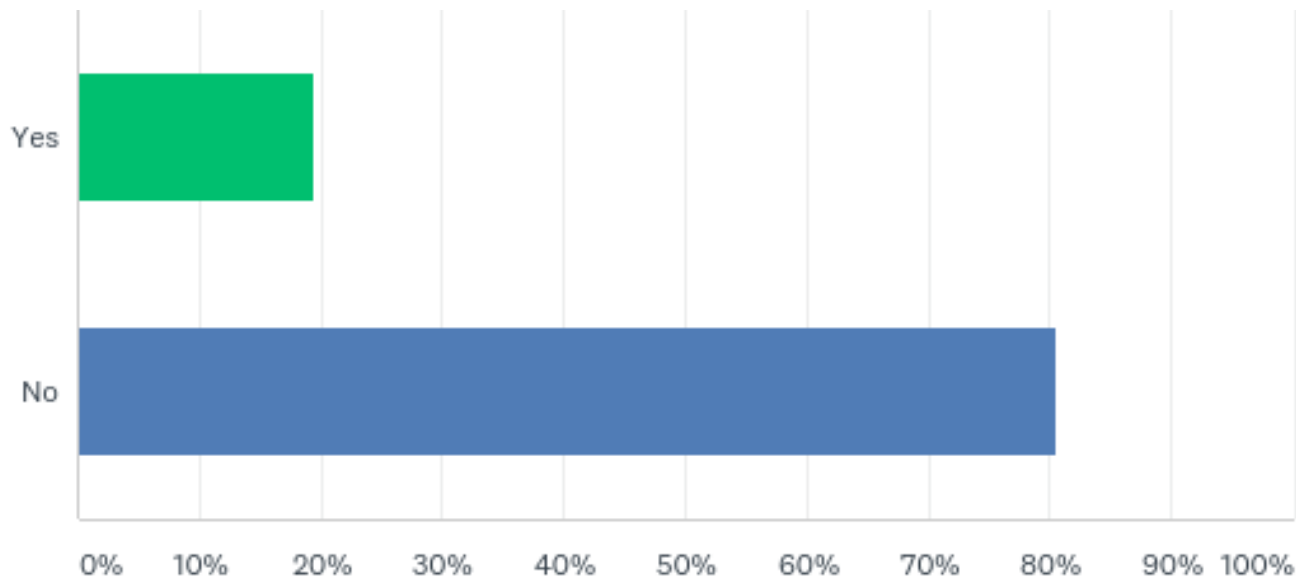


Q9: In your opinion, who is responsible for managing an orthopaedic trauma patient's long-term (up to 3 months) pain medication following discharge from the hospital?



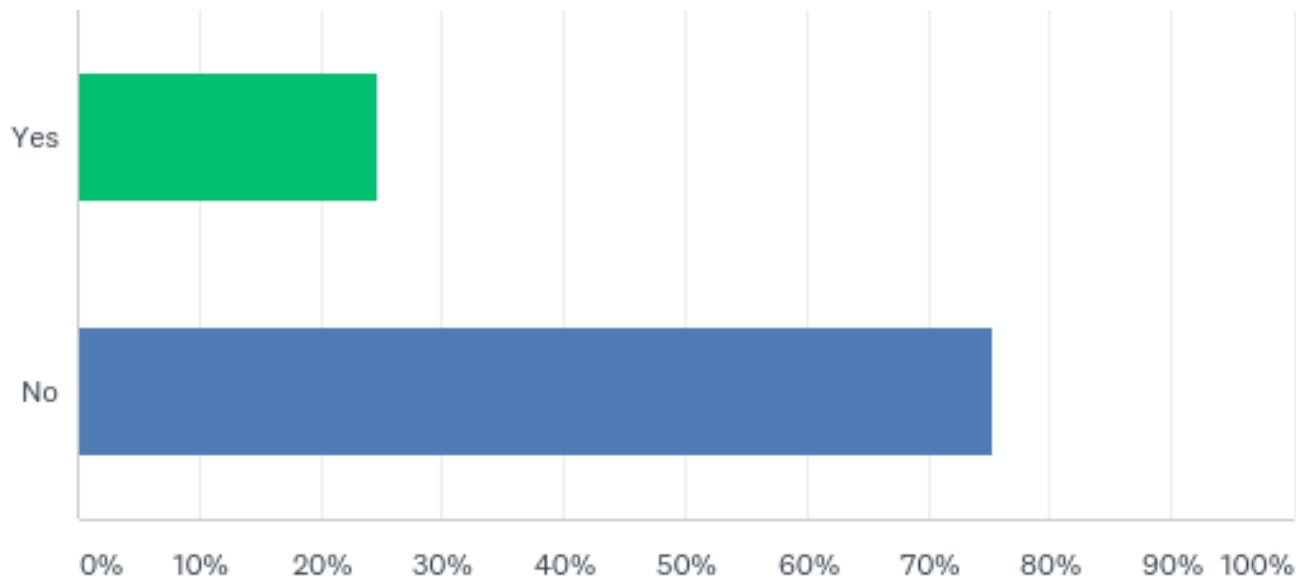
Q10: Are you keeping patients in the hospital longer to manage their pain medications prior to discharge?

Answered: 67 Skipped: 0



Q11: Has your practice implemented a solution to minimize the burden of this new legislation that has been successful? If yes, please describe.

Answered: 65 Skipped: 2



Comments

- ◆ Nursing staff member logs into MAPS system for patients receiving opioids.
- ◆ Education to the patient on why this is being implemented and the challenges of the past with too much being prescribed especially in the orthopedic sector
- ◆ Training for MA/Nursing staff. Folders with opioid waivers at each nurses station and at check-out. Opiate posters in each patient room for education.

Comments

- ◆ We are working on order sets ie. for rib fractures and elderly patients that include many alternative non-opioid meds so we can reduce inpatient use and hence outpatient prescribing.
- ◆ Just optimizing work flow to complete all requirements.
- ◆ We divide the tasks MAPS done Preop Surgeon does education in prep area for outpatients. Then delegates to surgical PA what post op Rx to prescribe. If Elective cases admitted. Same sequence. Surgeon delegates to resident what Rx to provide

Comments

- ◆ Add APPs. More involved discharge rounds.
- ◆ The laws have added some increased “burden”, maps, counseling, etc; but I have seen a significant decrease in the amount of medication being prescribed and used by my patients; it has put a stop to the routine over prescribing of narcotics because it was “easier” or was the common routine. I have seen far less addicted patients now during the postop period. The ones who are seeking medicine, however, will make multiple visits to the ER and other physicians to obtain narcotics, complicating the process

Comments

- ◆ Set expectations by advertising our pain medication policies in waiting/exam rooms.
- ◆ Patient education.

Comments

- ◆ Creating order set and drop down list to satisfy the requirement for the exemption.
- ◆ Looking for answers and standardization. I feel my trauma patients are the hardest to manage for pain control as they are a diverse group to begin with and few are narcotic naive before their injury which hampers me for pain management after surgery.
- ◆ Team approach to managing extra paperwork. EMR with easy MAPS check to speed up work.

Orthopaedic Fracture Coding

Bryant Oliphant, MD
Jim Goulet



Orthopaedic Data in the MTQIP Registry

Bryant W. Oliphant, MD, MBA, MSc

 @BonezNQuality

But it's easy, right?

- Data mining
- Simple papers

ORIGINAL ARTICLE

In-hospital mortality from femoral shaft fracture depends on the initial delay to fracture fixation and Injury Severity Score: A retrospective cohort study from the NTDB 2002–2006

Robert Victor Cantu, MD, MS, Sara Catherine Graves, MD, MS,
and Kevin F. Spratt, PhD, *Lebanon, New Hampshire*

Delayed Internal Fixation of Femoral Shaft Fracture Reduces Mortality Among Patients with Multisystem Trauma

By Saam Morshed, MD, MPH, Theodore Miclau III, MD, Oliver Bembom, PhD, Mitchell Cohen, MD, M. Margaret Knudson, MD, and John M. Colford Jr., MD, PhD

	MTQIP	
Fracture	% Specified	% Not Further Specified
Pelvic Ring		
Acetabulum		
All Femur		
Proximal Femur		
Femoral Shaft		
Distal Femur		
All Tibia		
Proximal Tibia		
Tibial Shaft		
Distal Tibia		
Talus		
Calcaneus		
Navicular		
Clavicle		
Scapula		
Proximal Humerus		
Humerus		
Radius		
Ulna		

	MTQIP		NTDB	
Fracture	% Specified	% Not Further Specified	% Specified	% Not Further Specified
Pelvic Ring	76.58	23.42	65.53	35.47
Acetabulum	61.07	38.93	46.32	53.68
All Femur	88.14	11.86	87.14	12.86
Proximal Femur	96.50	3.50	94.03	5.97
Femoral Shaft	65.72	34.28	97.18	2.82
Distal Femur	65.17	34.83	96.26	3.74
All Tibia	63.17	36.83	54.49	45.51
Proximal Tibia	78.92	21.08	72.40	27.60
Tibial Shaft	73.05	26.95	66.06	33.94
Distal Tibia	51.72	48.28	47.89	52.11
Talus	42.68	57.32	42.74	57.26
Calcaneus	42.42	57.58	42.40	57.60
Navicular	32.14	67.86	31.60	68.40
Clavicle	75.13	24.87	56.31	43.69
Scapula	54.01	45.99	49.04	50.96
Proximal Humerus	72.74	27.26	64.09	35.91
Humerus	93.12	6.88	89.46	10.54
Radius	97.58	2.42	93.96	6.04
Ulna	96.25	3.75	91.65	8.35

MTQIP vs. NTDB

	MTQIP	NTDB
All Fractures	70,918	1,269,278
All NFS Fractures	13,116	342,472
Overall percentage NFS	18.5%	27%

MTQIP

Level 1		Level 2	
Total Fractures	NFS Fractures	Total Fractures	NFS Fractures
29,122	6,187	41,796	6,929
21.2% NFS		16.6% NFS	

*p < 0.001

MTQIP

Simple		Complex	
Total Fractures	NFS Fractures	Total Fractures	NFS Fractures
45,529	4,350	25,389	8,766
9.6% NFS		34.5% NFS	

*p < 0.001

NTDB

Simple		Complex	
Total Fractures	NFS Fractures	Total Fractures	NFS Fractures
722,212	113,526	547,066	228,946
15.7% NFS		41.8% NFS	

*p < 0.001

Ranking of Sources of Injury Information

- Medical Examiner/Autopsy Reports
- Hospital/Medical Records
 - Autopsy Reports
 - Operative Reports → *Gobbledygook*
 - Radiology Reports
 - Nursing or ICU Notes
 - Physician Progress Notes
 - ED Record
 - Discharge Summary
 - Face Sheet
- “Field Records”
 - Ambulance Run Sheets
 - Police Reports
- Bystander
- Patient (esp. LOC)

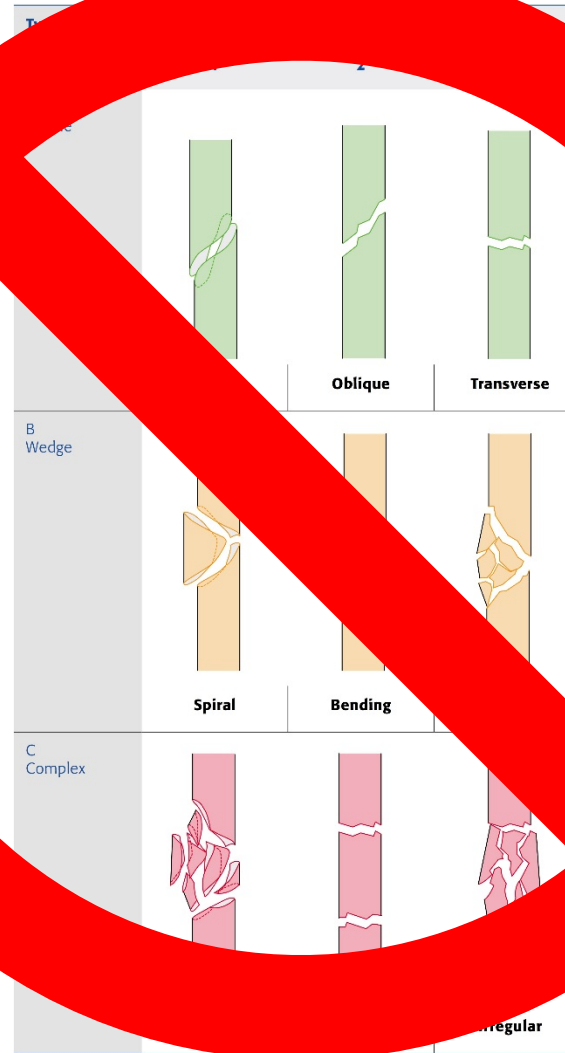
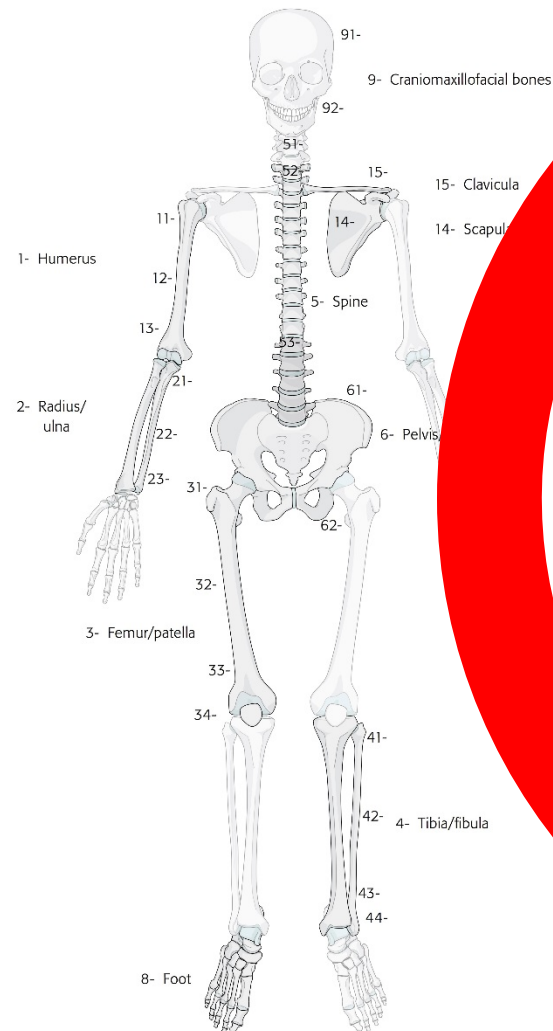


Highest

Level of General Reliability
Completeness of Detail

Lowest

Orthopaedic Classification Systems



Type	Group		
	1	2	3
A Extraarticular			
	Simple	Wedge	Complex
B Partially articular			
	Split	Depression	Split-depression
C Complex			
	Simple articular, simple metaphyseal	Simple articular, complex metaphyseal	Complex articular, complex metaphyseal

ICD9

- 808 Fracture of Pelvis
 - 808.4 Closed fracture of other specified part of pelvis
 - 808.43 Multiple closed pelvic fractures with disruption of pelvic circle

ICD9

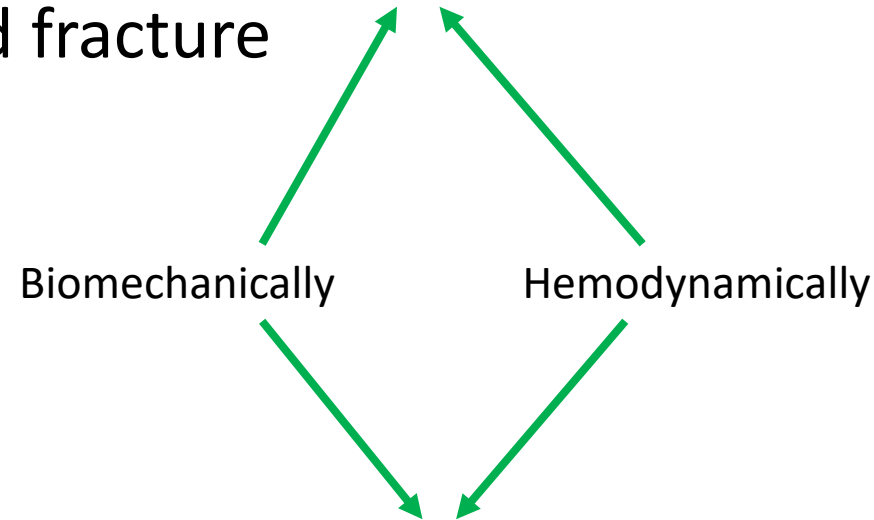
- 808 Fracture of Pelvis
 - 808.4 Closed fracture of other specified part of pelvis
 - 808.43 Multiple closed pelvic fractures with disruption of pelvic circle

ICD10

- [S32.810A](#) Multiple fractures of pelvis with stable disruption of pelvic ring, initial encounter for closed fracture
- [S32.811A](#) Multiple fractures of pelvis with unstable disruption of pelvic ring, initial encounter for closed fracture

ICD10

- **S32.810A** Multiple fractures of pelvis with **stable** disruption of pelvic ring, initial encounter for closed fracture



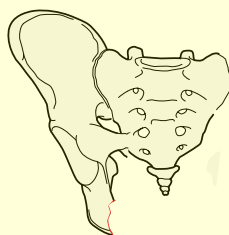
- **S32.811A** Multiple fractures of pelvis with **unstable** disruption of pelvic ring, initial encounter for closed fracture

AIS2005

Stable



Partially Stable



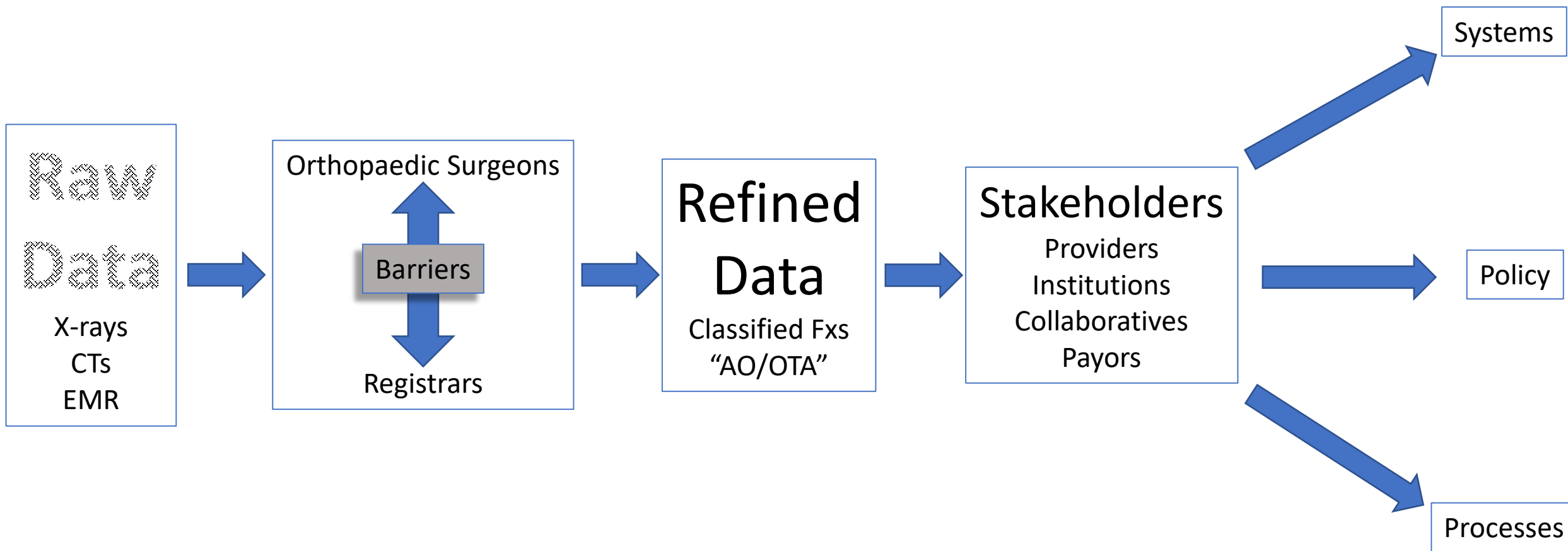
Unstable

LC1 (Non-operative)

APC2 (Operative)



Pelvic ring fracture (AIS2005):
Incomplete disruption of posterior arch



Where's the rest of the data?



No Follow up

Where are the real orthopaedic outcomes?

- Planned Surgeries?
 - Infections?
 - Nonunions?
 - Malunions?
 - Post traumatic arthritis?
-
- They happen...but where's the data?

“You can't build a great building on a weak foundation.
You must have a solid foundation if you're going to
have a strong superstructure.”

- Gordon B. Hinckley



Where can we go from here?

Can we make a registry?

- Where are the details we need/want?
- Improve the data we collect
- Coordinate MI Centers

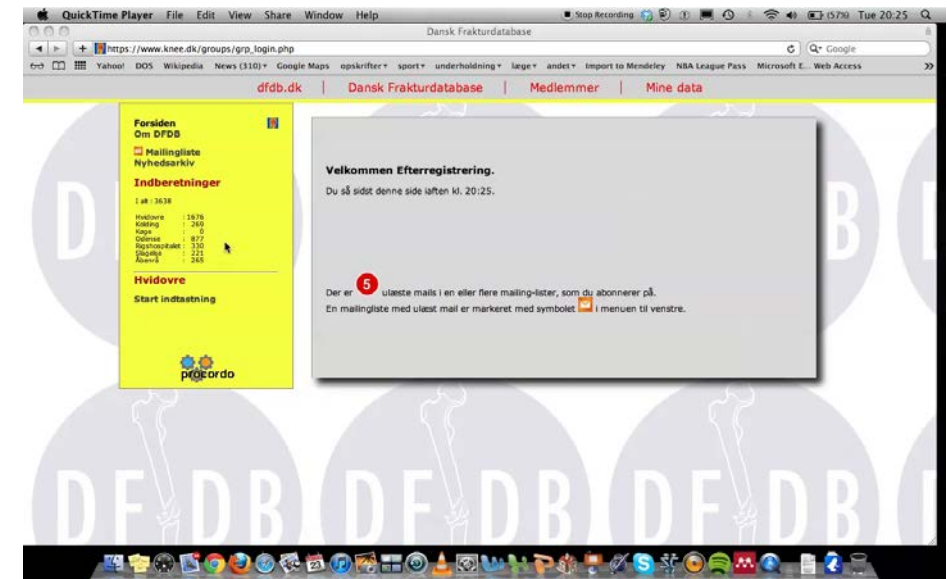




Danish Fracture DataBase

- 2 min per registration
- To be completed by the surgeon immediately after surgery
- Reoperations are linked to primary interventions
- Patient, trauma and surgery related factors are recorded
 - AO/OTA Fracture classification
 - Procedure(s) performed
 - Implant(s) used

Kirill Gromov, MD, PhD



Move Away From The Big Brother Mindset



Conclusions

- Be careful of simple answers to complex issues
- Risk adjustment is difficult for orthopaedic injuries
- If we want to have a great system, we (ortho) need to put in the effort
- We have the opportunity to make something spectacular

Thank you

Bryant Oliphant, MD, MBA, MSc

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 @BonezNQuality

Inadequate Coding

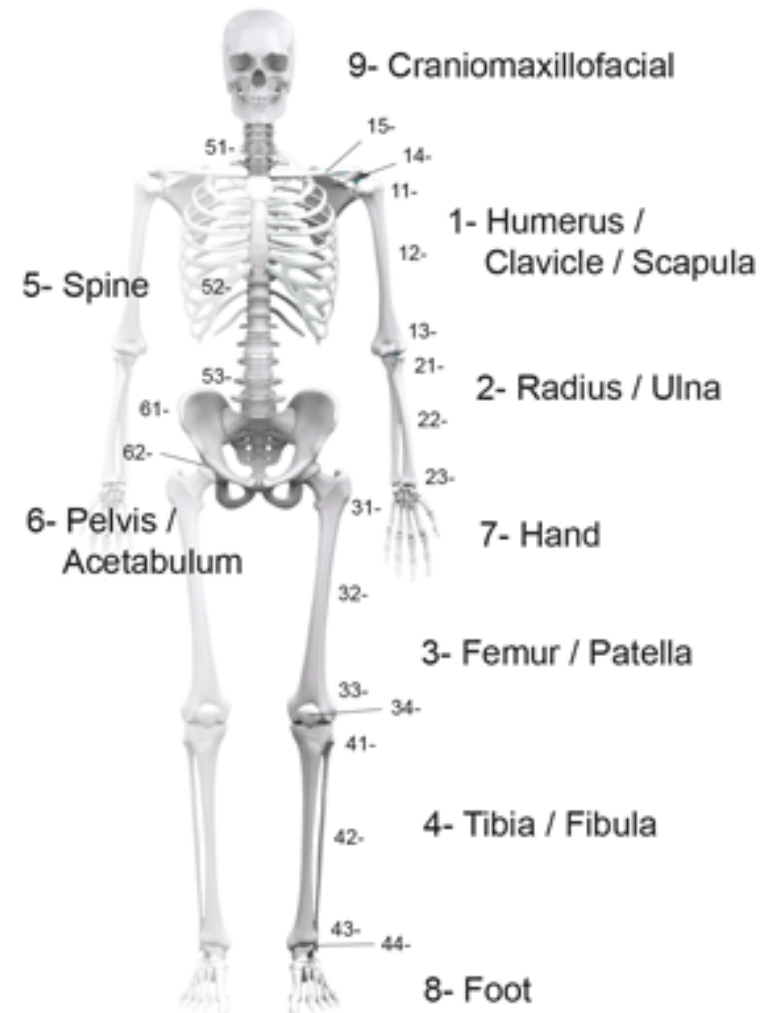
James A Goulet, MD

Professor, Department of Orthopaedic Surgery

Michigan Medicine

AO:OTA fracture classification

- Methodology
- Sample size
- Comparison
- Next steps

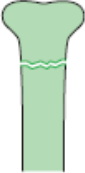


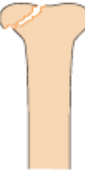
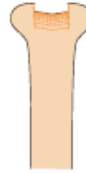
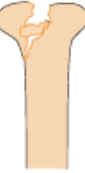
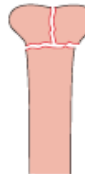

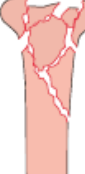


Methodology

- Standard coding system (AO/OTA) introduced at Michigan Medicine Orthopaedic Trauma surgery admissions
- Introduced July 1st, 2018 as pilot
- No further reminders/follow-up after initial presentation
- Coding system compendium was provided to residents

Sample size

- 113 patient encounters from July 1, 2018- September 4, 2018
- 40 of these encounters were coded using new system
- 37 of the 40 also had an ICD code reported

Type	Group		
	1	2	3
A Extraarticular	 Simple	 Wedge	 Complex
B Partial articular	 Split	 Depression	 Split-depression
C Articular	 Simple articular, simple metaphyseal	 Simple articular, complex metaphyseal	 Complex articular, complex metaphyseal

Coding comparison

- AO/OTA- Pelvis, acetabulum, partial articular, isolated column or wall, anterior column or wall fracture, High anterior column fracture (exits along iliac crest)
 - 5 levels (62A3.2)
 - High specificity, provides information for surgical intervention and fracture outcomes
- ICD-10- Fracture of unspecified parts of lumbosacral spine and pelvis, initial encounter for open fracture
 - 7 levels (S32.9XXB)
 - Low specificity

Next steps

- Promote coding system as a standard protocol for charting surgical admissions
- Continue gathering information on site
- Expand study to St Joseph Mercy Ann Arbor this year
- Add new coding system data fields to MTQIP



Thank You

Conclusion

- ◆ Evaluations
 - Fill out and turn in
- ◆ Questions?
- ◆ See you in February