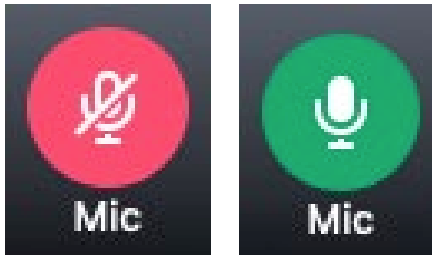
The Michigan Trauma Quality Improvement Program

Virtual, MI
October 13, 2020

Meeting Logistics



- Join via computer and enter full name
- Mute all microphones
- Discussion opportunities at section ends
- Use chat to signal contribution
- You'll unmute your own microphone

GoToMeeting

Meeting Logistics

- **Please sign the electronic confidentiality agreement to receive attendance points**

https://umich.qualtrics.com/jfe/form/SV_ahQcb5OMpSCATT7 **or**

Disclosures

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

Disclosures

- Mark Hemmila Grants
  - Blue Cross Blue Shield of Michigan
  - Michigan Department of Health and Human Services
  - Ford Motor Company
  - Department of Defense
  - National Institutes of Health - NIGMS

No Photos Please

Evaluations

- Link will be emailed to you following meeting
- You have up to 7 days to submit
- Please answer the evaluation questions
- Physicians/Nurses/Advanced Practitioners:
  - CME for this meeting
- BCBSM Questions
  - 4 Questions

Program Updates

- Submitting 2-year SOW
  - MTQIP
  - MACS
- MACS Coordinator
  - Kim Kramer, PA-C
  - kikramer@med.umich.edu

Data Submission

- Data submitted August 7, 2020
  - This report
- Data submitted October 2, 2020
  - Pending
  - Will notify
- Next data submission
  - December 4, 2020

Future Meetings

- Winter
  - Tuesday February 9, 2021
  - Virtual
- Spring
  - Wednesday May 12, 2021
  - Boyne Mountain vs. Virtual
- Spring (Registrar's, MCR's)
  - Tuesday June 1, 2020
  - Ypsilanti, EMU Marriott

State of Michigan

- FY 2021
  - 22 Level 3 Hospitals
  - State and region reporting (Level 1,2,3)
  - Level 3 Data Validation
    - 6 Hospitals done, 1 2x
    - 5 Hospitals pending

ACS COT Verification Review Information

William Marx, DO
Anna Ledgerwood, MD
Alita Pitogo

Virtual Verification Site Visits

Bill Marx, DO, FACS

VRC Chair

VRC Virtual Verification Pilot: Phase I

- Reverification
  - Level I Adult Center
  - Pediatric Center
  - Level III Center

Phase I: What did we learn?

- The pre-review call is essential
- The roles of site visit coordinator and navigators
- The chart review
- The tour
- The review meeting

Phase I: What did we learn?

- Positive feedback from both trauma centers and reviewers
- No additional cost of hotel for reviewer and review dinner for the hospital
- No travel for the reviewers

Detroit Receiving Hospital Virtual Reverification 2020

CRITICAL ELEMENTS FOR A SUCCESSFUL VIRTUAL VISIT

CHALLENGES

MEDICAL RECORD REVIEW

Dr Anna Ledgerwood, TMD
Alita C. Pitogo, TPM

Critical Elements

Critical Elements for a successful virtual reverification

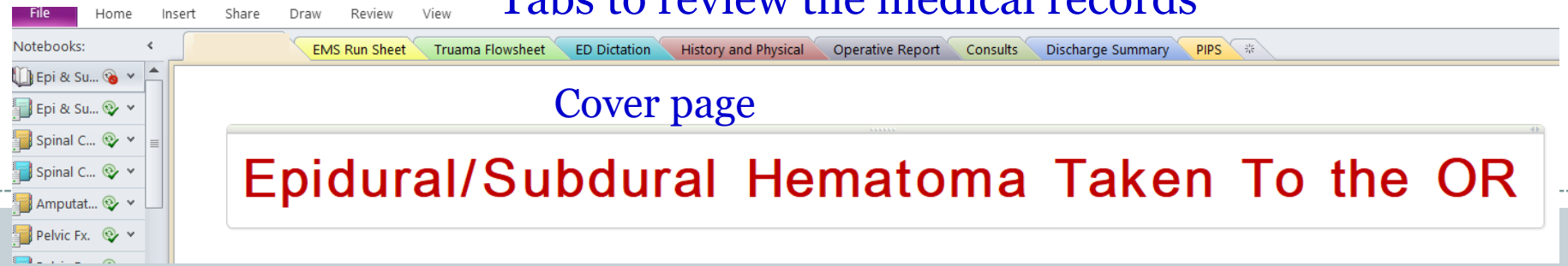
- Administration support
- Compliance officer involvement
- Information technology involvement
- Dry runs
- Using trauma staff as navigators
- 2- Zoom sessions
- IT personnel remotely shadow the surveyor's PC 2 days before pre-review, to make sure they have all the applications needed to open the EMR and view the medical record in OneNote

Challenges

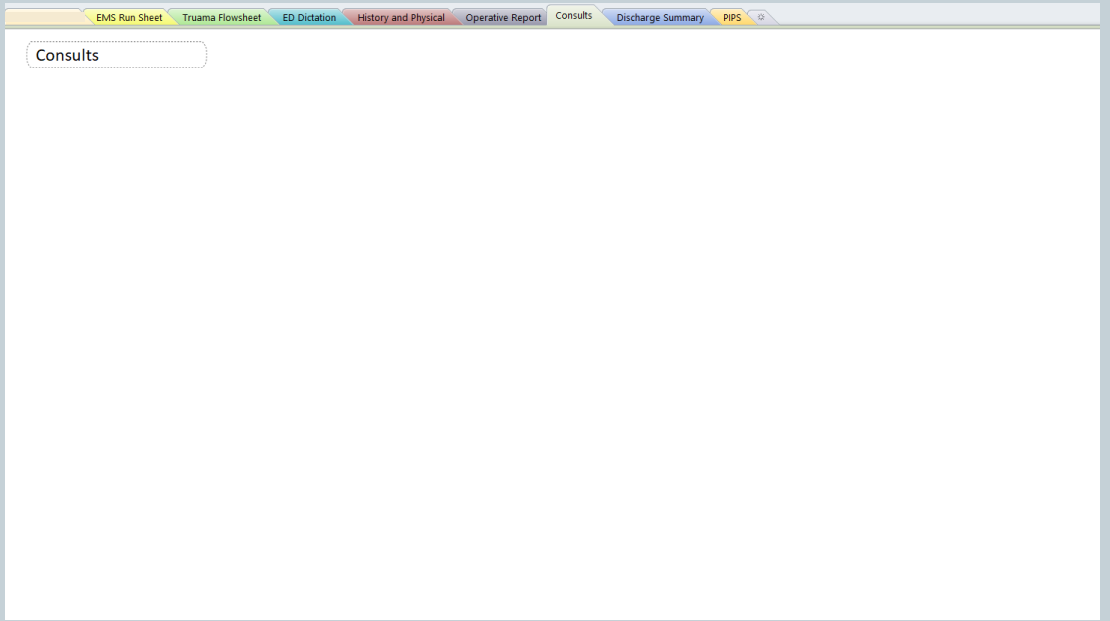
- Walk around tour in a crowded ED
- Reviewers are in two rooms
- Virtual tour suggestions
- Pre-review sessions
- PI Minutes
- Education, Prevention, Research
- Case Reviews each reviewer select their cases

Medical Record Review

Tabs to review the medical records



Consult tab arranged by date and service



Documents are saved in a USB drive with a password to open the file

Questions

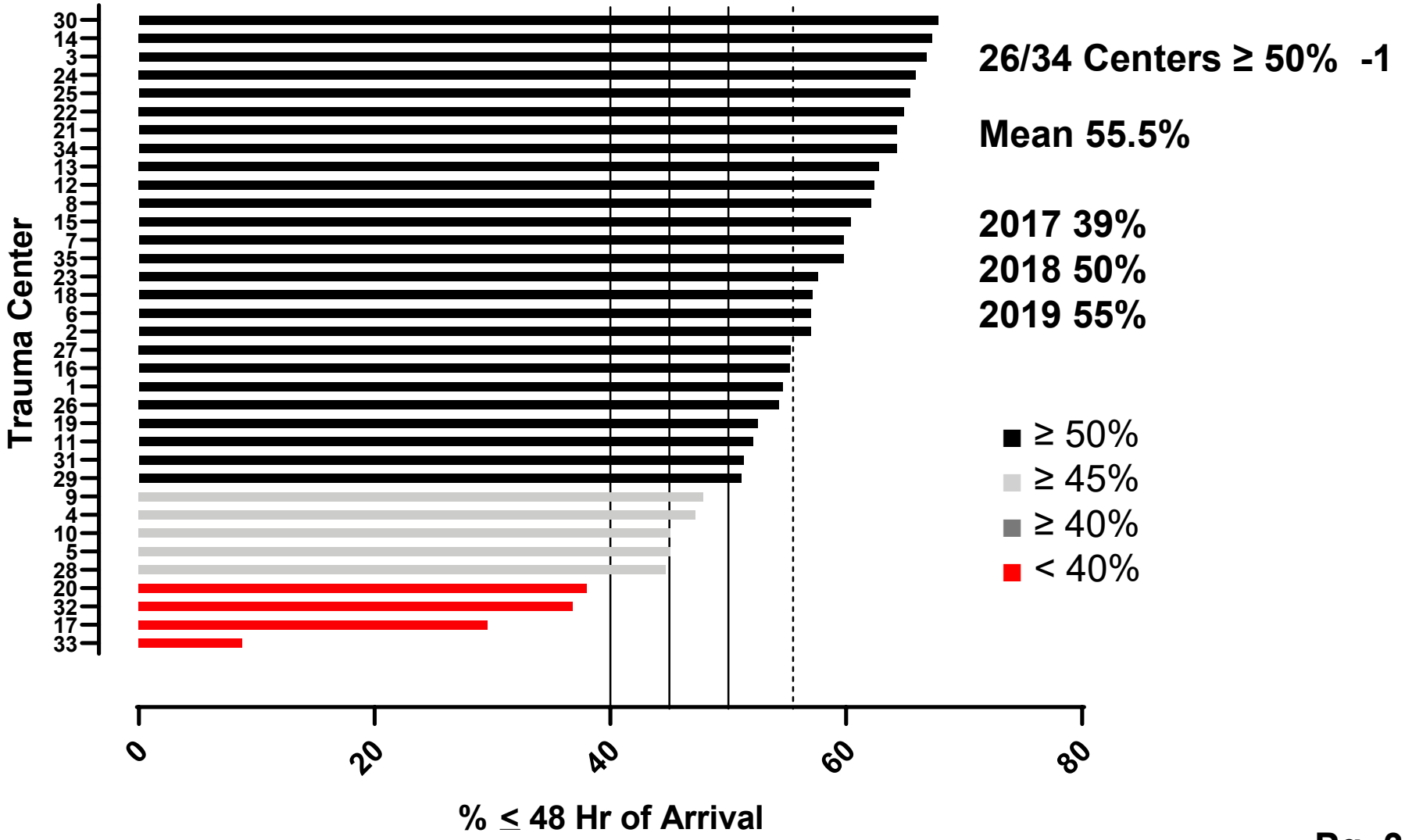
MTQIP Data

Mark Hemmila, MD

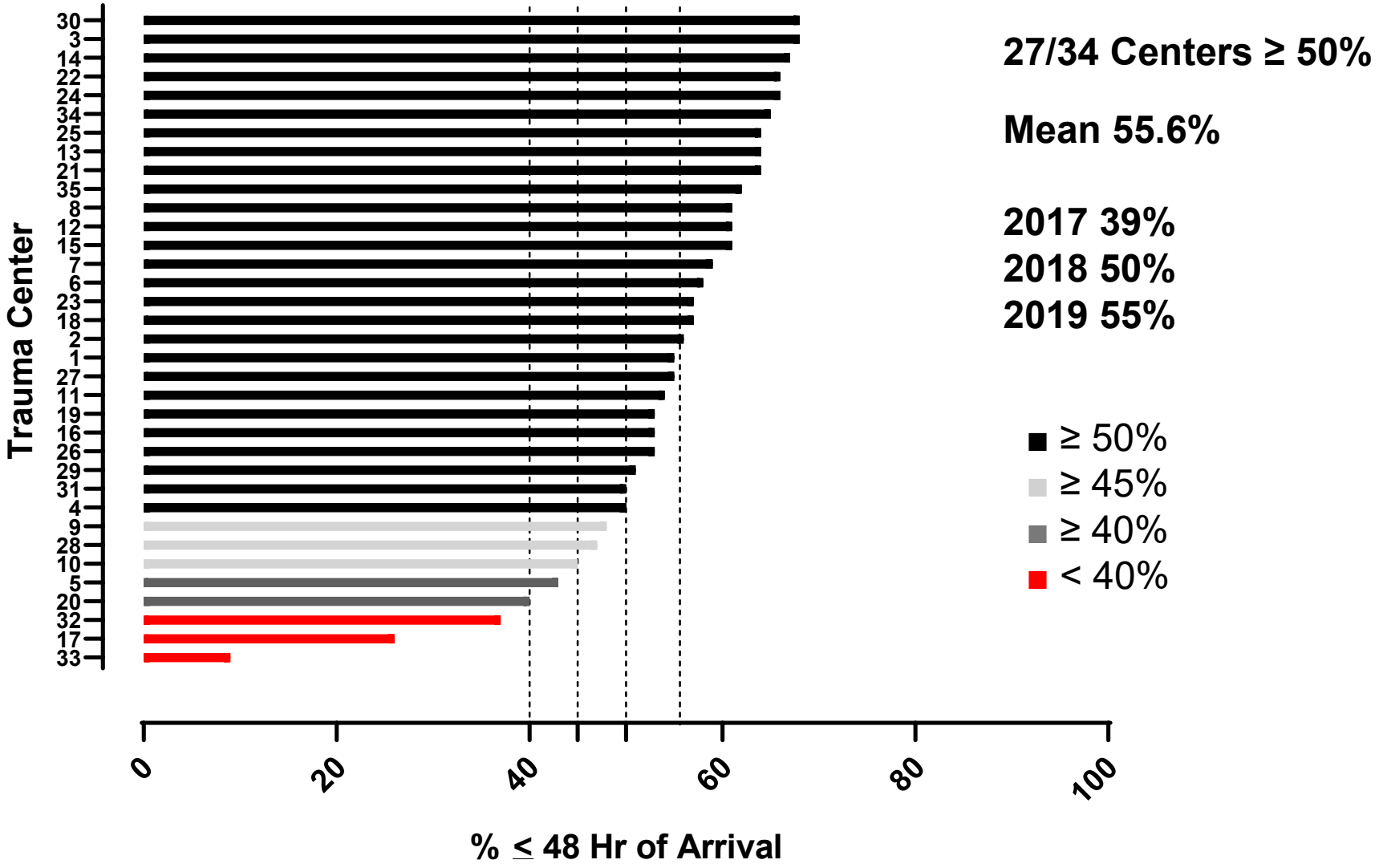
#4 Timely LMWH VTE Prophylaxis in Trauma Service Admits

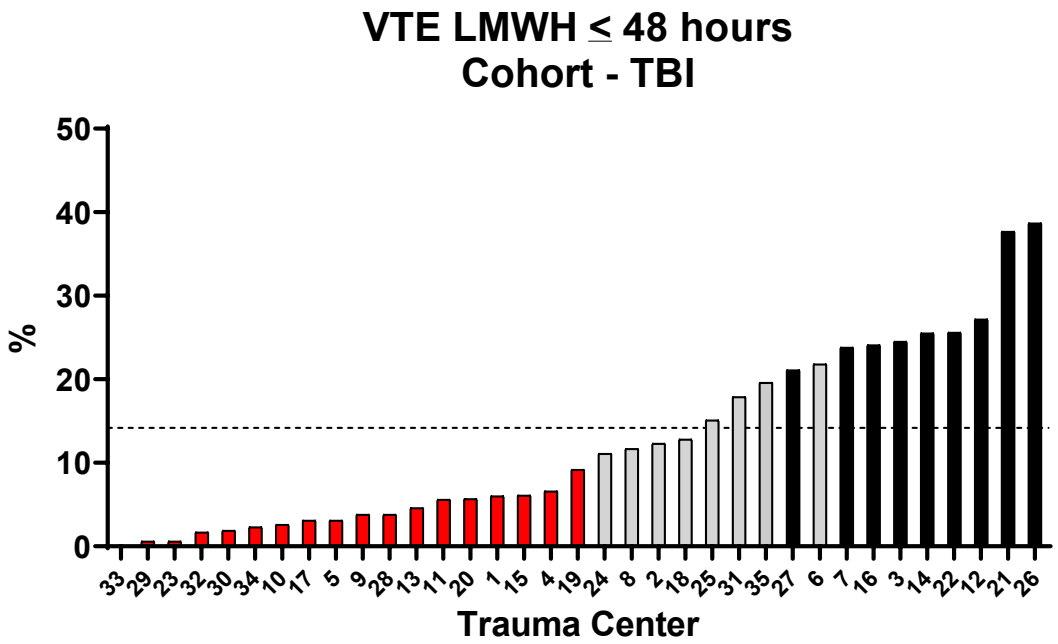
- Venous Thromboembolism (VTE) Prophylaxis with LMWH Initiated Within 48 Hours of Arrival in Trauma Service Admits with > 2 Day Length of Stay (18 mo: 1/1/19-6/30/20)
  - ≥ 50% of patients (≤ 48 hr)
  - ≥ 45% of patients (≤ 48 hr)
  - ≥ 40% of patients (≤ 48 hr)
  - < 40% of patients (≤ 48 hr)

Metric #4 - VTE Prophylaxis LMWH Timeliness
Cohort 2 - Admit to Trauma
1/1/19 - 5/31/20

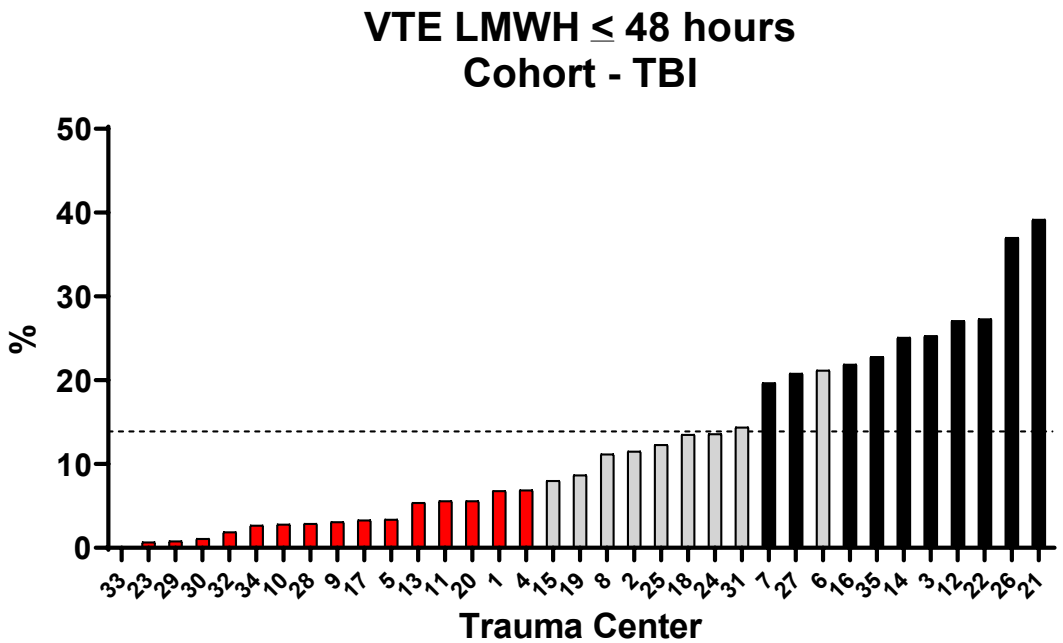


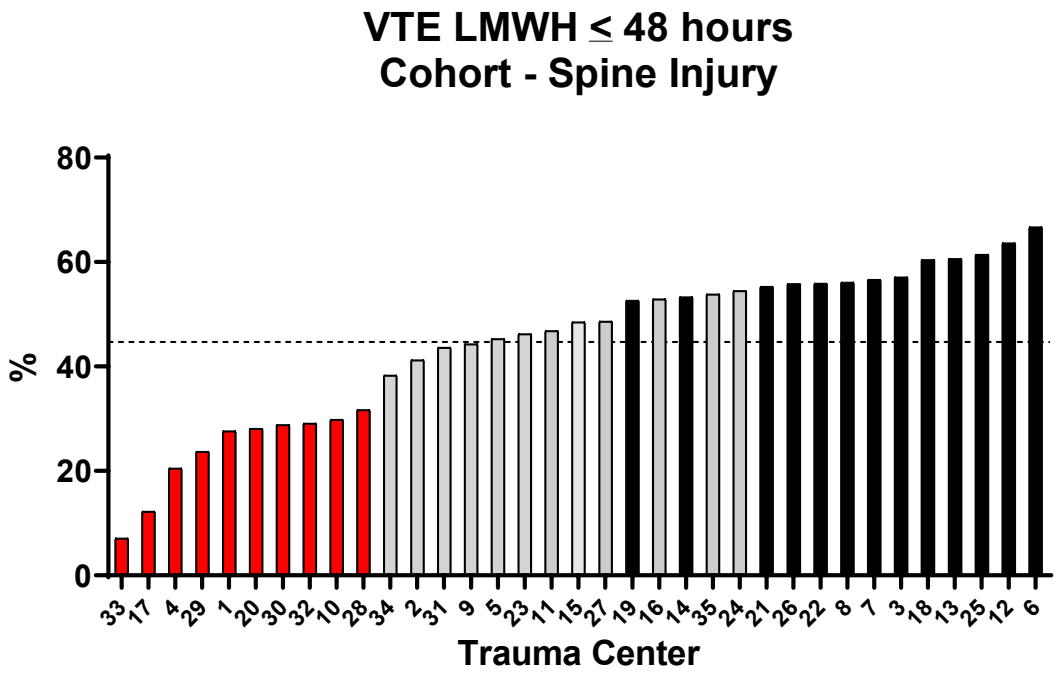
Metric #4 - VTE Prophylaxis LMWH Timeliness
Cohort 2 - Admit to Trauma
1/1/19 - 1/31/20



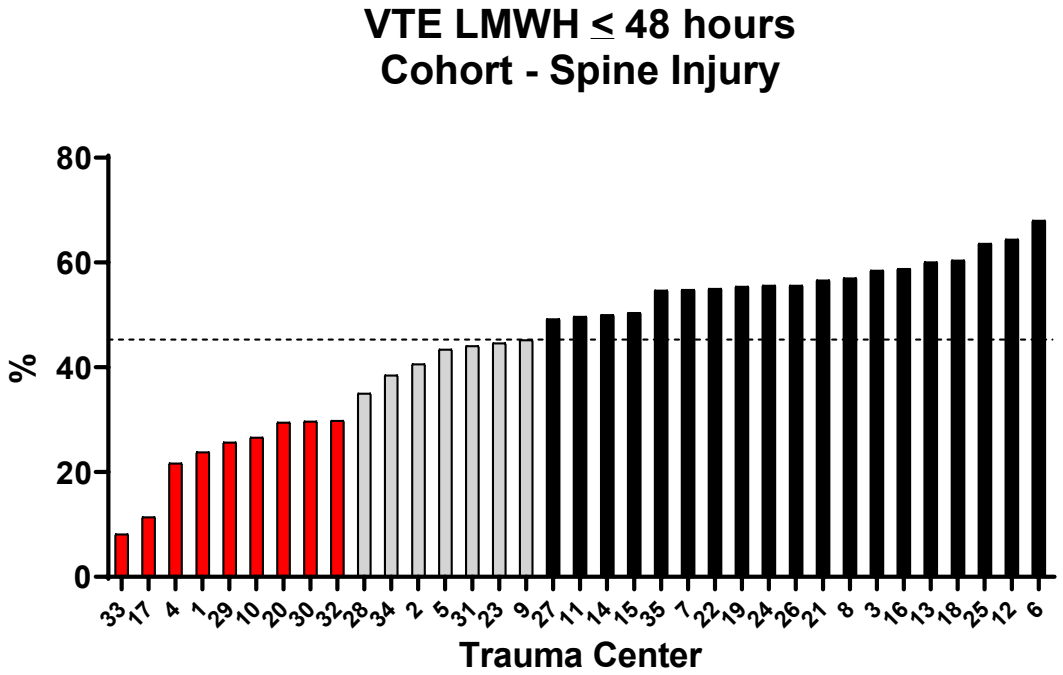

VTE LMWH ≤ 48 hours
Cohort - TBI
%
50
40
30
20
10
0
33 29 23 32 30 34 10 17 5 9 28 13 11 20 1 15 4 19 24 8 2 18 25 31 35 27 6 7 16 3 14 22 12 21 26
Trauma Center

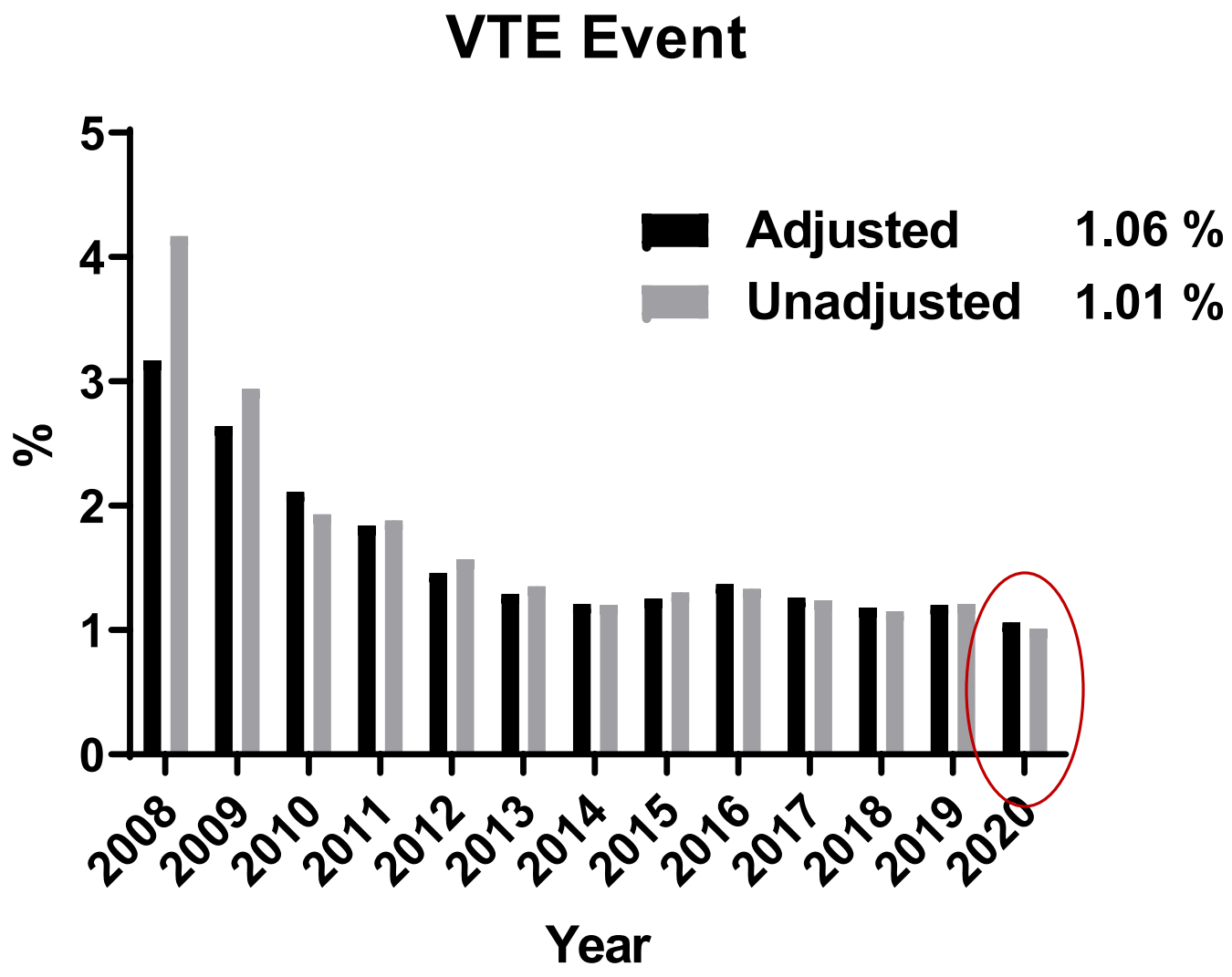
Current


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


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

Current


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


VTE Event
Adjusted 1.06 %
Unadjusted 1.01 %
%
0
1
2
3
4
5
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

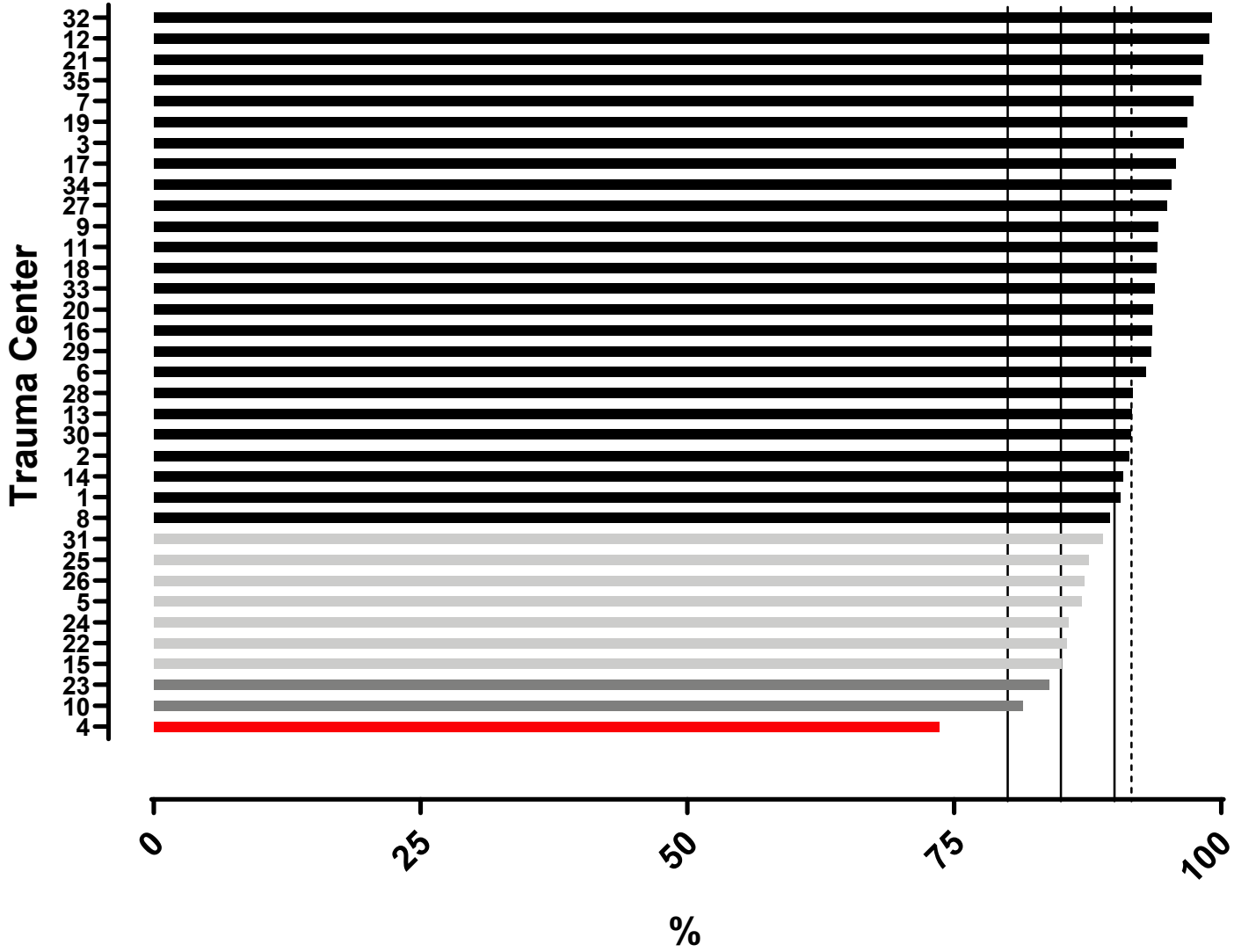
#5 Timely Surgical Repair in Geriatric (Age ≥ 65) Isolated Hip Fracture

- Time to surgical repair of isolated hip fracture in patients age 65 or older (12 mo: 7/1/19-6/30/20) who get an operation
  - ≥ 90% of patients (≤ 48 hr)
  - ≥ 85% of patients (≤ 48 hr)
  - ≥ 80% of patients (≤ 48 hr)
  - < 80% of patients (≤ 48 hr)

Should we include non-operative patients?

- Pro
  - Could represent surgeon bias
- Con
  - These patients automatically count as > 48 hrs
- What is the intent of the measure?
  - Timely operation
  - Reduce delays > better outcome
  - Avoid unnecessary testing

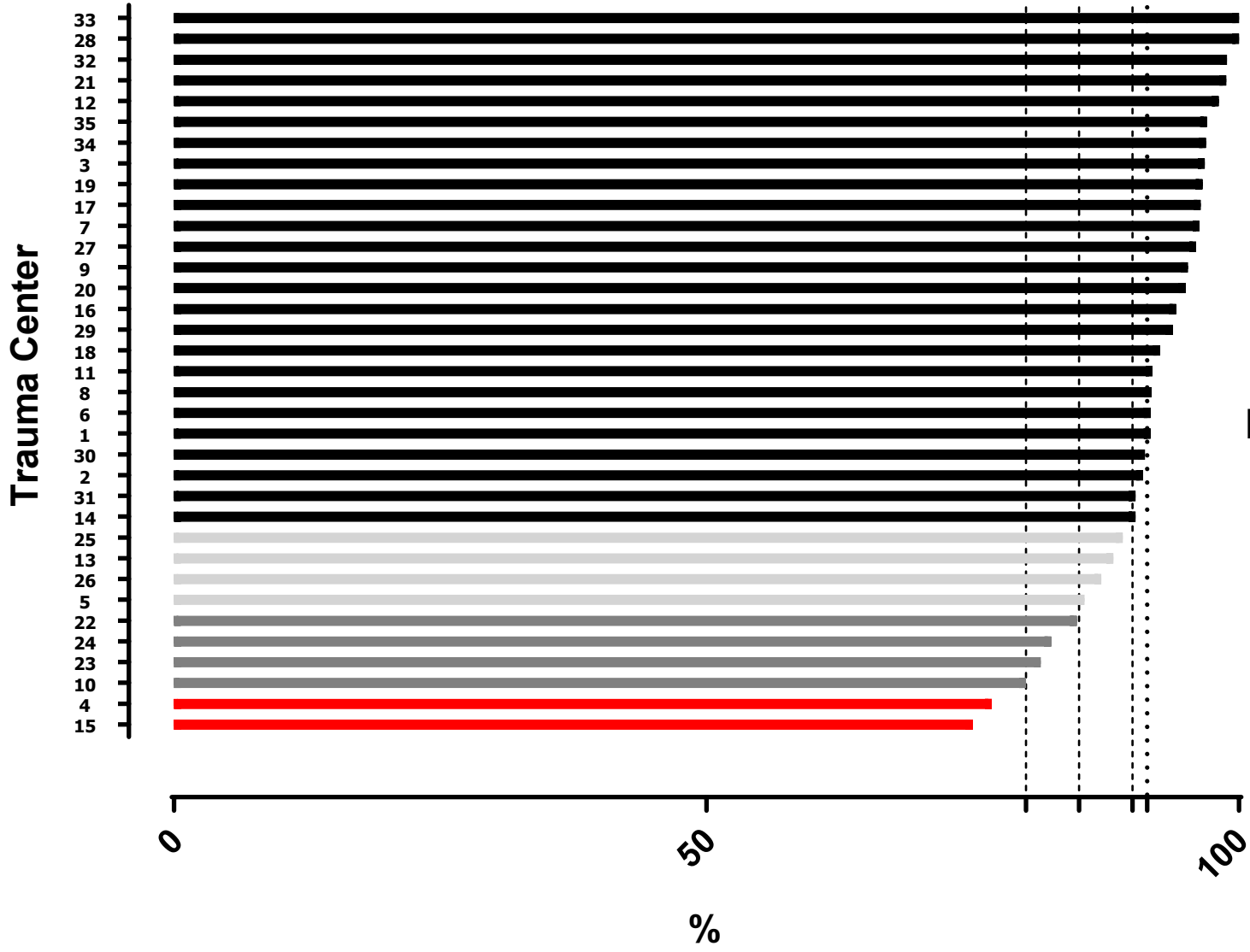
Metric #5 - Timely Surgical Hip Repair ≥ 65 years
Cohort 8 - Isolated Hip Fracture
7/1/19 - 5/31/20



Mean 91.6%

Non-op excluded

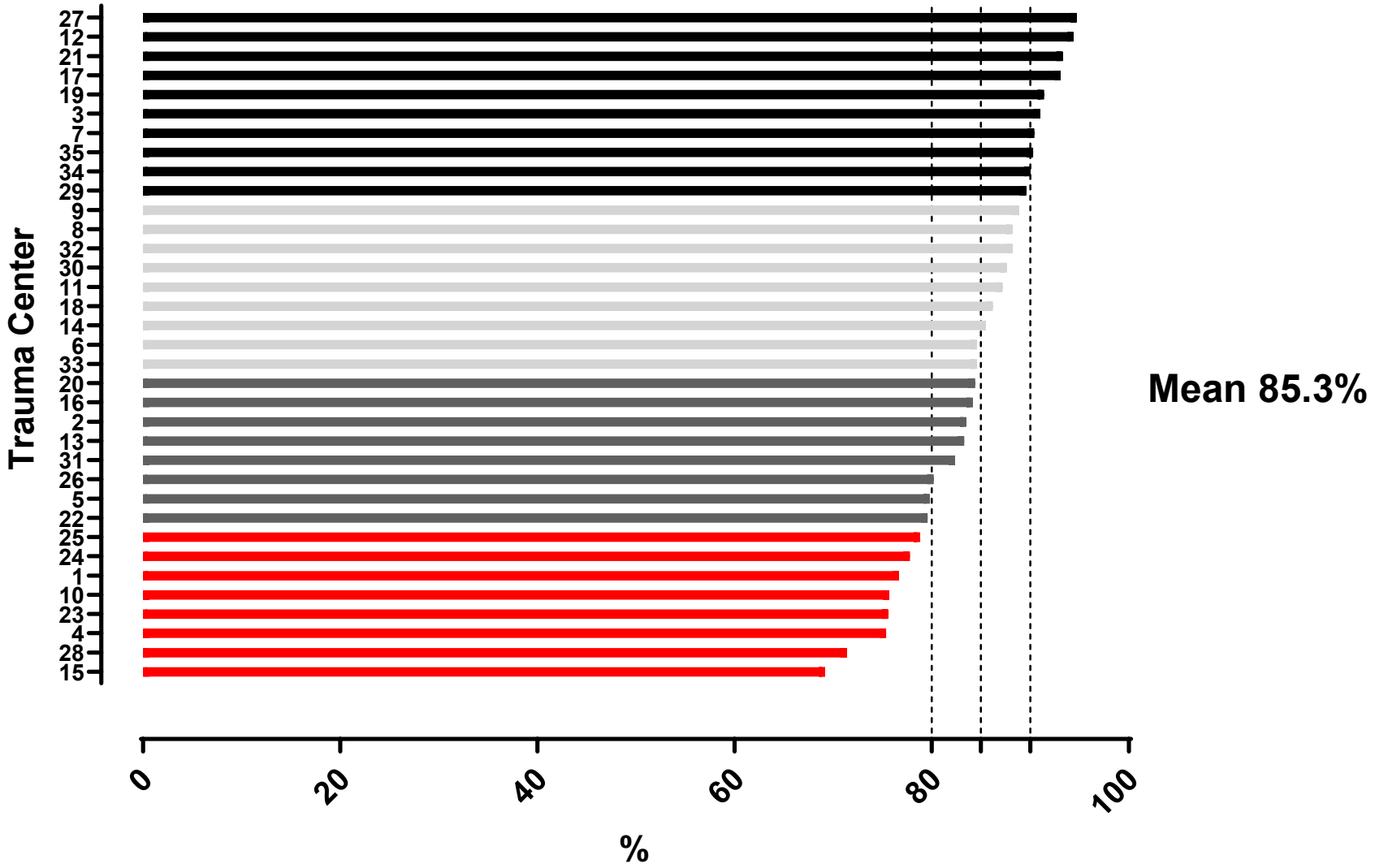
Metric #5 - Timely Surgical Hip Repair ≥ 65 years
Cohort 8 - Isolated Hip Fracture
7/1/19 - 1/31/20



Mean 91.4%

Non-op excluded

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

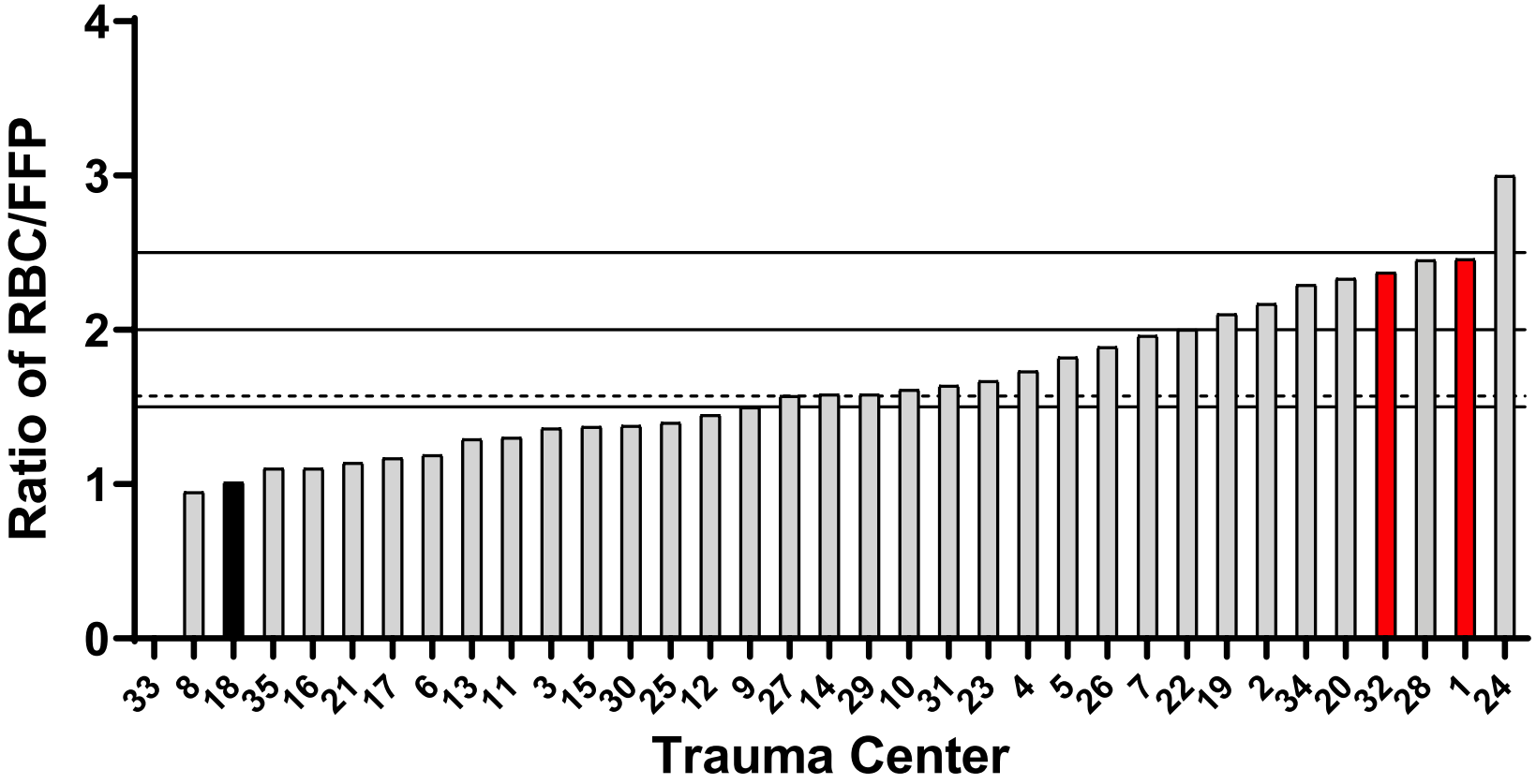


Mean 85.3%

#6 Red Blood Cell to Plasma Ratio

- Red blood cell to plasma ratio (weighted mean points) of patients transfused ≥5 units in first 4 hours (18 Mo's: 1/1/19-6/30/20)

Metric #6 - RBC to FFP Ratio - Mean
Cohort 1 - MTQIP All
1/1/19 - 5/31/20



Mean 1.57 - ↑1.56

ACS TQIP Collaborative

Table 34: Massive Transfusion Protocol: Plasma to Packed Red Blood Cells (PRBC) Ratios for Hemorrhagic Shock Patients

	Patients[1]	Plasma:PRBC Transfused Ratio between 1:1 and 1:2	
Group	N	N	%[2]
All Others	2,299	1,580	68.7
Collaborative	64	51	79.7

[1] Patients receiving more than 6 units of PRBCs within 4 hours from ED/Hospital arrival
[2] Patients with no plasma or unknown volume of plasma are included in the denominator

Mean points on MTQIP CQI Hospital Scoring Index = 8.1

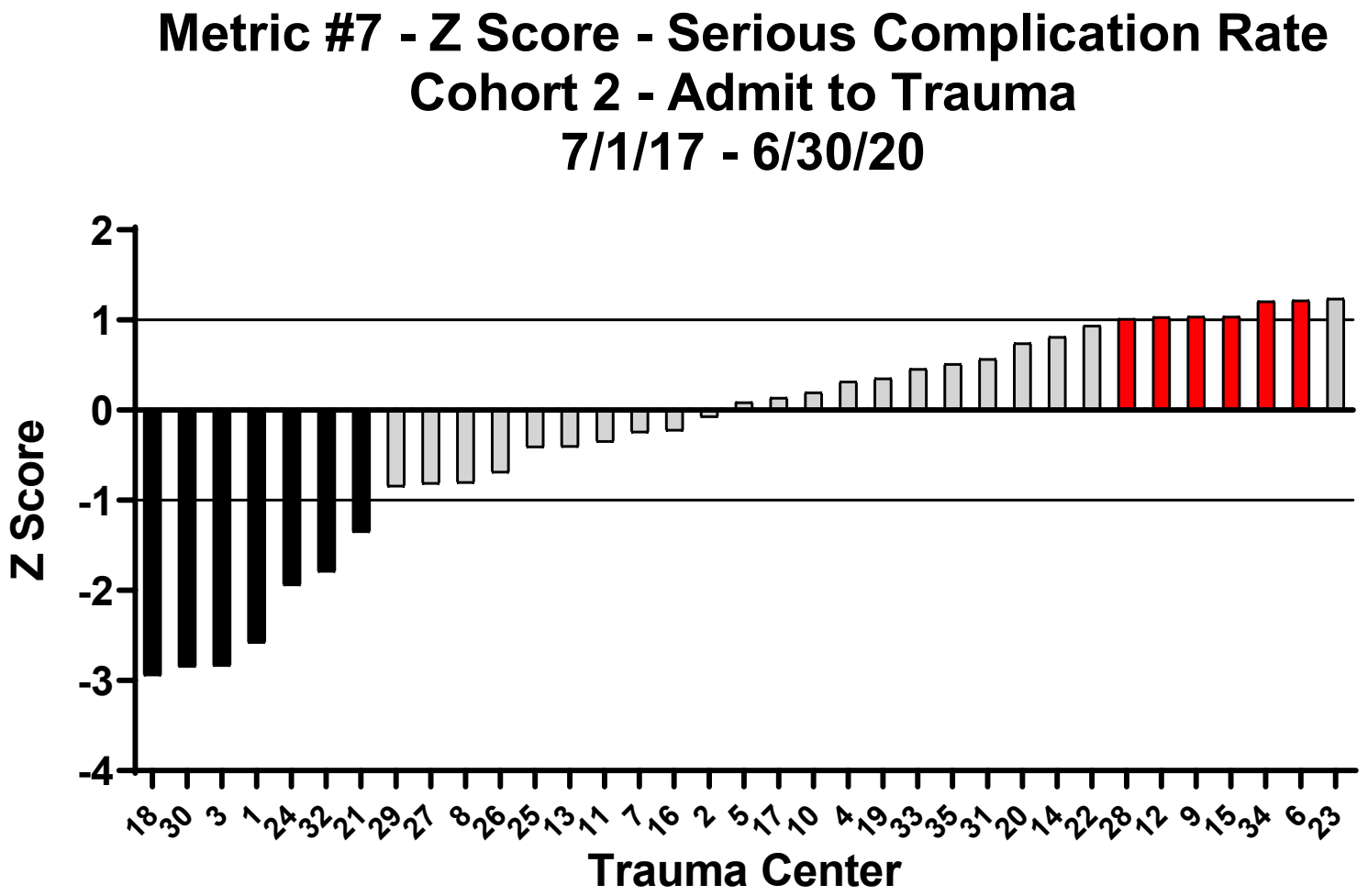
#7 Serious Complications

- Serious Complication Rate-Trauma Service Admits (3 years: 7/1/17-6/30/20)

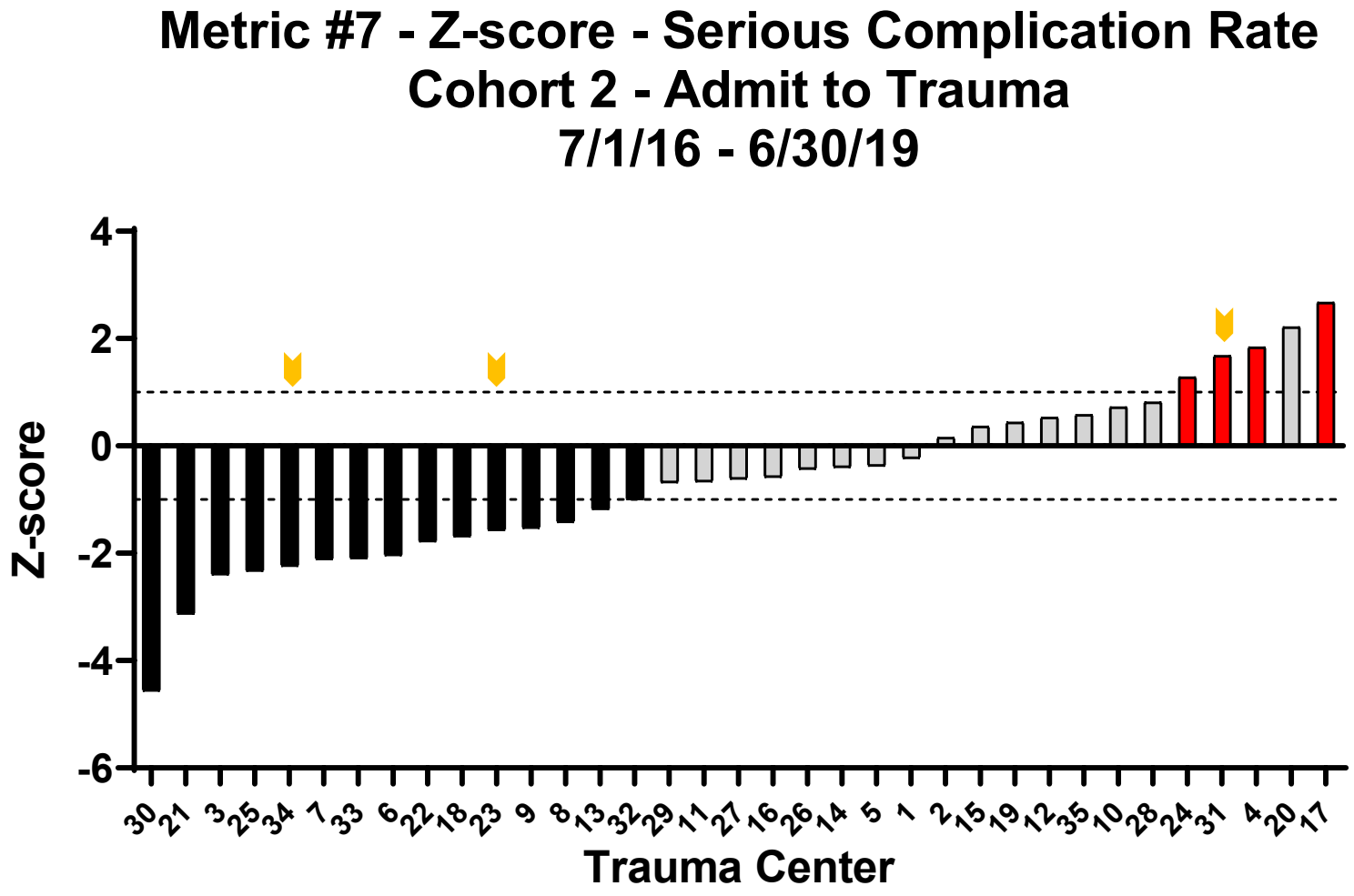
Z-score

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

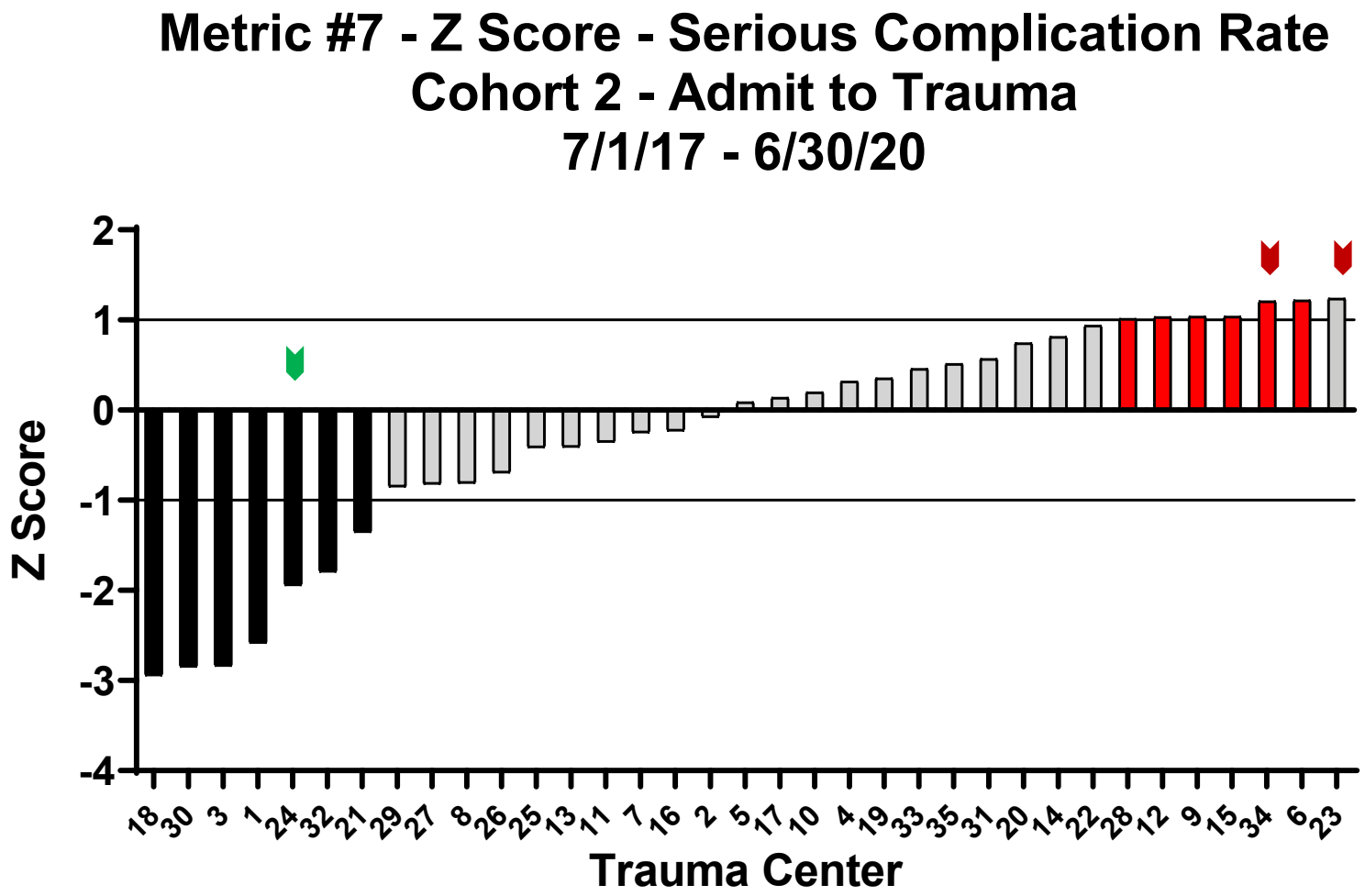
#7 Serious Complication Rate (Z-score)



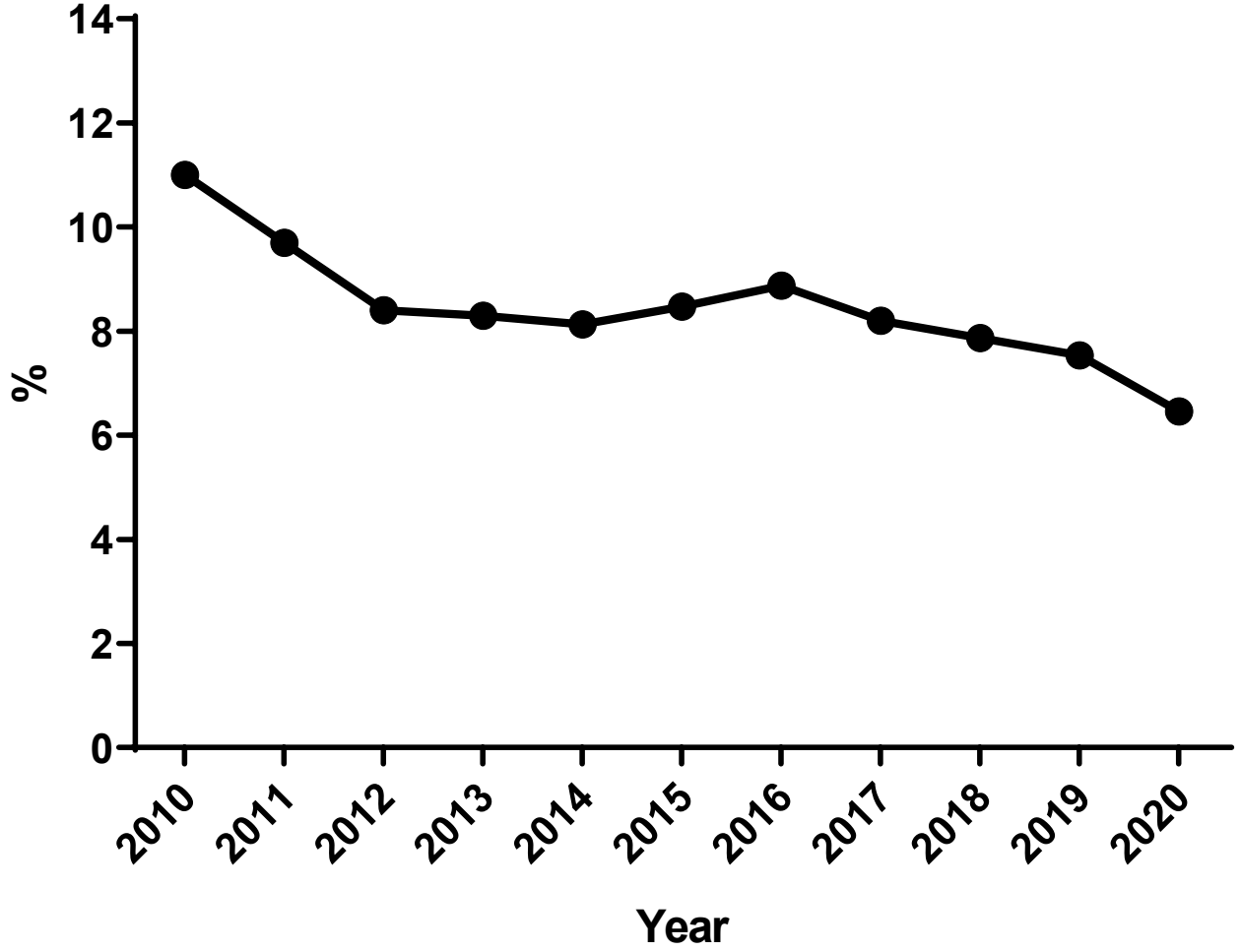
#7 Serious Complication Rate (Z-score)



#7 Serious Complication Rate (Z-score)



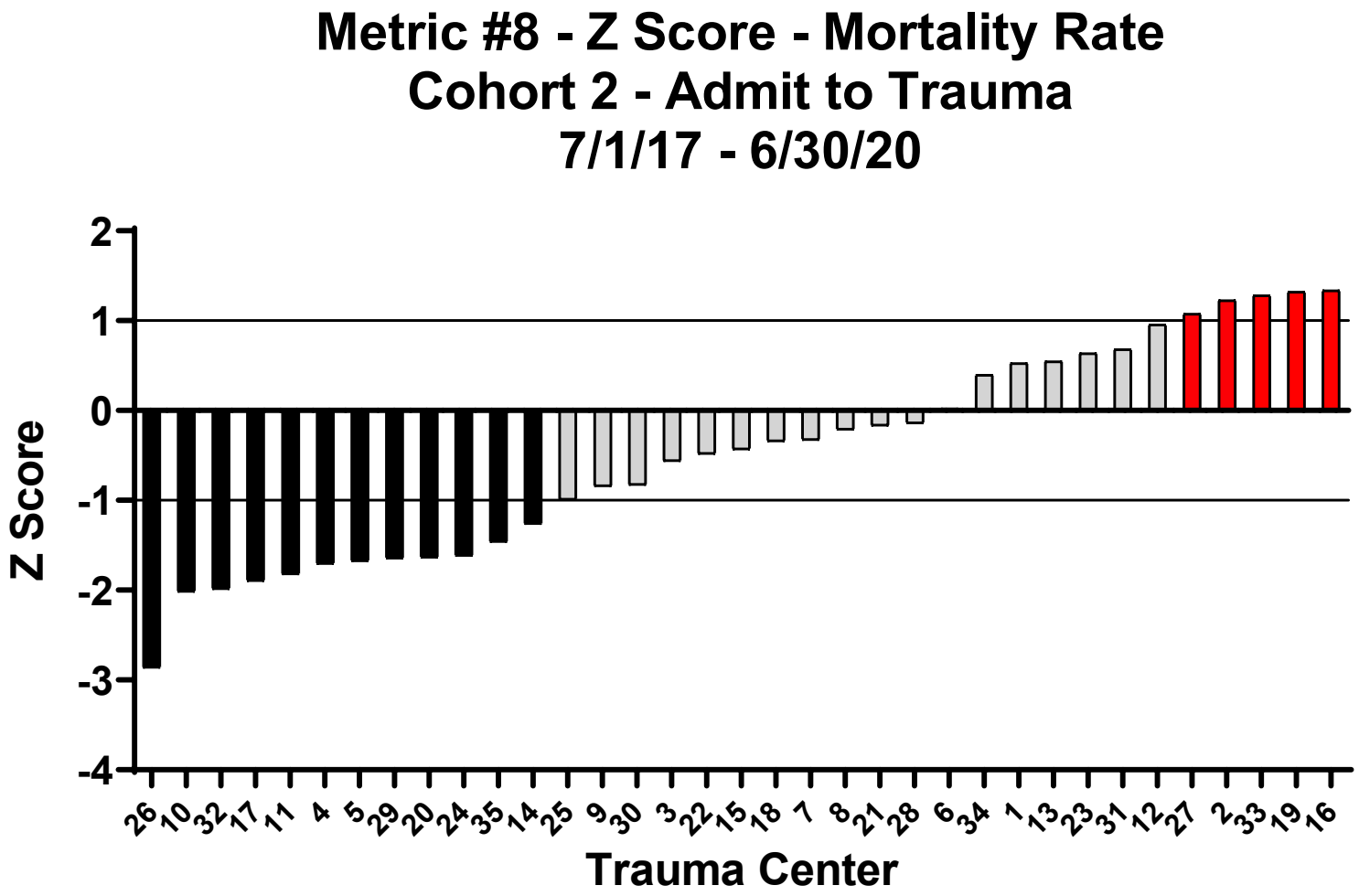
Collaborative Outcome Overview - Serious Cx
Cohort 2 - Admit to Trauma



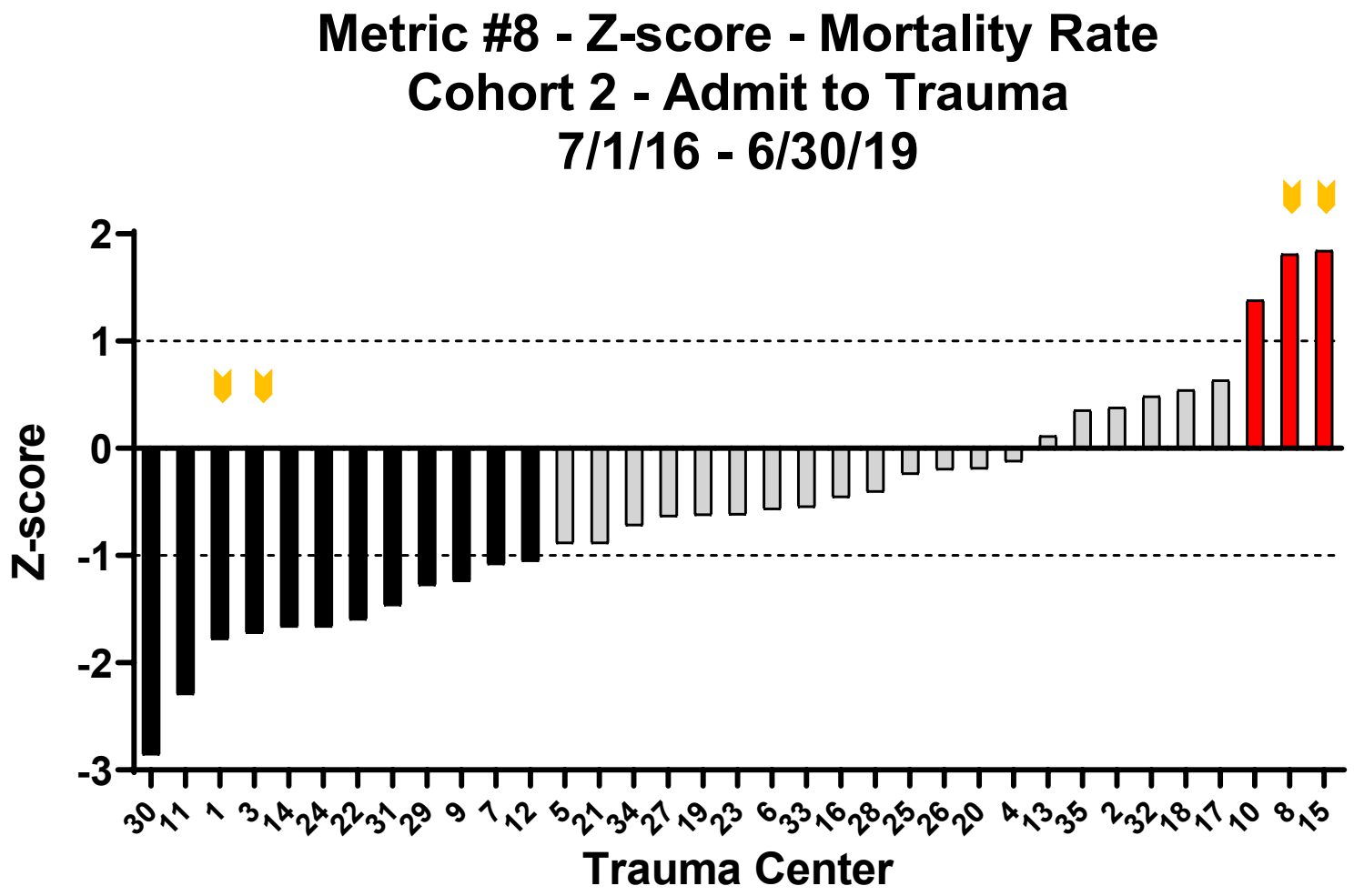
#8 Mortality

- Mortality Rate-Trauma Service Admits (3 years: 7/1/17-6/30/20)

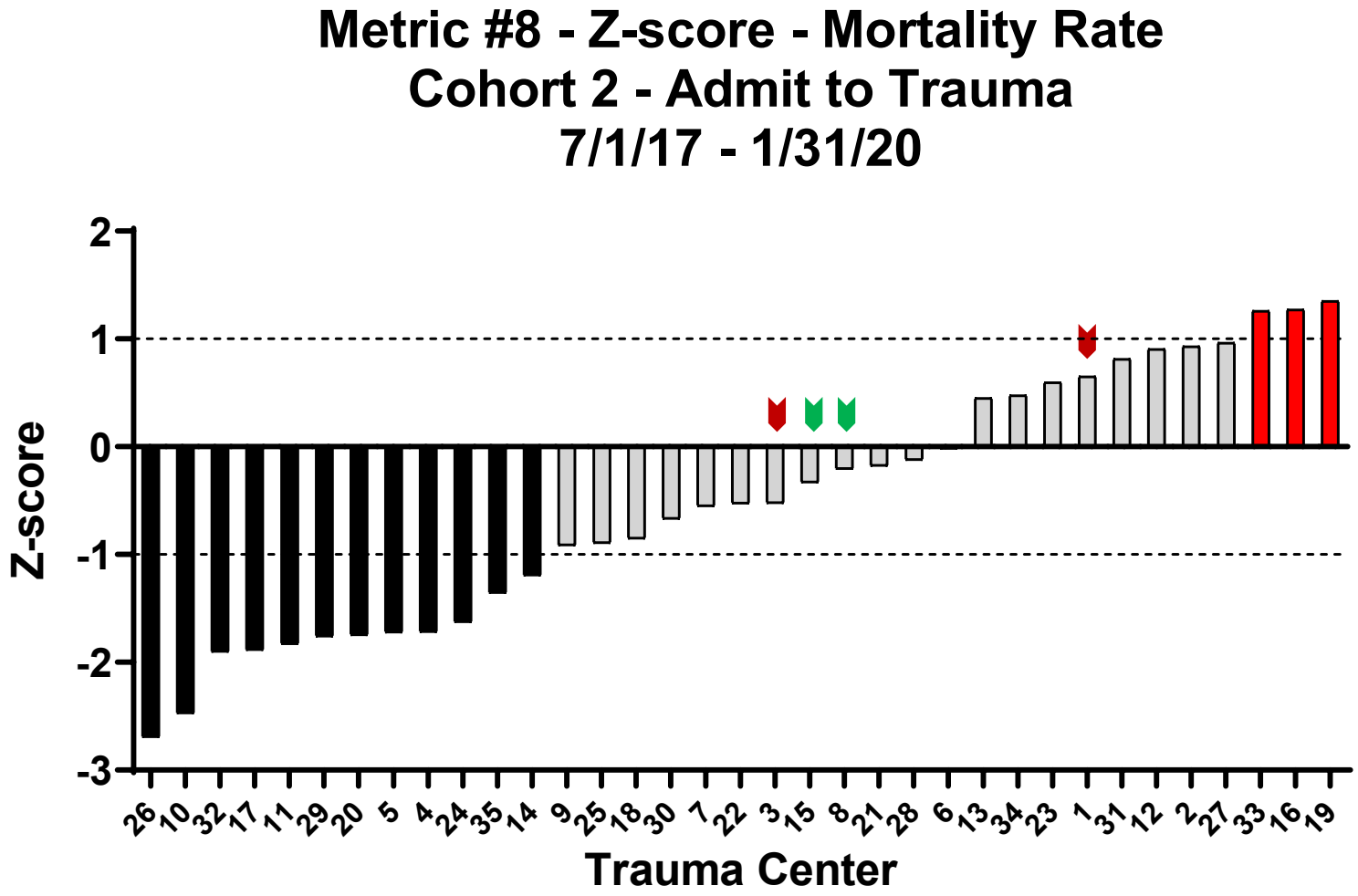
#8 Mortality Rate (Z-score)



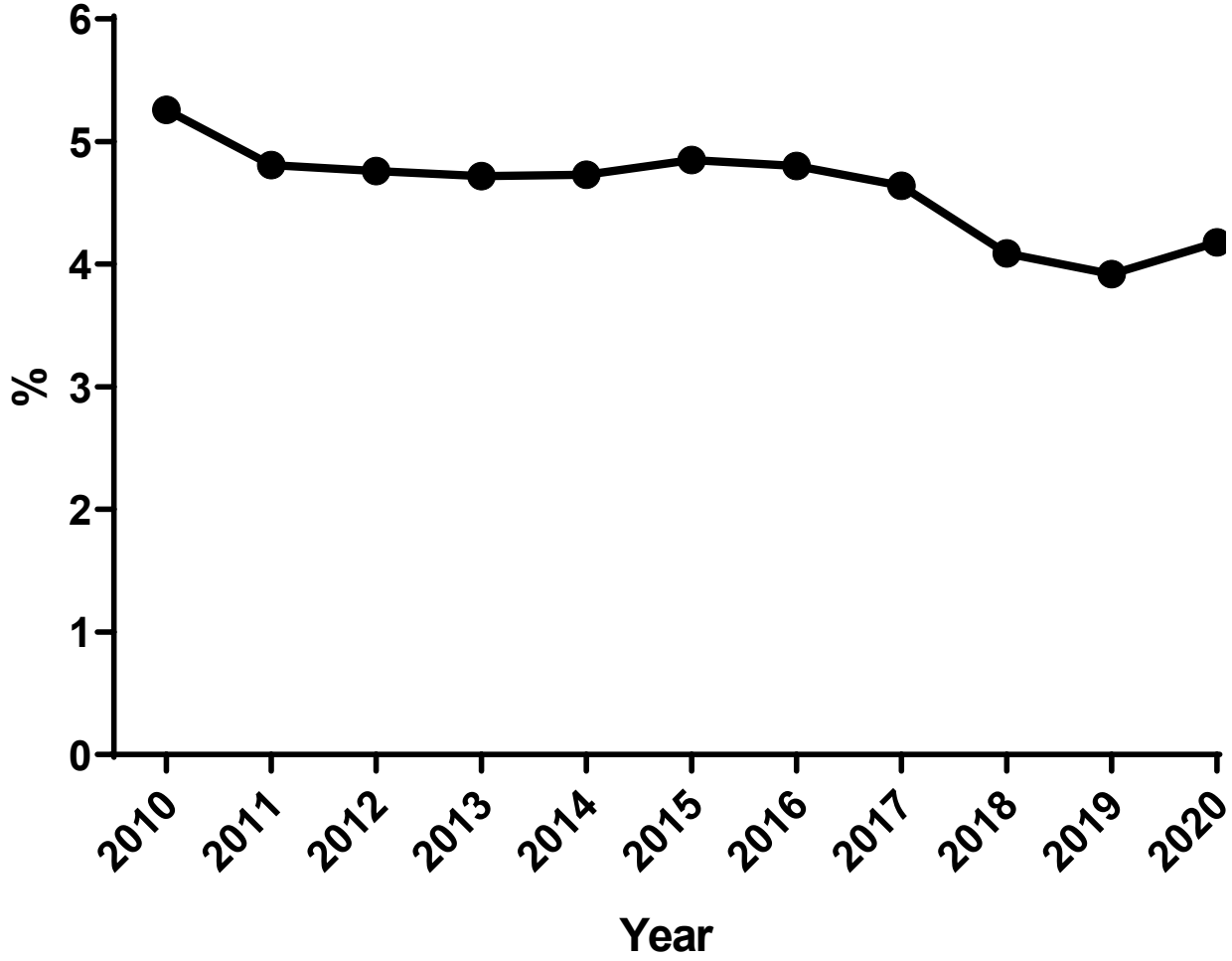
#8 Mortality Rate (Z-score)



#8 Mortality Rate (Z-score)



Collaborative Outcome Overview - Mortality
Cohort 2 - Admit to Trauma



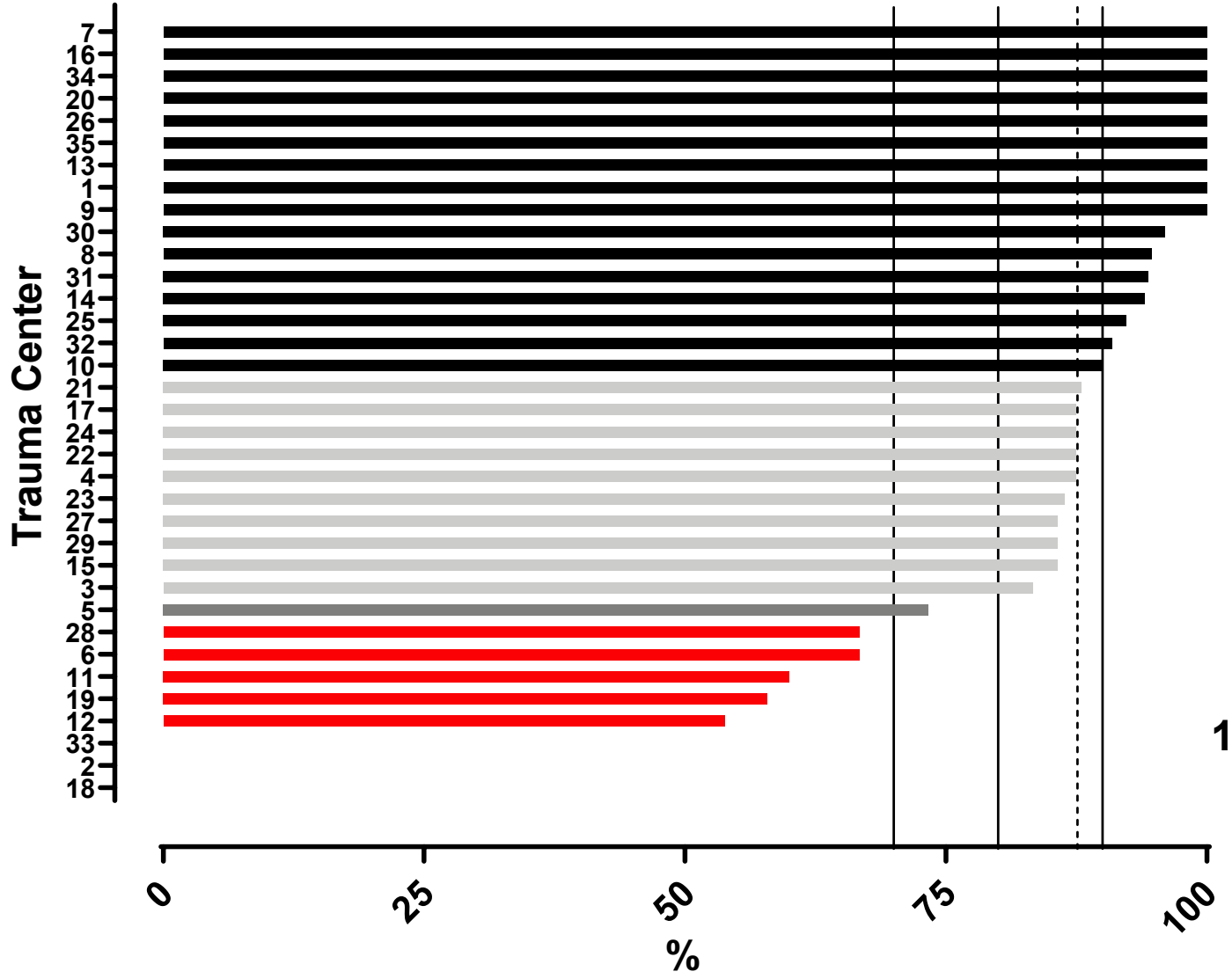
#9 Timely Head CT in TBI Patients on Anticoagulation Pre-Injury

- Head CT date and time from procedures
- Presence of prehospital anticoagulation
- 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 = 7/1/19 to 6/30/20

#9 Head CT

- Measure = % of patients with Head CT, date, and time
- Timing
  - ≥ 90% patients (≤ 120 min)
  - ≥ 80% patients (≤ 120 min)
  - ≥ 70% patients (≤ 120 min)
  - < 70% patients (≤ 120 min)

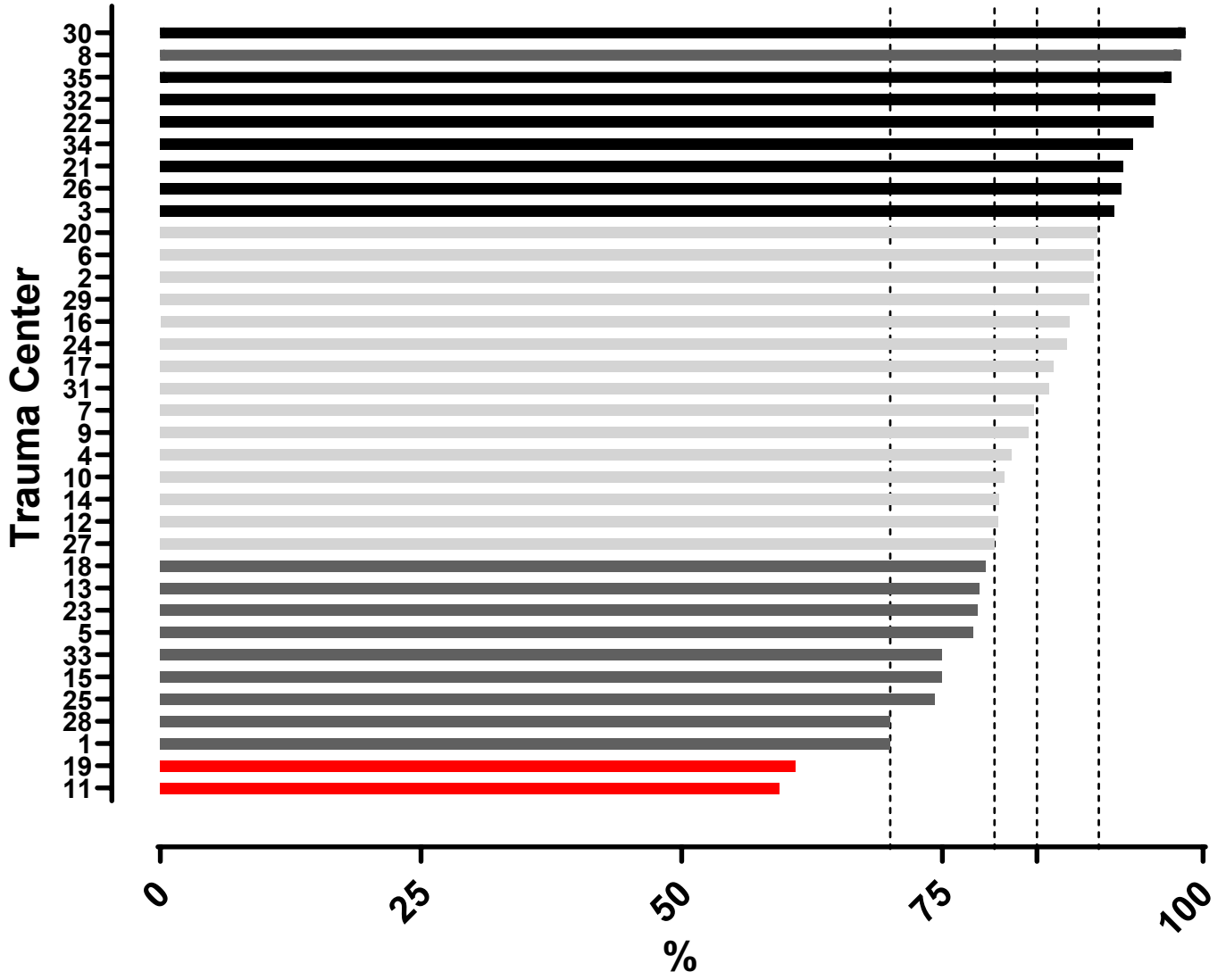
Metric #9 - ED Head CT ≤ 120 min
Cohort 1 - MTQIP All on Anticoagulant (Excluding ASA)
7/1/19 - 5/31/20



Mean 87.6%

16/34 Centers ≥ 90% (-3)

2020 Metric #10 - ED Head CT ≤ 120 min
Cohort 1 - MTQIP All, TBI on Anticoagulant (Excluding ASA)
7/1/18 - 6/30/19



9/34 Centers ≥ 90%

Mean 84.1%

Information

- Anticoagulation = 402 patients
  - 87.6% CT within 120 min
- Stats
  - Mean = 12 patients
  - Min = 1 patient
  - Max = 25 patients
- ?

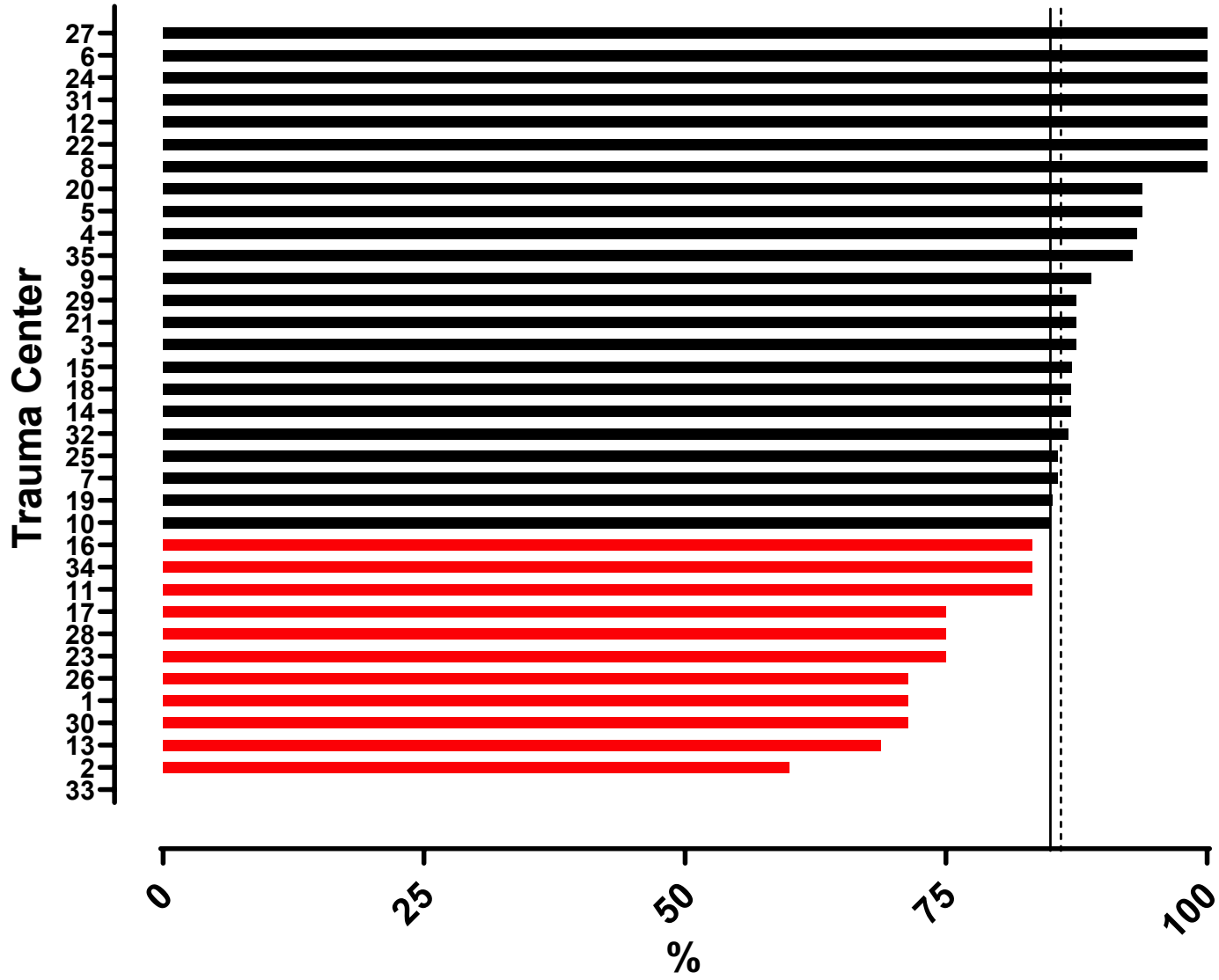
#10 Timely Antibiotic in Femur/Tibia Open Fractures - Collaborative Wide Measure

- 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 = 7/1/19 to 6/30/20

#10 Open Fracture Antibiotic Usage

- Measure = % of patients with antibiotic type, date, time recorded ≤ 120 minutes
  - ≥ 85% patients (≤ 120 min) > 10 points
  - All or nothing
- ACS-COT Orange Book – VRC resources
  - Administration within 60 minutes
    - ACS OTA Ortho Update
    - ACS TQIP Best Practices Orthopedics

Metric #10 - Open Fracture - Time to Abx ≤ 120 min
Cohort 1 - MTQIP All
7/1/19 - 5/31/20

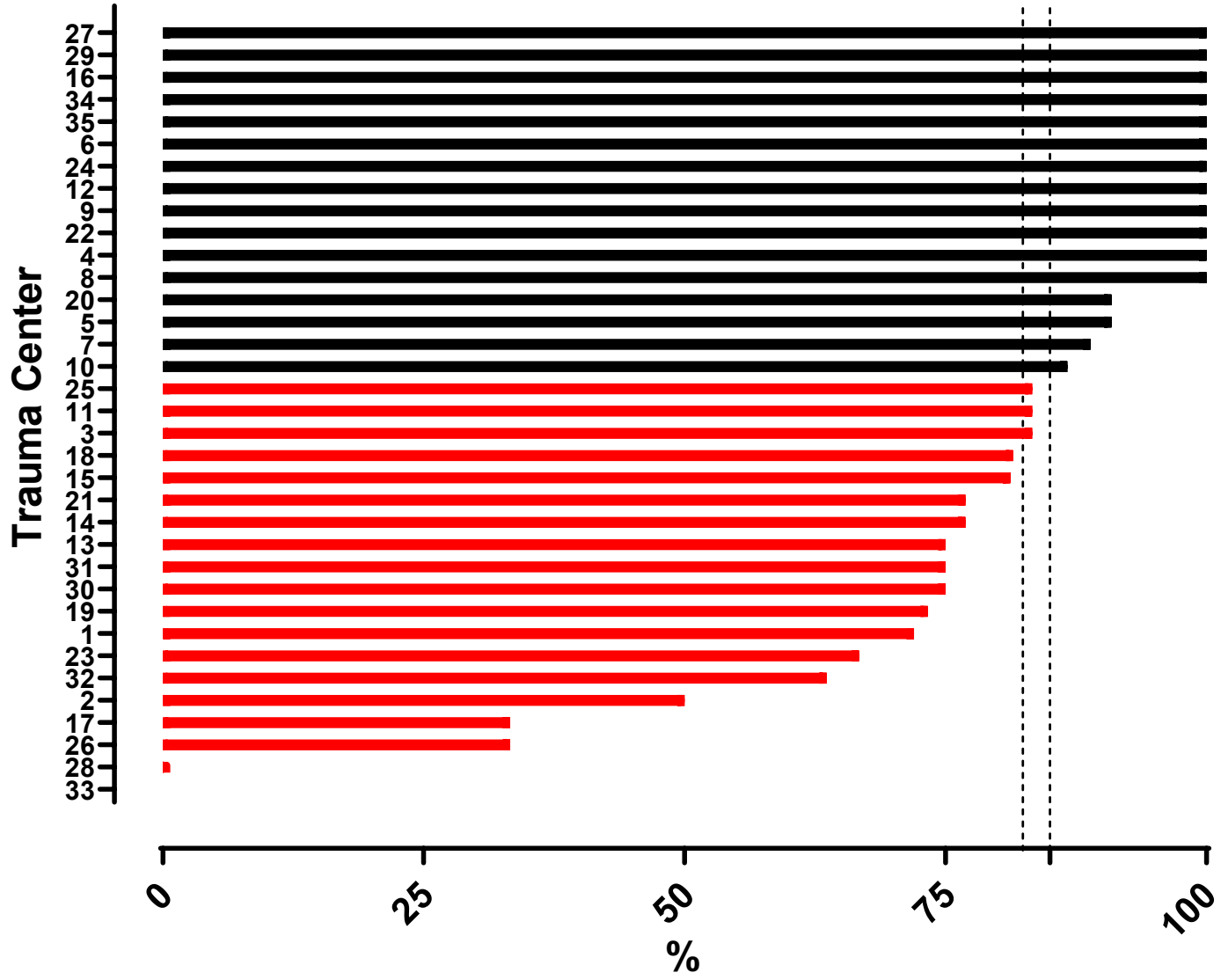


23/34 Centers ≥ 90%
(+7)

Collaborative Mean
= 86.1%

482 patients May
1 month left

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

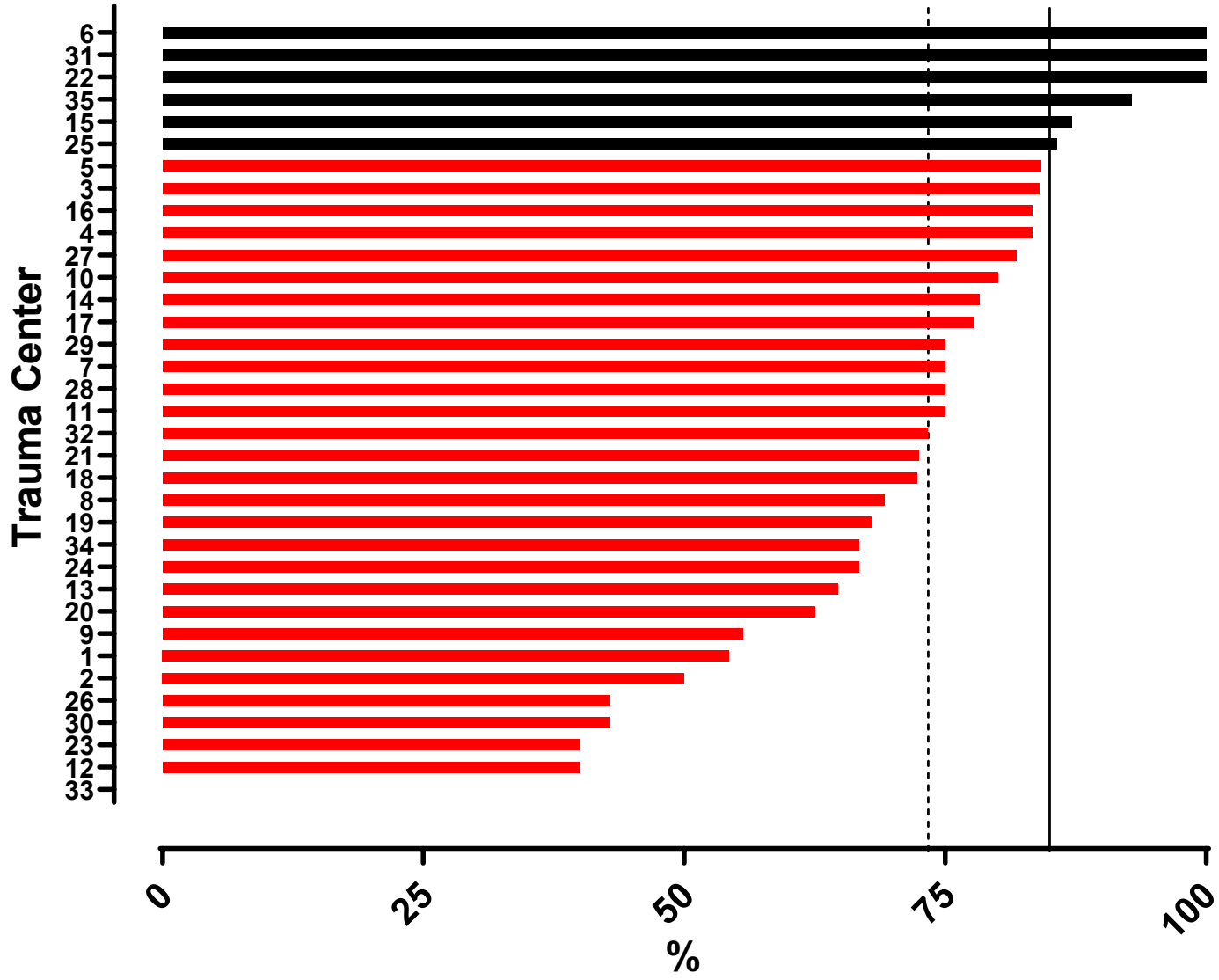


16/34 Centers ≥ 90%
(-1)

Collaborative Mean
= 82.4%

354 patients April
7-10 patients more

Open Fracture - Time to Abx ≤ 60 min
Cohort 1 - MTQIP All
7/1/19 - 5/31/20



6/34 Centers ≥ 85% (0)

Collaborative Mean = 73.4%

- Push report
  - Metric #4, 5, 9 10
- Check your data

Metric #10 - Timely Antibiotic in Femur/Tibia Fx

Open Fracture Metric	Cases Numerator	Cases Denominator		MTQIP - All - Unadj	P Value (Unadj)
Negative/Missing Type, Date or Time	0	9	0	2.04	0.82
Time to Antibiotic Admin Mean Femur/Tibia (Hrs)	6.41	9	0.71	1	1
Time to Antibiotic Admin Median Femur/Tibia (Hrs)	6.41	9	0.75	0.42	1
<= 1 Hr Femur or Tibia (%)	7	9	77.8	72.2	0.72
<= 1.5 Hr Femur or Tibia (%)	9	9	100	80.1	0.17
<= 2 Hr Femur or Tibia (%)	9	9	100	84.2	0.25
> 2 Hr Femur or Tibia (%)	0	9	0	14	0.25
Time to Antibiotic Admin Mean Femur (Hrs)	0.92	1	0.92	1.34	1
Time to Antibiotic Admin Median Femur (Hrs)	0.92	1	0.92	0.43	1
<= 1 Hr Femur (%)	1	1	100	68.4	0.37
<= 1.5 Hr Femur (%)	1	1	100	74.5	0.46
<= 2 Hr Femur (%)	1	1	100	78.6	0.52
> 2 Hr Femur (%)	0	1	0	16.3	0.55
Time to	5.49	8	0.69	0.92	0.84

Filters:

Hospitals	
Cohort	Cohort 1 (All MTQIP)
Dead	No Filter
No Signs of Life	Exclude DOAs
AIS / ISS	ALL
Age	>= 16
Transfers In	Exclude Transfers In
Transfers Out	Include Transfers Out
Default Periods	07/01/2019 - 01/31/2020
Peer Groups	MTQIP - All

MTQIP Open Fracture Drill Down

UM

M·TQIP

Performance Index Target ≤ 120 Min

Trauma #	Age	ED Arrival Date	ED Arrival Time	Activation Status	ISS	Mortality	First Antibiotic Type	Second Antibiotic Type	Antibiotic Date	Antibiotic Time	Missing Data Alert	Arrival to Antibiotic Time (Min)

TBI and Anticoagulation Decision Support

Christopher Tignanelli, MD

Clinical Decision Support Intervention Decreases Time to Imaging in Elderly Patients with Traumatic Brain Injuries

Brian Thielen, BS, Simon Yang, MS, Arthur Nguyen, AB, Regina M. Lorenzo, MPH, Kristina Techar, BS, Cameron Berg, MD, Christopher Palmer, MD, Patty Reicks, RN, Jonathan Gipson, MD FACS, **Christopher J. Tignanelli, MD FACS**

NORTH MEMORIAL HEALTH

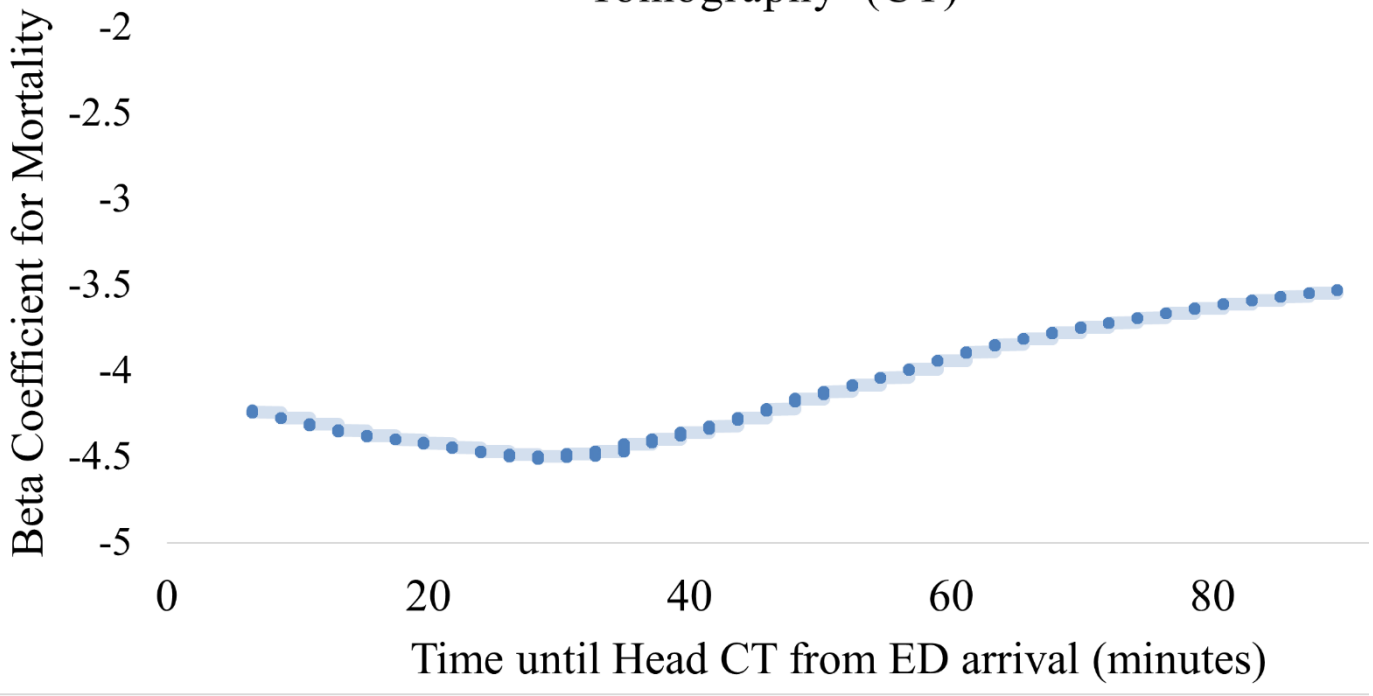
UNIVERSITY OF MINNESOTA
Driven to Discover℠

Conflicts of Interest

No conflicts of interest or disclosures

Early Imaging Improves Survival for Elderly Patients with Mild Traumatic Brain Injuries

Figure 2. Lowess Graph for time until Head Computed Tomography (CT)



Tina Kristina Techar, BS Arthur Nguyen, AB Regina M. Lorenzo, MPH Simon Yang MS, Brian Thielen, BS Anne Cain-Nielsen, MS Mark R. Hemmila, MD Christopher J. Tignanelli, MD

JSR Journal of Surgical Research

Early Imaging Improves Survival for Elderly Patients with Mild Traumatic Brain Injuries

Primary Outcome	Odds Ratio (OR)	95% CI	p value
All cause in-hospital mortality	0.58	0.35 – 0.95	0.03
Secondary Outcomes	**OR**	**95% CI**	**p value**
Any complication	0.96	0.76 – 1.2	0.8
Major complication	0.83	0.6 – 1.2	0.3
Received FFP within 4 hours for anticoagulated patients	1.5	1.04 – 2.2	0.03
	Incident Rate Ratio	**95% CI**	**p value**
Hospital length of stay	1.0	0.95 – 1.04	0.9
Time to neurosurgical intervention	0.76	0.48 – 1.2	0.2
ED length of stay	0.9	0.87 – 0.92	< 0.001

Tina Kristina Techar, BS, Arthur Nguyen, AB, Regina M. Lorenzo, MPH, Simon Yang, MS, Brian Thielen, BS, Anne Cain-Nielsen, MS, Mark R. Hemmila, MD, Christopher J. Tignanelli, MD

JSR Journal of Surgical Research

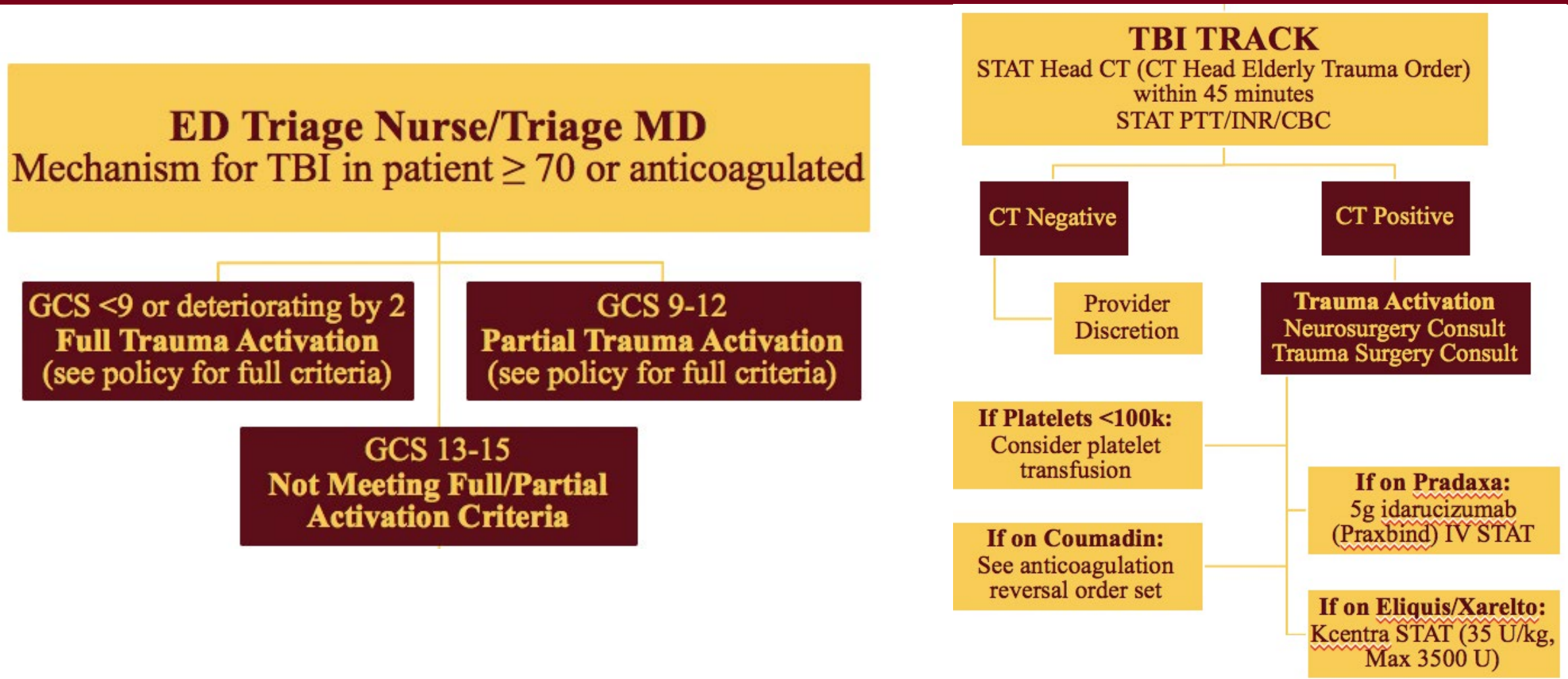
Local needs assessment identifed long time to imaging

Historic time to imaging in ED:

Age > 70: 85 Minutes

21% were positive

Development of TBI Track Orderset and Radiology Tech Triage CDS-I



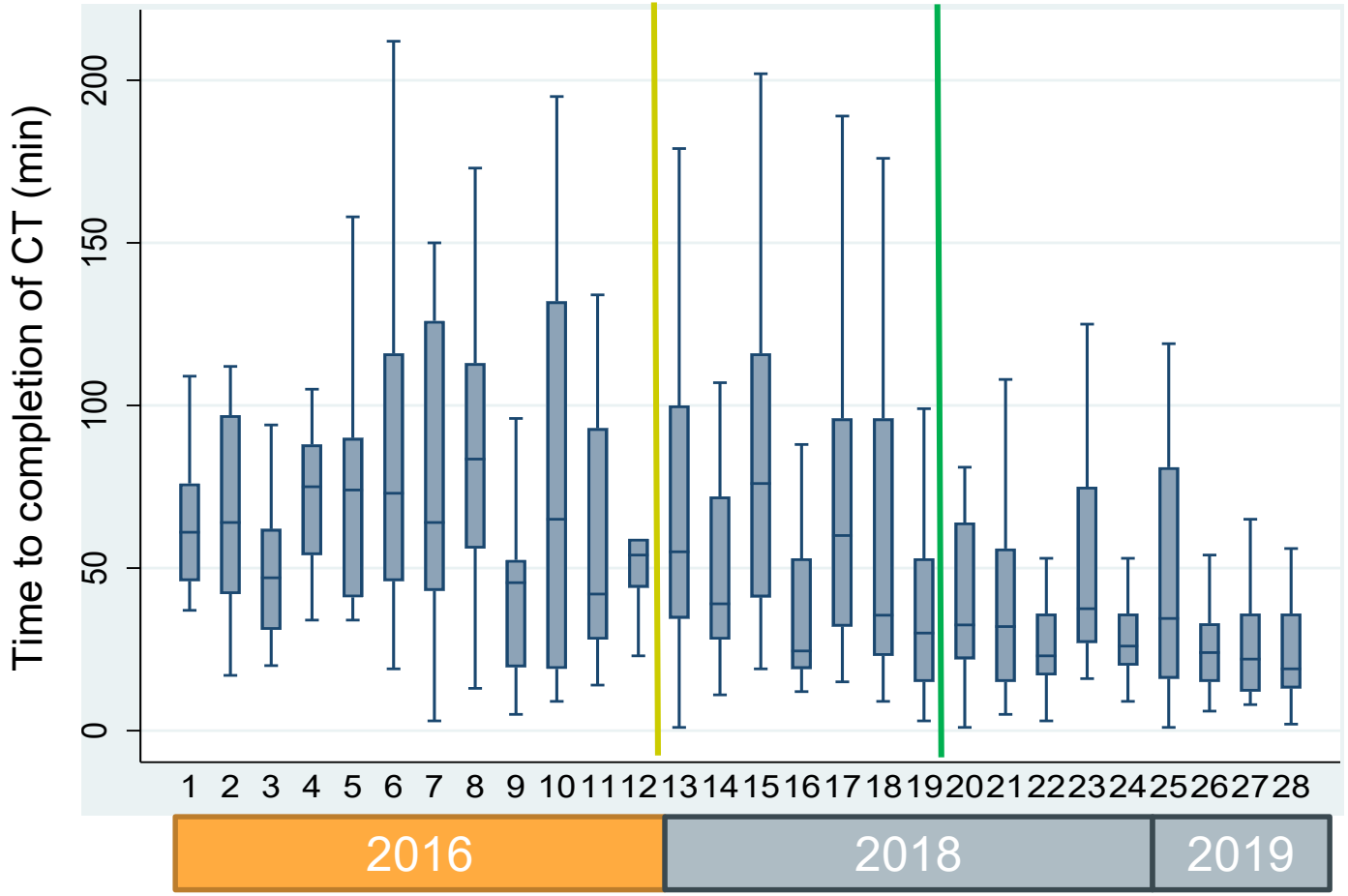
Head CT Protocol and CDS-I Development

- Developed and integrated a radiology technician CDS-I
  - A radiology technician visualization triage tool was developed linked to the TBI track orderset which allows rapid identification of TBI CT orders in a sea of STAT imaging requests

- Protocol was developed, disseminated, and implemented by a multidisciplinary team in September 2018
  - Radiology, ED, Informatics, Surgery, Trauma, and Nursing

- Primary objective:
  - Reduce Time from ED arrival to head CT imaging < 35 minutes for highest risk patients (Age > 70 and on anticoagulants)

Intervention Associated With Significant Reduction in Time to Imaging



Workgroup began developing intervention

Implementation

Patients 70 years or older AND on anticoagulants

NORTH MEMORIAL HEALTH

UNIVERSITY OF MINNESOTA
Driven to Discover℠

Intervention Associated With Significant Reduction in Time to Imaging

	IRR	95% CI	P value
All Patients	0.93	0.87 – 0.99	0.02
Age ≥ 70	0.78	0.71 – 0.86	< 0.001
Anticoagulation	0.65	0.56 – 0.74	< 0.001
Age ≥ 70 and Anticoagulation	0.59	0.51 – 0.68	< 0.001

Negative Binomial Regression

Secondary Outcomes (Patients 70+ and anticoagulation)

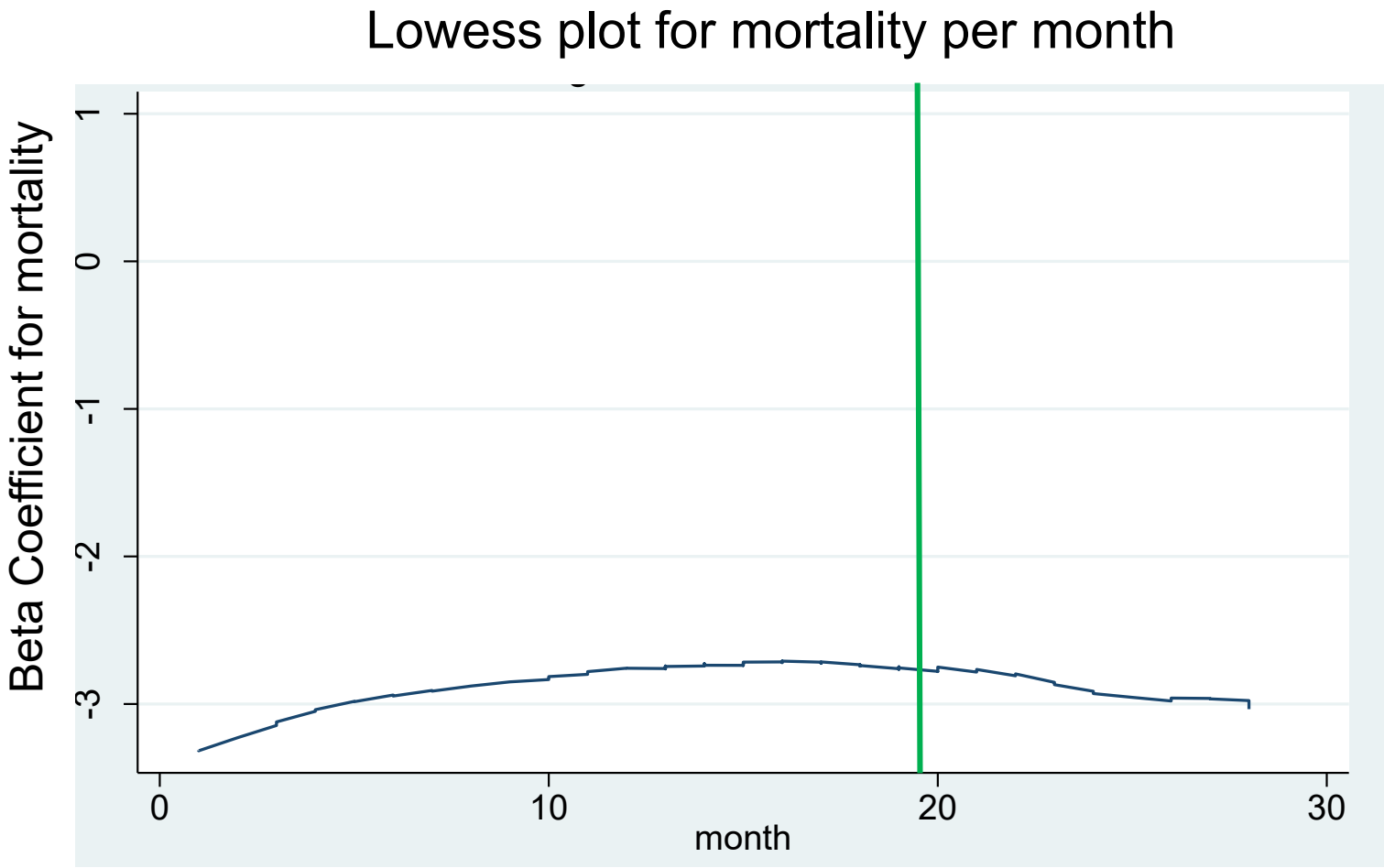
	Pre-intervention	Post-Intervention	p-value
N	269	182	
Minutes until imaging completion, median (IQR)	**56.0 (32.0, 93.0)**	**27.0 (16.0, 44.0)**	**<0.001**
Age, years, mean (SD)	83.3 (6.8)	83.0 (7.3)	0.64
Male, n (%)	117 (43.5%)	75 (41.2%)	0.63
ISS, median (IQR)	5.0 (2.0, 10.0)	5.0 (2.0, 9.0)	0.13
ED GCS, median (IQR)	15.0 (15.0, 15.0)	15.0 (15.0, 15.0)	0.20
ED SBP, mean (SD)	145.2 (27.9)	147.6 (24.6)	0.34
Race: White, n (%)	261 (97.4%)	176 (96.7%)	0.62
Black	3 (1.1%)	4 (2.2%)	
Other	4 (1.5%)	2 (1.1%)	
Died, n (%)	17 (6.3%)	8 (4.4%)	0.38
Hospital LOS, median (IQR)	**4.0 (2.0, 6.0)**	**3.0 (1.0, 5.0)**	**0.004**
ICU LOS, median (IQR)	3.0 (2.0, 5.0)	3.0 (2.0, 5.0)	0.60
Vent Days, median (IQR)	2.0 (1.0, 4.0)	2.0 (2.0, 4.0)	0.96
Intubation, n (%)	15 (5.6%)	5 (2.7%)	0.15
ICU Utilization, n (%)	58 (21.6%)	33 (18.1%)	0.37

Univariate analysis (T-test, Mann Whitney U, Chi Squared)

Secondary Outcomes Mortality (Patients 70+ and anticoagulation)

Mortality increasing over time in this population

Post-intervention decreased



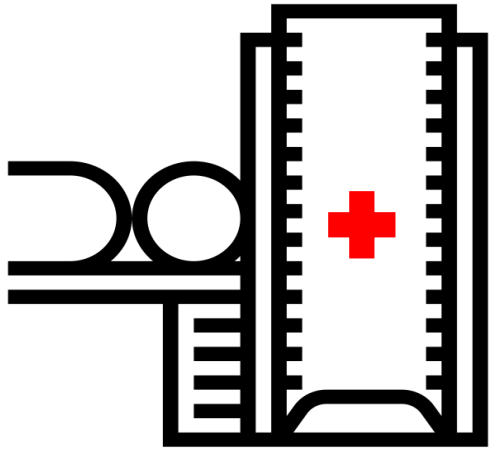
Secondary Outcomes Mortality (Patients 70+ and anticoag)

Post-Intervention	OR / IRR	95% CI	P value
Mortality	0.88	0.3 – 2.3	0.8
Intubation	0.61	0.18-2.07	0.4
Hospital LOS	**0.83**	**0.72 – 0.86**	**0.01**
ICU LOS	0.96	0.71-1.3	0.8
Vent Days	0.8	0.36-1.8	0.6

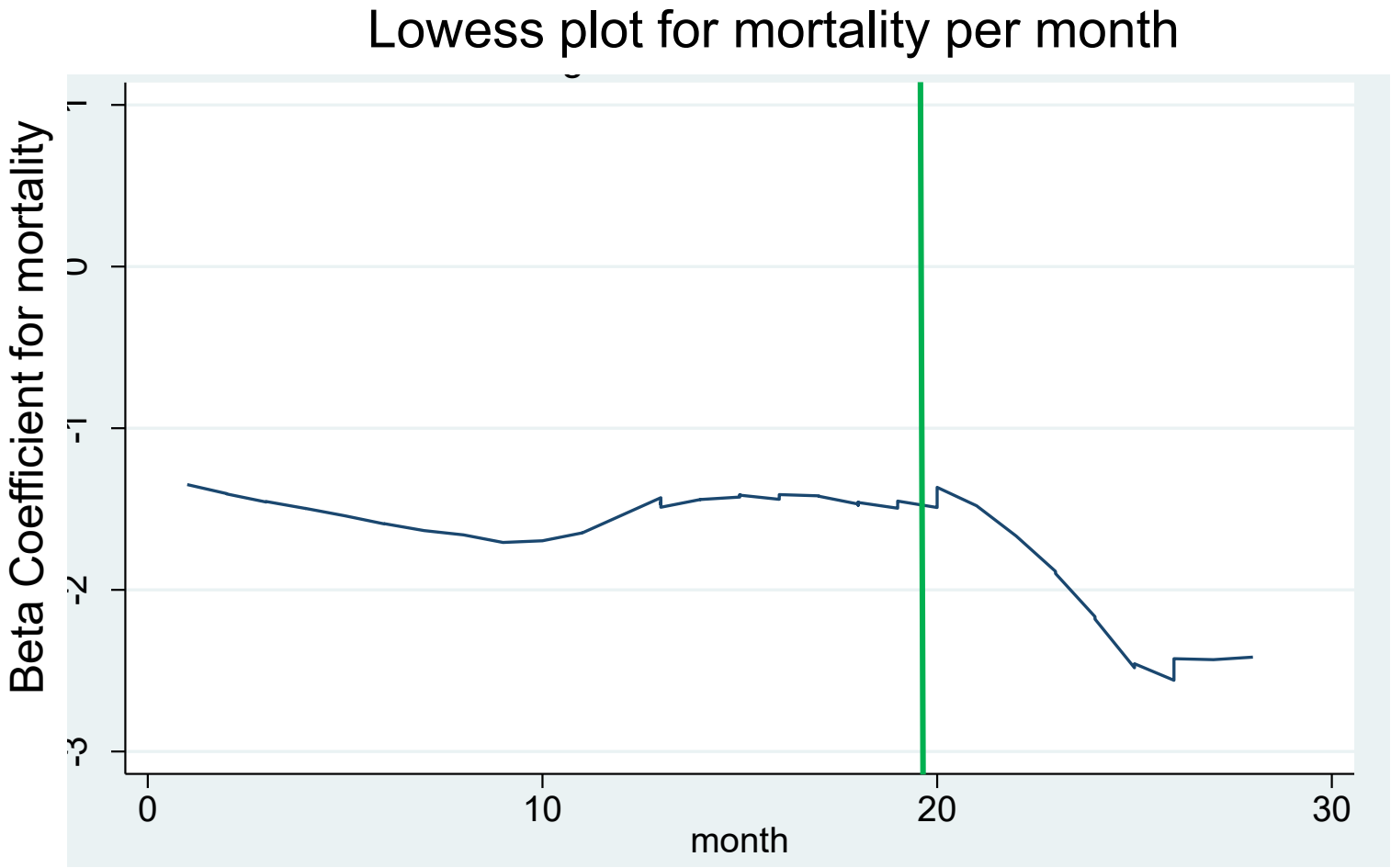
Adjusted for age, injury severity score (ISS), GCS, gender, ED systolic blood pressure
Race not adjusted for due to collinearity

Positive Head CT

	Positive Head CT	Positive Head CT and GCS 14-15
Age ≥ 70	248 (20.2%)	178 (72%)
Anticoagulation	98 (17%)	73 (75%)
Age ≥ 70 AND Anticoagulation	**78 (18%)**	**57 (73%)**



Trend towards reduced mortality in patients 70+ and on anticoagulation with a **positive** Head CT



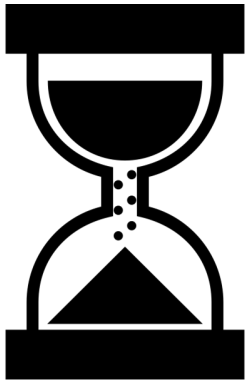
Outcomes among patients 70+ on anticoagulation with a positive head CT

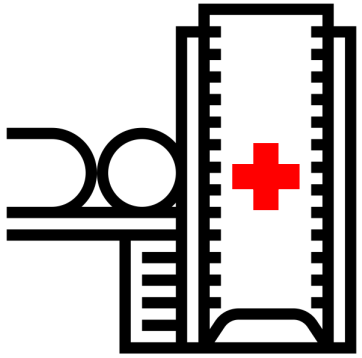
Post-Intervention	OR / IRR	95% CI	P value
Mortality	0.27	0.03 – 2.2	0.2
Intubation	0.55	0.1-2.8	0.5
Hospital LOS	0.79	0.58 – 1.07	0.1
ICU LOS	0.92	0.64-1.31	0.6
Vent Days	1.06	0.42-2.71	0.9

Adjusted for age, injury severity score (ISS), GCS, gender, ED systolic blood pressure
Race not adjusted for due to collinearity

Conclusions

Significantly reduced time to head CT for high risk populations with our protocol and CDS-I	Nearly 20% of elderly patients on anticoagulation with suspected head trauma will have a positive head CT **75% will have GCS 14-15**	Earlier imaging reduces hospital length of stay and may reduce mortality for highest risk population





↓ Hospital LOS

Questions

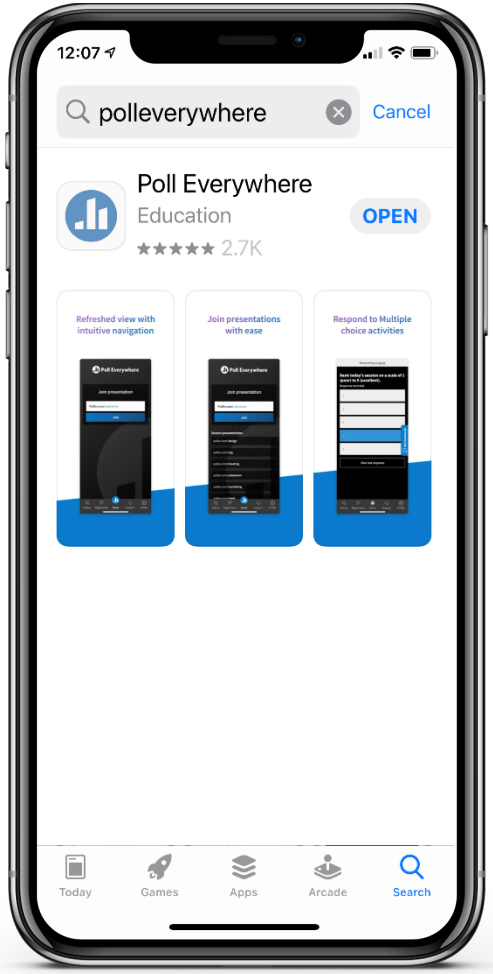
Break

Back in 15 min

Meeting Polling

- **Mobile App**
  - Go to your app store
  - Search Poll Everywhere
  - Download
  - Enter username mtqip910
  - Enter your full name

- **Web Browser**
  - Go to PollEv.com/mtqip910
  - Set a browser bookmark
  - Enter your full name



Poll Everywhere

Timing of VTE Prophylaxis

Mark Hemmila, MD

Association of Timing of Initation of Pharmacologic Venous Thromboembolism Prophylaxis with Outcomes in Trauma Patients

Jason Hecht, PharmD, BCPS, BCCCP
Clinical Pharmacy Specialist – Surgical Critical Care
St. Joseph Mercy Ann Arbor

Emily Han, PharmD
Anne Cain-Nielsen, MS
John Scott, MD, MPH
Mark Hemmila, MD, FACS
Wendy Wahl, MD, FACS, FCCM

Background

No Prophylaxis

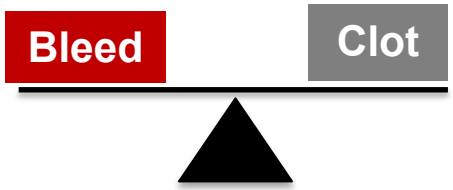
~60% patients developed VTE after major trauma **without** the use of prophylaxis

Timing of Initiation?

3x

4 DAYS

~3x ↑ risk of VTE when initiation delayed **>4 days**

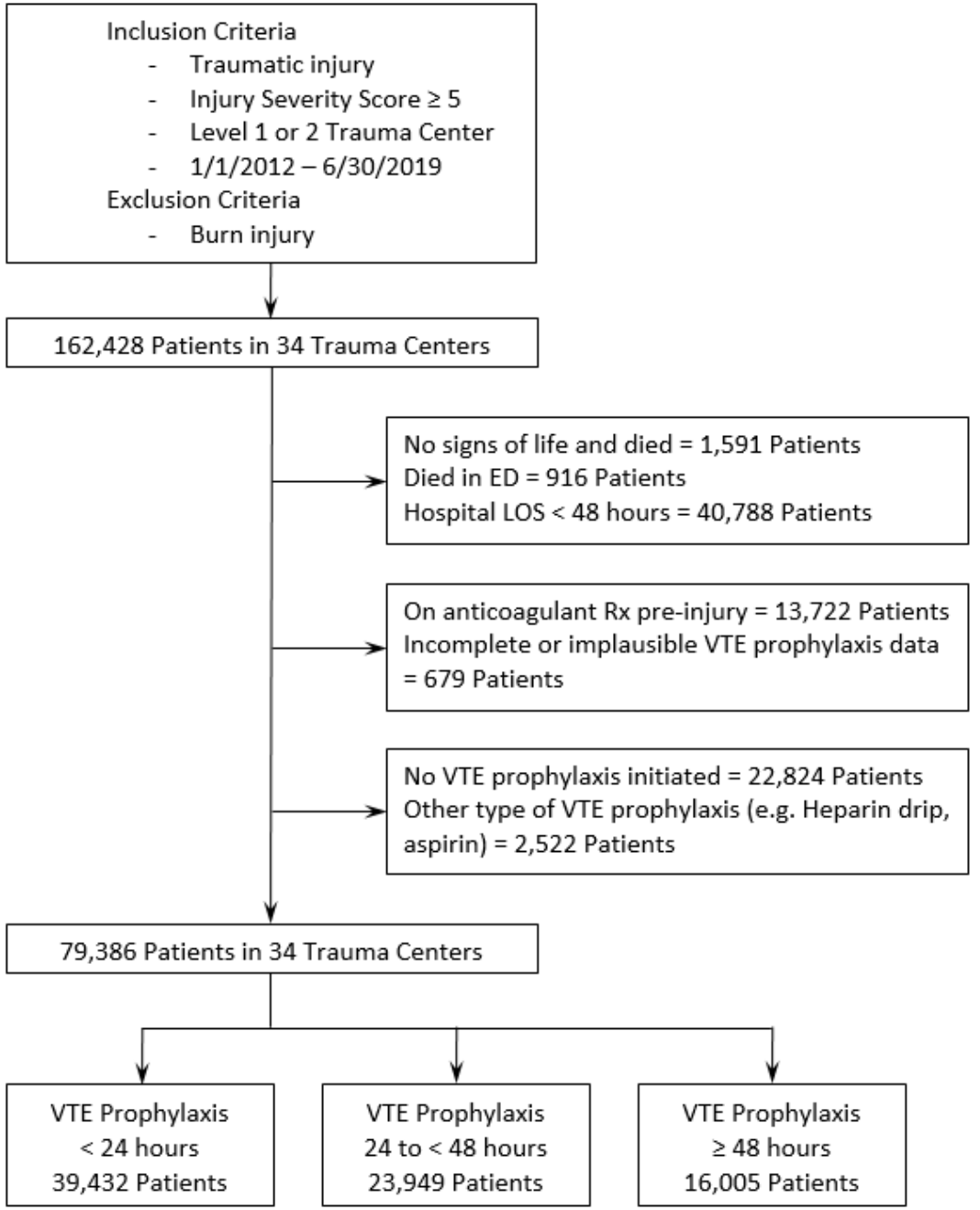


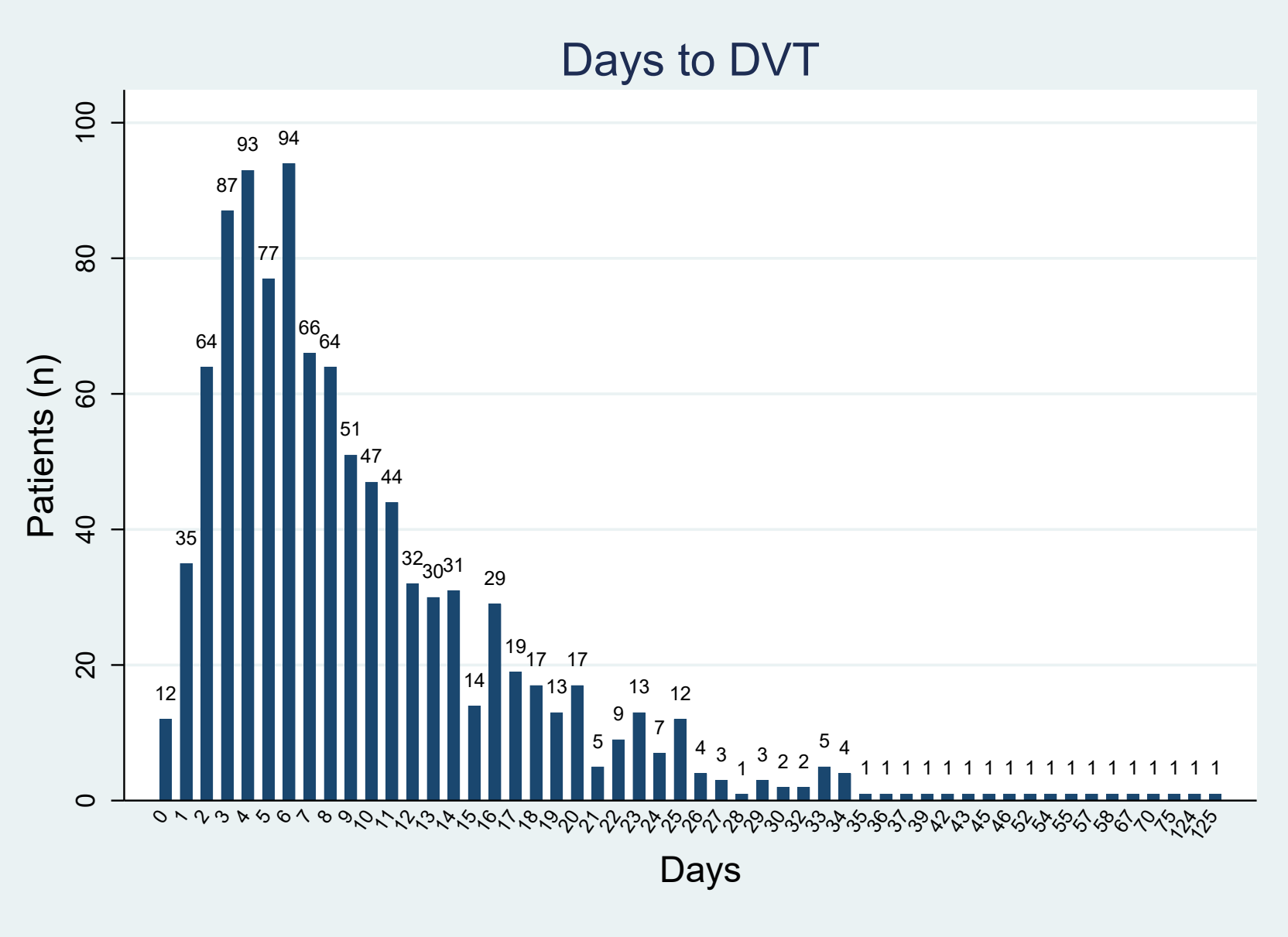
Lack of robust studies comparing timing of VTE prophylaxis initiation and VTE rate

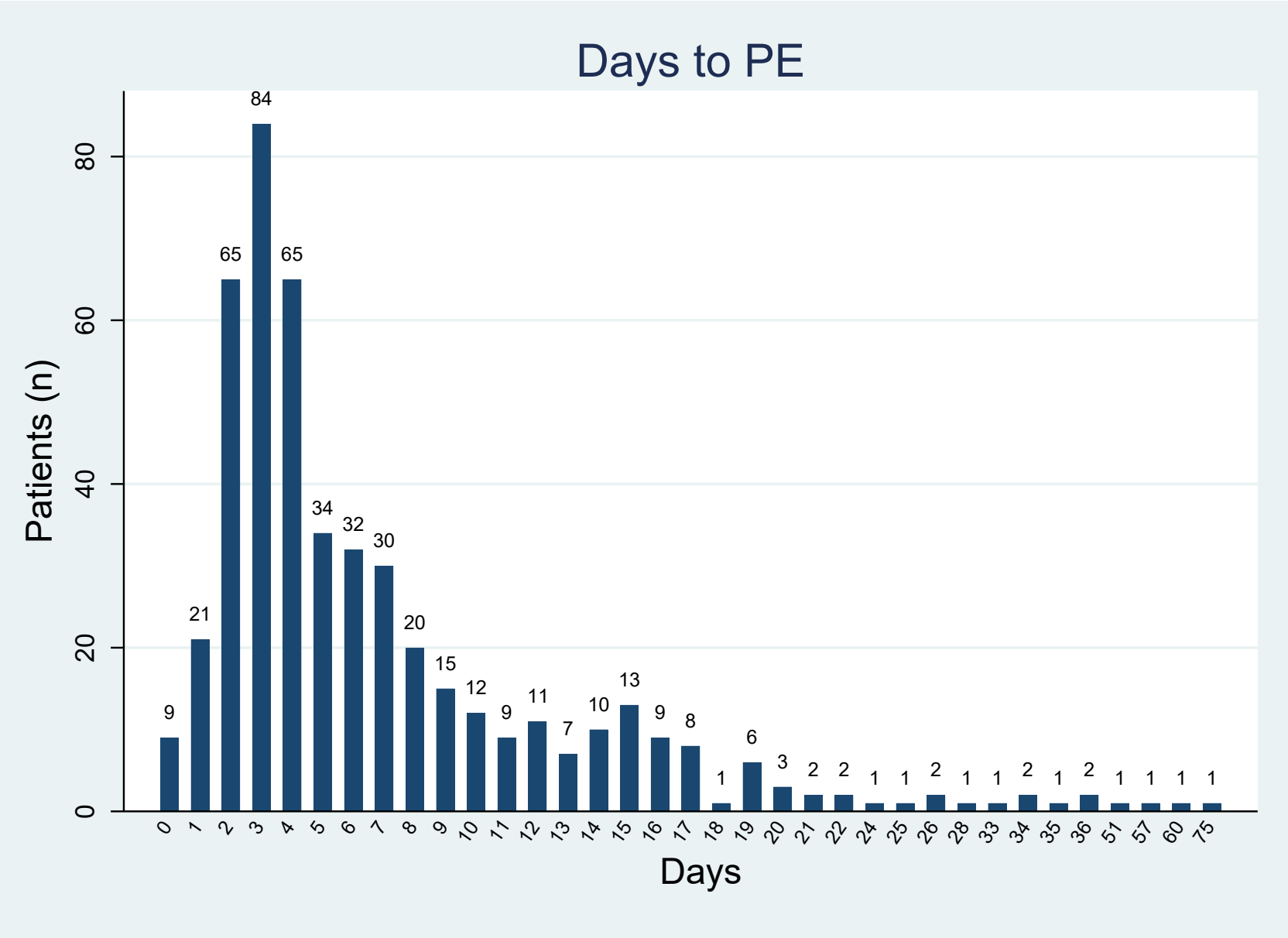
1. Geerts WH et al. NEJM. 1994
2. Nathens AB. J Trauma Acute Care Surg. 2007

Study Cohort

- MTQIP Data
  - 1/2012 to 6/30/2019
  - Date of entry into MTQIP
- Groups
  - VTE Pro < 24 hrs
  - VTE Pro 24 to < 48 hrs
  - VTE Pro ≥ 48 hrs




Days to DVT
Patients (n)
0
20
40
60
80
100
12
35
64
87
93
94
77
66
64
51
47
44
32
30
31
29
19
17
13
17
5
9
13
7
12
4
3
1
3
2
2
5
4
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 32 33 34 35 36 37 39 42 43 45 46 52 54 55 57 58 67 70 75 124 125
Days


Days to PE
Patients (n)
0
20
40
60
80
Days
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 24 25 26 28 33 34 35 36 51 57 60 75
9 21 65 84 65 34 32 30 20 15 12 9 11 7 10 13 9 8 1 6 3 2 2 1 1 2 1 1 2 1 2 1 1 1 1

Analysis

- Differences in characteristics
  - ISS, AIS, Physiology, Comorbid
- Outcomes
  - VTE, PE, DVT
  - Mortality
- Adjustment
  - Logistic Regression
  - Sensitivity analysis
    - Exclude pts getting PRBC in first 4 hrs
    - Exclude PRBC and/or TBI
    - Propensity score

Patient Characteristic	Timing of VTE Prophylaxis Initiation			*p*-value
	0 to < 24 hrs	24 to < 48 hrs	≥ 48 hrs	
Patients, N	39,432	23,949	16,005	
Age, mean (SD)	61.7 (22.6)	63.5 (22.4)	58.2 (22.4)	<0.001
Age, %				
16-25y	8.4	7.7	10.6	<0.001
26-45y	16.7	15.1	19.1	
46-65y	26.7	24.7	28.7	
66-75y	13.7	14.5	13.6	
>75y	34.5	38.0	28.0	
Male, %	51.1	47.7	58.5	<0.001
Race, %				
White	77.0	81.6	77.9	<0.001
Black	19.6	14.7	18.0	
Other	3.4	3.7	4.1	
Mechanism, %				
Blunt	92.3	94.7	93.6	<0.001
Penetrating	7.7	5.3	6.4	
Injury Severity Score, %				
5-15	87.8	83.3	56.8	<0.001
16-24	9.3	11.4	22.7	
25-35	2.3	4.3	15.9	
>35	0.4	1.0	4.6	
AIS Head/neck>2, %	6.6	11.9	37.7	<0.001
AIS Chest>2, %	20.2	14.9	24.7	<0.001
AIS Abdomen>2, %	4.9	4.9	10.5	<0.001
AIS Extremity>2, %	41.7	55.5	33.7	<0.001
ED Heart Rate, %				
51-120, bpm	91.6	91.7	88.1	<0.001
> 120	4.3	4.0	8.0	
0-50	0.8	0.9	1.2	
Missing	3.3	3.4	2.7	
ED Systolic Blood Pressure, %				
> 90, mmHg	94.0	94.3	92.1	<0.001
61-90	2.0	1.9	4.3	
≤ 60	0.3	0.2	0.5	
Missing	3.7	3.6	3.1	
Glasgow Coma Scale Motor, %				
6	87.1	85.0	74.2	<0.001
5-2	2.8	3.4	10.5	

Unadjusted

Outcome	Timing of VTE Prophylaxis Initiation			
	0 to < 24 hrs from Admission	24 to < 48 hrs from Admission	≥ 48 hrs from Admission	*p*-value
Patients, N	39,432	23,949	16,005	--
Mortality, % (N)	1.34 (528)	1.33 (319)	3.69 (590)	<0.001
Venous Thromboembolism, % (N)	1.07 (420)	1.42 (339)	4.60 (736)	<0.001
Pulmonary Embolism, % (N)	0.42 (167)	0.57 (136)	1.37 (220)	<0.001
Deep Venous Thrombosis, % (N)	0.72 (284)	0.93 (223)	3.66 (585)	<0.001

Adjusted – Characteristics, Timing, Type

Outcome	Timing of VTE Prophylaxis Initiation					
	0 to < 24 hrs from Admission		24 to < 48 hrs from Admission		≥ 48 hrs from Admission	
	OR (95% CI)	*p*-value	OR (95% CI)	*p*-value	OR (95% CI)	*p*-value
Venous Thromboembolism	Reference	--	1.26 (1.09-1.47)	0.002	2.34 (2.04-2.70)	<0.001
Mortality	Reference	--	0.87 (0.75-1.01)	0.07	1.16 (1.00-1.35)	0.049
Incisional Surgical Site Infection	Reference	--	0.95 (0.73-1.24)	0.7	1.23 (0.95-1.61)	0.1
Organ/Space Surgical Site Infection	Reference	--	1.07 (0.73-1.57)	0.7	1.27 (0.88-1.83)	0.2
Unplanned Visit to the Operating Room	Reference	--	0.91 (0.73-1.14)	0.4	1.44 (1.17-1.77)	0.001

Complications investigated as potential proxies for bleeding

Adjusted – Exclude 6,062 pts getting PRBC

Outcome	Timing of VTE Prophylaxis Initiation					
	0 to < 24 hrs from Admission		24 to < 48 hrs from Admission		≥ 48 hrs from Admission	
	N = 37,299		N = 22,354		N = 13,671	
	OR (95% CI)	*p*-value	OR (95% CI)	*p*-value	OR (95% CI)	*p*-value
Venous Thromboembolism	Reference	--	1.26 (1.06-1.49)	0.008	2.54 (2.15-2.99)	<0.001
Mortality	Reference	--	0.82 (0.70-0.97)	0.018	1.13 (0.96-1.34)	0.15
Incisional Surgical Site Infection	Reference	--	0.91 (0.65-1.27)	0.56	1.12 (0.78-1.60)	0.54
Organ/Space Surgical Site Infection	Reference	--	0.90 (0.53-1.52)	0.68	0.95 (0.55-1.62)	0.84
Unplanned Visit to the Operating Room	Reference	--	0.86 (0.66-1.14)	0.30	1.35 (1.04-1.77)	0.026

Adjusted – Exclude 14,359 pts getting PRBC or with TBI

Outcome	Timing of VTE Prophylaxis Initiation					
	0 to < 24 hrs from Admission		24 to < 48 hrs from Admission		≥ 48 hrs from Admission	
	N = 36,277		N = 20,077		N = 8,673	
	OR (95% CI)	*p*-value	OR (95% CI)	*p*-value	OR (95% CI)	*p*-value
Venous Thromboembolism	Reference	--	1.27 (1.05-1.52)	0.01	2.41 (1.99-2.92)	<0.001
Mortality	Reference	--	0.87 (0.72-1.05)	0.14	1.40 (1.15-1.70)	0.001
Incisional Surgical Site Infection	Reference	--	1.01 (0.72-1.43)	0.94	1.18 (0.79-1.76)	0.82
Organ/Space Surgical Site Infection	Reference	--	0.83 (0.48-1.44)	0.51	0.82 (0.44-1.52)	0.53
Unplanned Visit to the Operating Room	Reference	--	0.93 (0.69-1.25)	0.63	1.06 (0.75-1.48)	0.75

Propensity Score Match

- Groups
  - VTE Pro 0 to <48 hrs
  - VTE Pro ≥48 hrs
- Patients
  - 15,510 pts in each group
  - Evenly matched
- Outcomes (early vs. late)
  - VTE, 2.0 vs. 3.9% ($p<0.001$)
  - Mortality, 2.4 vs. 2.8% ($p=0.037$)

Summary

- Initiation of pharmacologic VTE prophylaxis < 48 hours, and preferentially < 24 hours, after admission in trauma patients is associated with improved outcomes.
- The rates of VTE episodes were lower and mortality was not higher.
- Complications that are potential proxies for bleeding or hematoma formation were also found to not be higher among the group receiving pharmacologic VTE prophylaxis < 48 hours after admission.

Conclusion

When possible, initiation of prophylaxis within the first 24-48 hours after admission likely represents the optimal timing to maximally reduce VTE risk.

MACS Update

Mark Hemmila, MD

Emergency General Surgery

- 2019
  - 7/1/2019
  - 4 Hospitals
- 2020
  - Approval for 2 additional hospitals
  - Recruitment
    - Sparrow
    - One hospital dropped out
    - Funding difficulties

Emergency General Surgery

- 2021 and 2022
  - Goal is to get to 10+ hospitals
  - Recruitment
    - Reached out to prior applicants
    - Soliciting at todays MTQIP meeting
- 6 month rolling starts
  - 1/2021, 7/2021, 1/2022, 7/2022

Emergency General Surgery

- What you need
  - Institutional commitment to data collection
  - Prefer ACS model
  - Committed Surgeon Champion who can enact change
- Contact us (kikramer@med.umich.edu)
  - Forms
  - Information packet
  - Virtual meeting

MPOG/ASPIRE Collaboration

- We have exchanged data!
  - Initial matches on Isolated Hip fracture
  - Have some tweaks to make on data matching
    - Center
    - Gender
    - Age
    - Date/Time case start +/- 12 hrs
    - ICD10 to CPT code
- 5,377/6,952, (77%)
  - 825 from 2 hospitals with no matches, (88%)

Anesthesia Technique

- 56 (1%) Not Specified
- 3,953 (74%) General
- 1,239 (23%) Neuraxial
- 129 (2%) General and Neuraxial

Anesthesia Technique

- By Hospital
- Caution
  - 1st pass
  - High true positive matches
  - Low false positive matches
  - ? False negative matches

traumactr	neu_tech 0	1	Total
8	83 30.40	190 69.60	273 100.00
3	412 79.54	106 20.46	518 100.00
29	290 66.97	143 33.03	433 100.00
32	449 95.74	20 4.26	469 100.00
22	104 57.14	78 42.86	182 100.00
14	238 55.87	188 44.13	426 100.00
7	361 63.56	207 36.44	568 100.00
25	159 53.36	139 46.64	298 100.00
19	337 69.48	148 30.52	485 100.00
30	707 97.79	16 2.21	723 100.00
27	237 77.45	69 22.55	306 100.00
4	632 90.80	64 9.20	696 100.00
	4,009 74.56	1,368 25.44	5,377 100.00

Program Manager Data Update
Analytic Updates

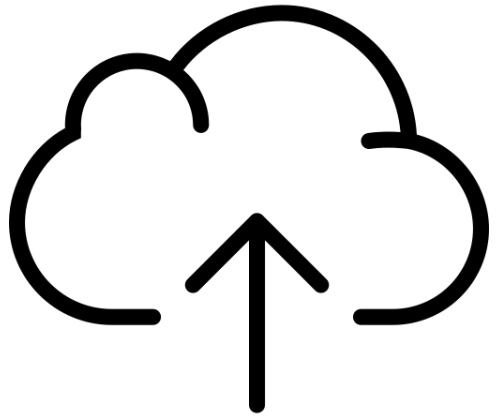
Jill Jakubus, PA-C

Topics

- **Announcements**
  AIS 2015
  Phases of care
  New analytics

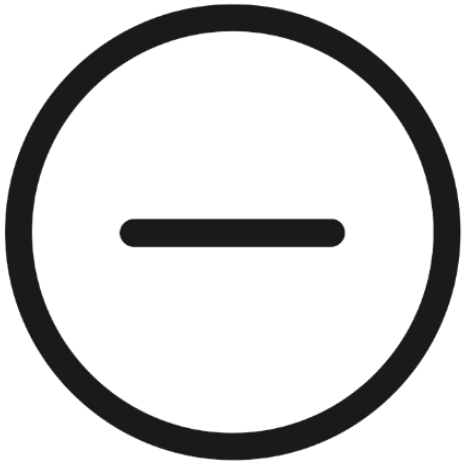
Performance Index Points

- **Final opportunity Dec submission**
- **Review: online analytics, case lists, push reports**
- **Only able to provide credit for data received**



Data Validation 2021

- Cryoprecipitate 0-4 Hours
- Cryoprecipitate 0-24 Hours
- IV Fluid 0-4 Hours
- IV Fluid 0-24 Hours
- Death
- Hospital Days



Retire

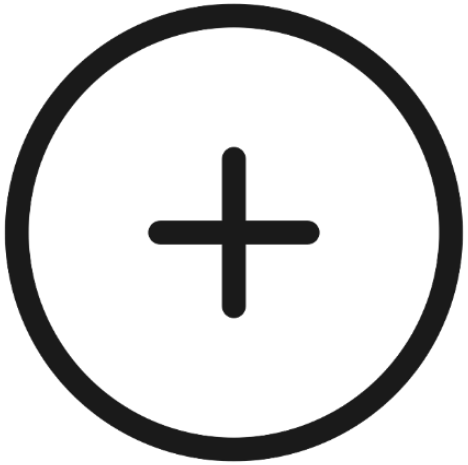
Data Validation 2021

- **Cardiac Arrest Requiring CPR**

Change

Data Validation 2021

- Hospital Discharge Date
- Hospital Discharge Time
- Pregnancy
- Delirium
- Patient Name
- Patient MRN
- Head CT Date
- Head CT Time
- IHF Date
- IHF Time



Additions

Remote Validation Staff Transition

- **Growth focus**
- **Sara Samborn, RN – MTQIP Auditor**
- **Confirmation email**

M·TQIP

Remote Data Validation

Audit Staff

Audit Staff	Sara Samborn	Shauna DiPasquo
Role	MTQIP Auditor	MTQIP Auditor
Email	smohar@med.umich.edu	dipasquo@med.umich.edu
Phone	(734) 936-2624	(734) 262-4677
Address	University of Michigan Hospital 1500 East Medical Center Drive Ann Arbor, MI 48109	University of Michigan NCRC MTQIP Building 16, Room 100N-09 2800 Plymouth Road Ann Arbor, MI 48109-2800

Research in Progress

Center	PI	Topic	Phase
Detroit Receiving	Oliphant	The accuracy of orthopaedic data in a trauma registry.	Data collection
Henry Ford	Johnson	EMS vs. private car effect on outcomes	Update pending
Michigan Medicine	Hemmila	Pedestrian protection	Analysis
Michigan Medicine	Wang	Injury prevention in vunerable populations	Analysis
Michigan Medicine	Ward	Clinical decision support tools	Analysis
Providence Hospital, Spectrum Health, St. Joseph Mercy, Michigan Medicine	Iskander, Lopez, Jakubus	Optimal timing head CT for geriatric falls	Analysis
Spectrum Health	Chapman	Outcomes in operative fixation of rib fractures	Submission
St. Joseph Mercy Ann Arbor	Hecht	Impact of time to anticoagulant reversal on mortality	Analysis
St Joseph Mercy Ann Arbor	Hecht	Early chemoprophylaxis in severely injured trauma patients reduces risk of VTE	Published *The American Surgeon*. July 2020.
St. Joseph Mercy Ann Arbor	Hoesel	Rib fractures in the elderly	Analysis
University of Minnesota	Tignanelli	NEI-6 modeling prospective validation	EAST multicenter trial application submitted

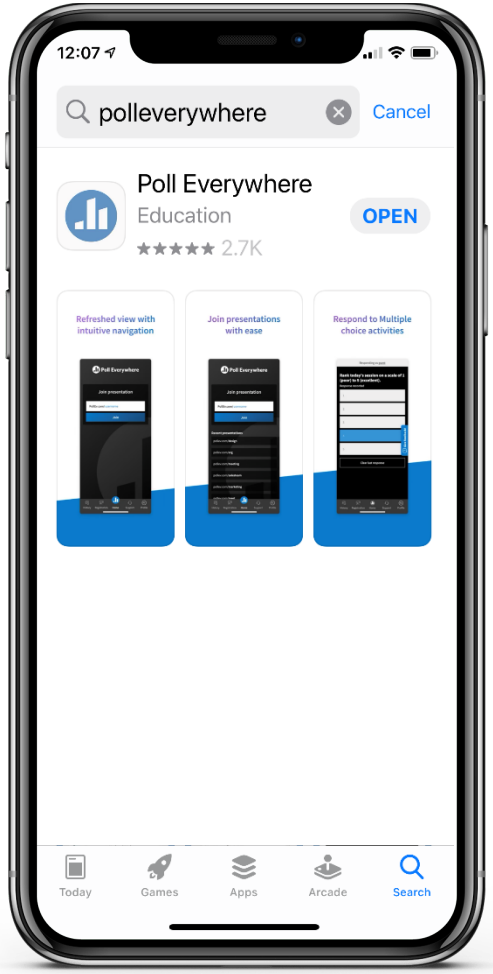
Topics

- ✓ **Announcements**
- • **AIS 2015**
  Phases of care
  New analytics

Meeting Polling

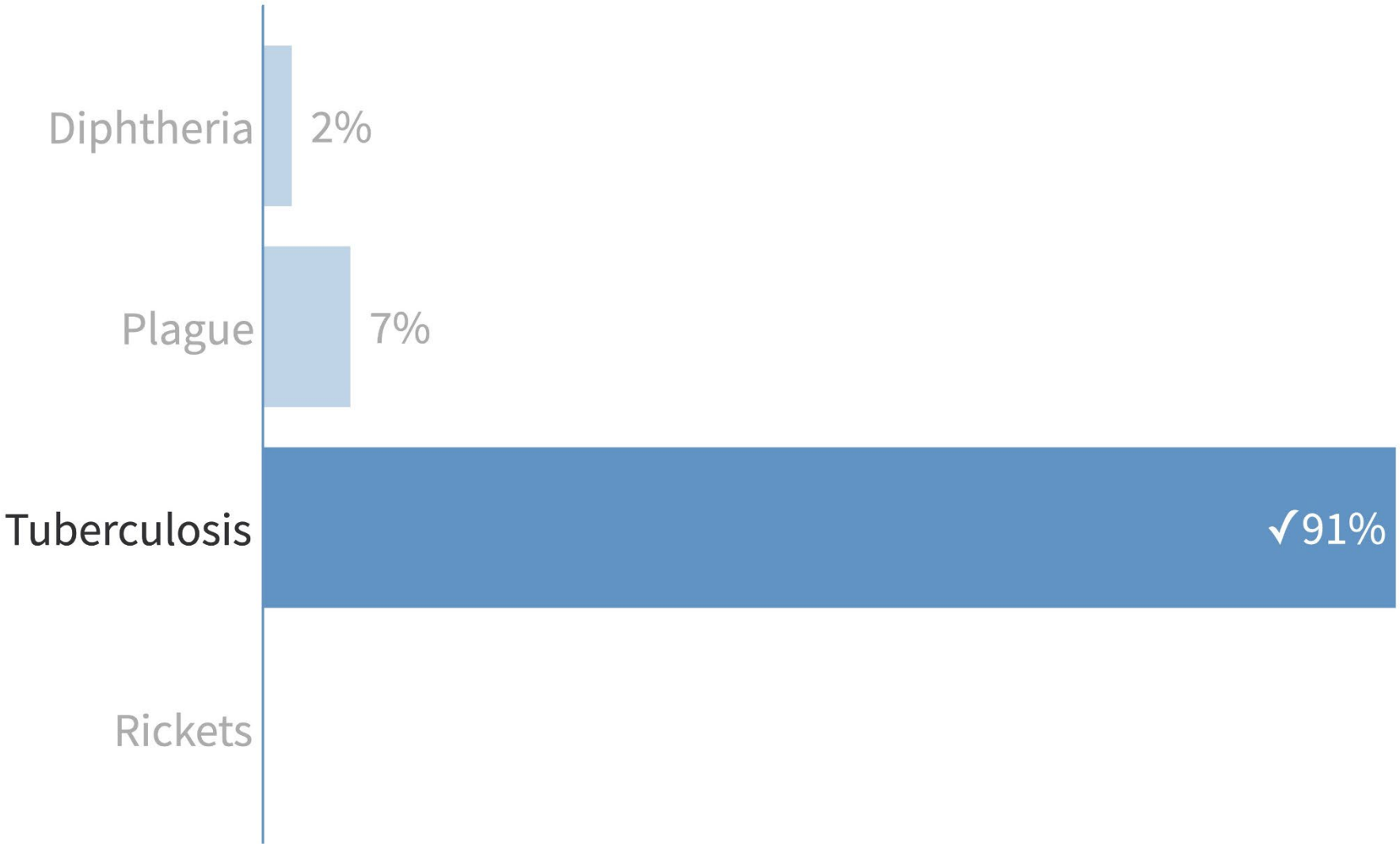
- **Mobile App**
  - Go to your app store
  - Search Poll Everywhere
  - Download
  - Enter username mtqip910
  - Enter your full name

- **Web Browser**
  - Go to PollEv.com/mtqip910
  - Set a browser bookmark
  - Enter your full name



Poll Everywhere

What condition was historically treated with plombage?



43 Responses

What's the best restaurant in the state?

Top		New	
5	Chic-fil-A	1	Don't know
5	Capitol grille	-1	Iciban
4	No idea.	-1	?
4	Cooper's Hawk	0	None
3	Buddy's pizza	2	Benihana
3	joe muer	0	?
2	Red Ginger	1	Holly hotel
2	Lucky"s	0	Taco bell
2	Ruth Chris	1	Thai delight
2	Benihana	1	eagans
2	Giovannis	0	Doherty
1	West End Grill	2	Giovannis
1	San Su - East Lansing	4	No idea.
1	Don't know	-1	Thai delight
1	Holly hotel	3	Buddy's pizza
1	Thai delight	5	Chic-fil-A
1	eagans	-1	Mario's

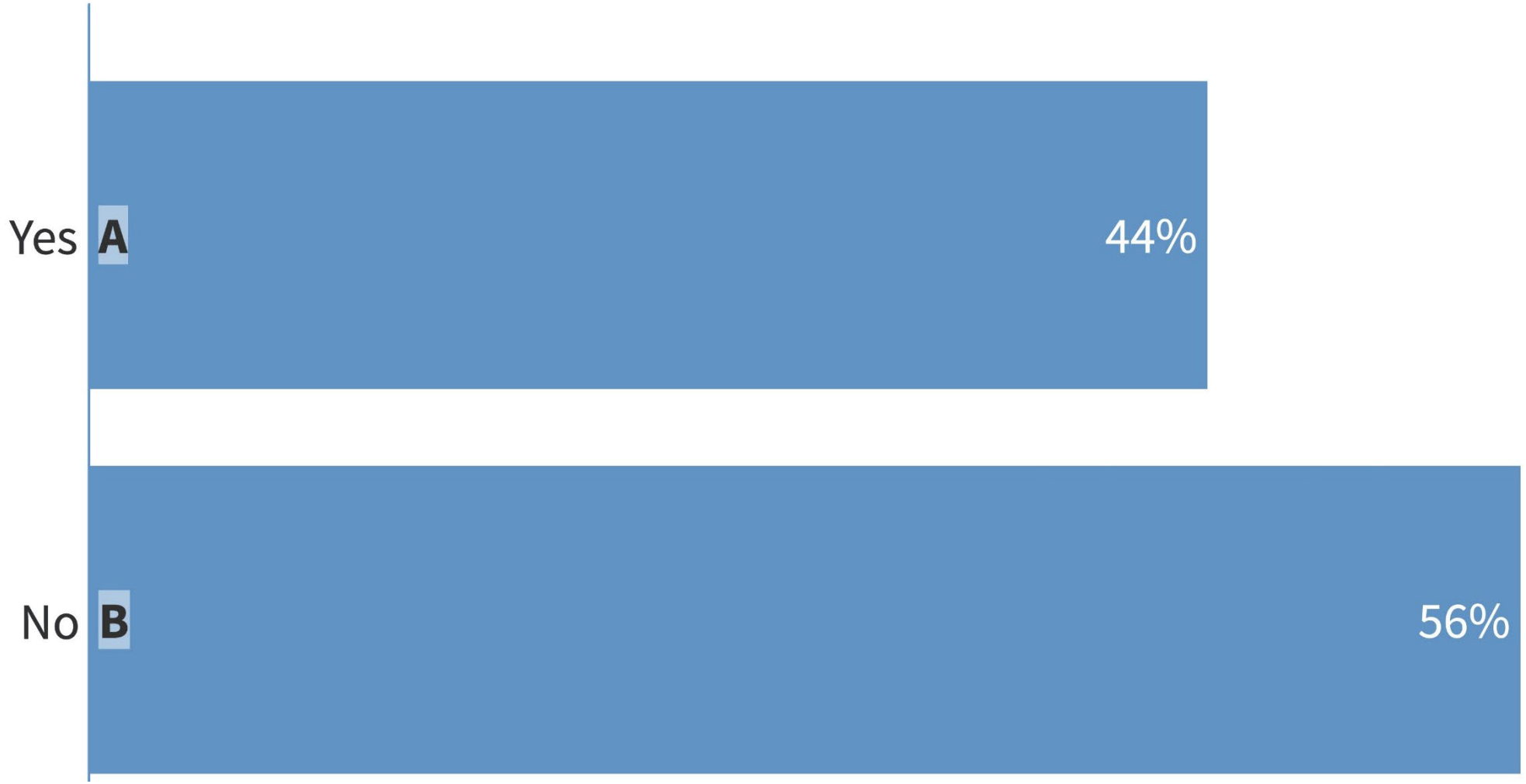
39 Responses

AIS 2015

- **Education**
  Vendors registry integration
  New yearly fees
  Analytic considerations
  Collaborative feedback poll

MTQIP requests uniform collaborative adoption

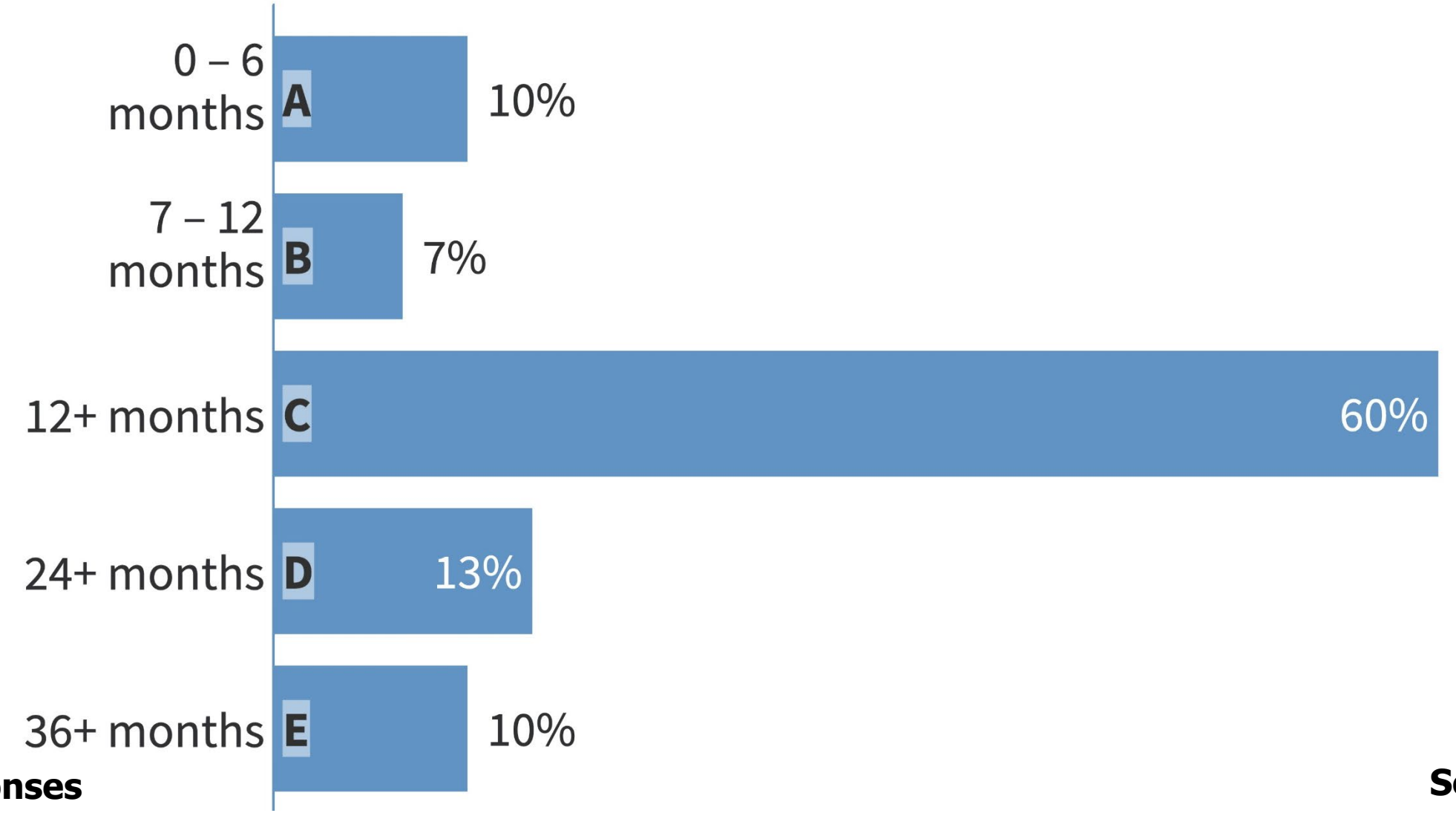
Q1 - For Level 1 and 2 trauma centers, have you completed AIS 2015 training?



57 Responses

Sept 2020

Q2 - For Level 1 and 2 trauma centers, how long ago was your AIS 2015 training?



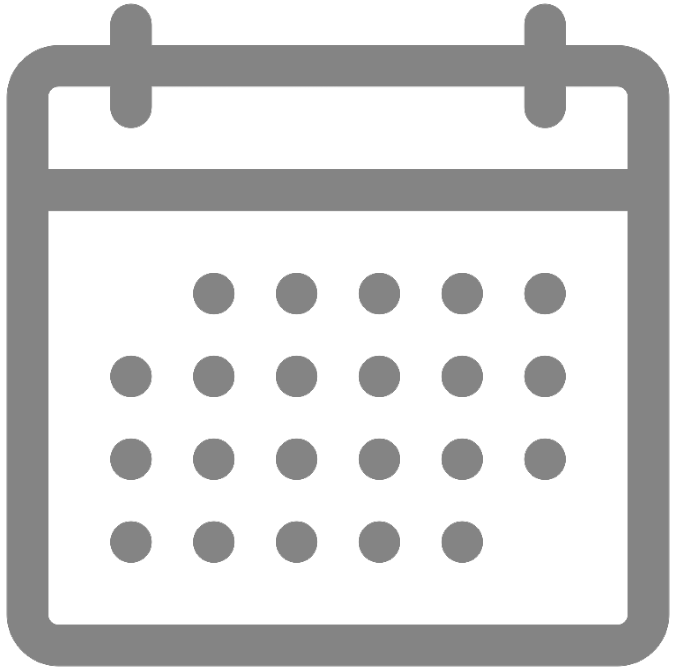
30 Responses

Sept 2020

AIS 2015

- Education
- Vendors registry integration
  New yearly fees
  Analytic considerations
  Collaborative feedback poll

AIS 2015 – Registry Integration



Earliest Mid – Late Q1 2021

AIS 2015

- Education
- Vendors registry integration
- New yearly fees
  Analytic considerations
  Collaborative feedback poll

AIS 2015 – New Yearly Fees

MTQIP

License Type	Annual License Fee (SRP)
System License	
National	$3,000
State	$1,000
Regional	$500
Coding License	
Individual/Single Center:	
Level III, IV, V	$250
Level I, II	$500
Multi-Center:	
Level IV, V	
0-50 centers (per center)	$100
>51 centers (per center)	$80
Level I, II, III	
0-5 centers (per center)	$400
6-15 centers (per center)	$300
>16 centers (per center)	$200

Center

Annual Subscription Fee
$300
$300

MTQIP Total $1,300

Center Total $800

AIS 2015

- Education
- Vendors registry integration
- New yearly fees
- Analytic considerations
  Collaborative feedback poll

AIS 2015 – Analytic Considerations

- Crosswalk AIS 2005 > ICD-10
- Vendor testing and crosswalking
- MTQIP programming
- Model re-calibration
- Cohort formation instability

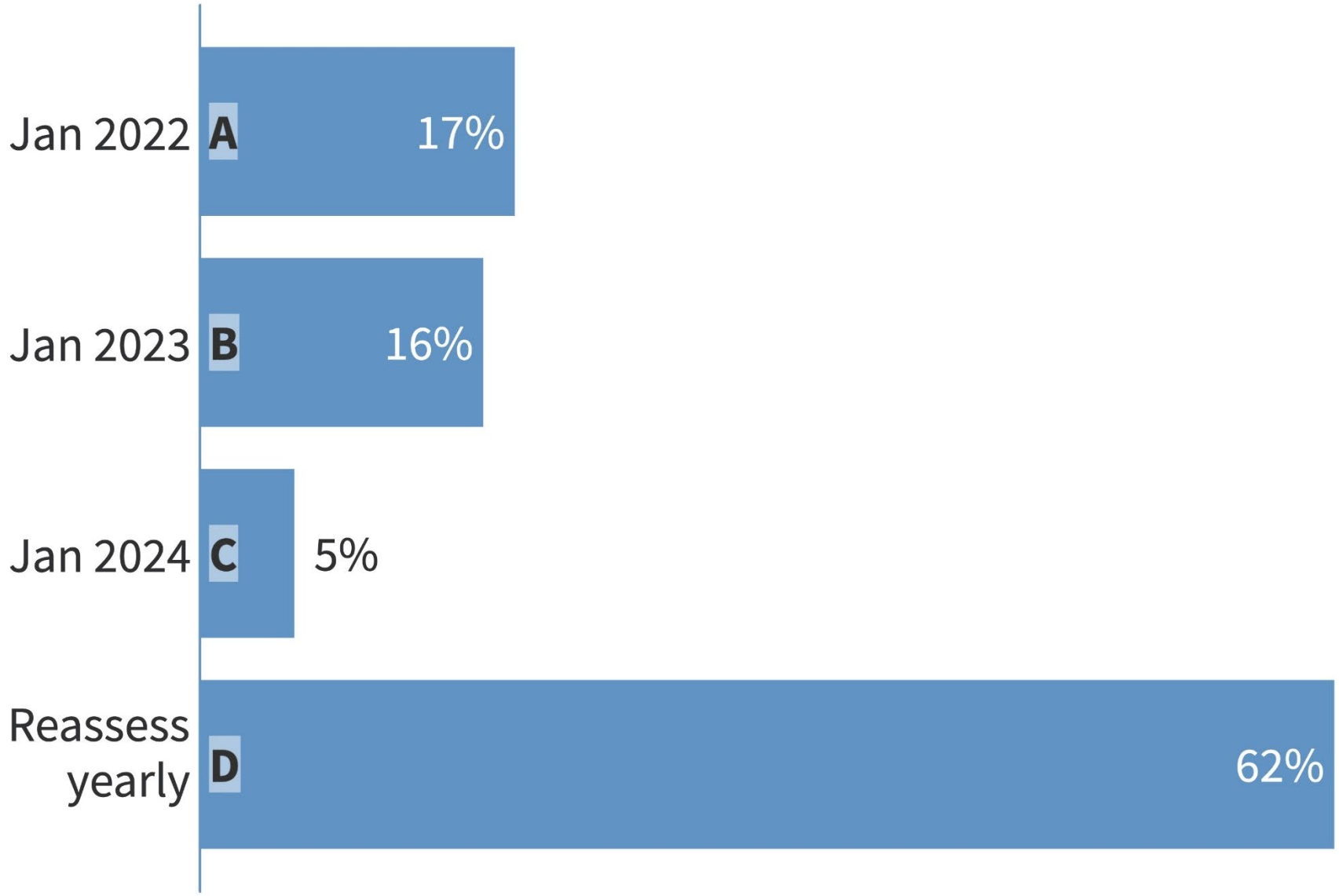
AIS 2015 – Analytic Considerations

- Unclear gains to be realized for the cost
- MTQIP recommends deferring at this time
- Allow period user testing by non-MTQIP centers
- Protecting analytics and modeling
- Minimizing cost and resource burden

AIS 2015

- Education
- Vendors registry integration
- New yearly fees
- Analytic considerations
- Collaborative feedback poll

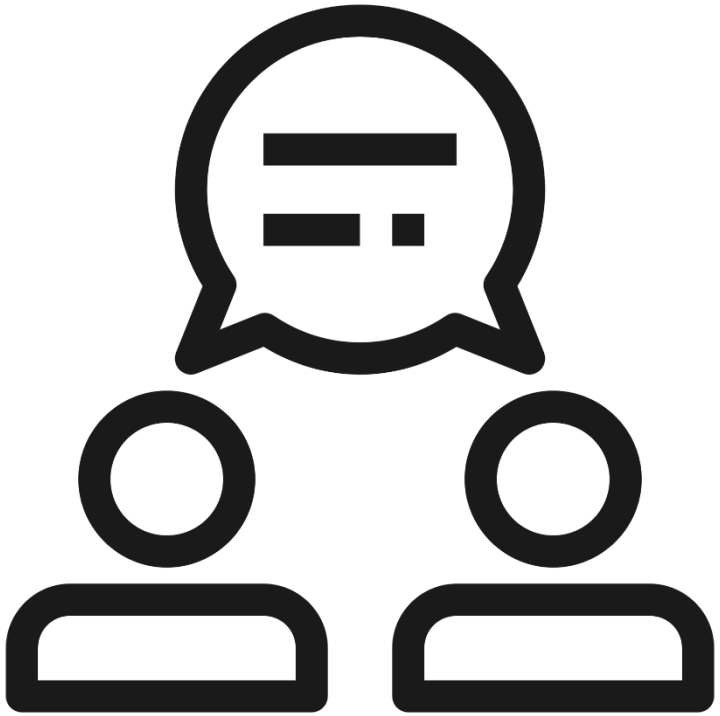
When should MTQIP as a collaborative adopt AIS 2015?



58 Responses

Oct 13, 2020

Discussion Opportunity

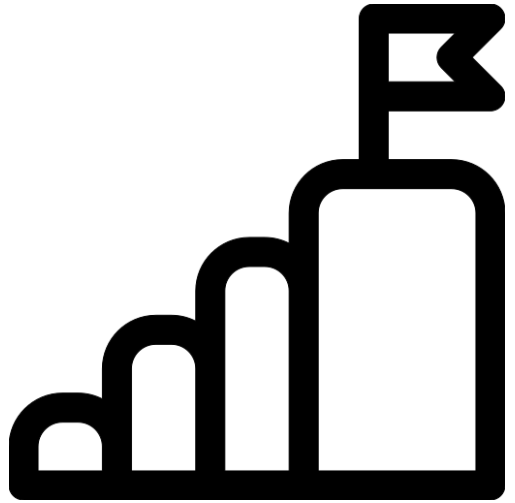


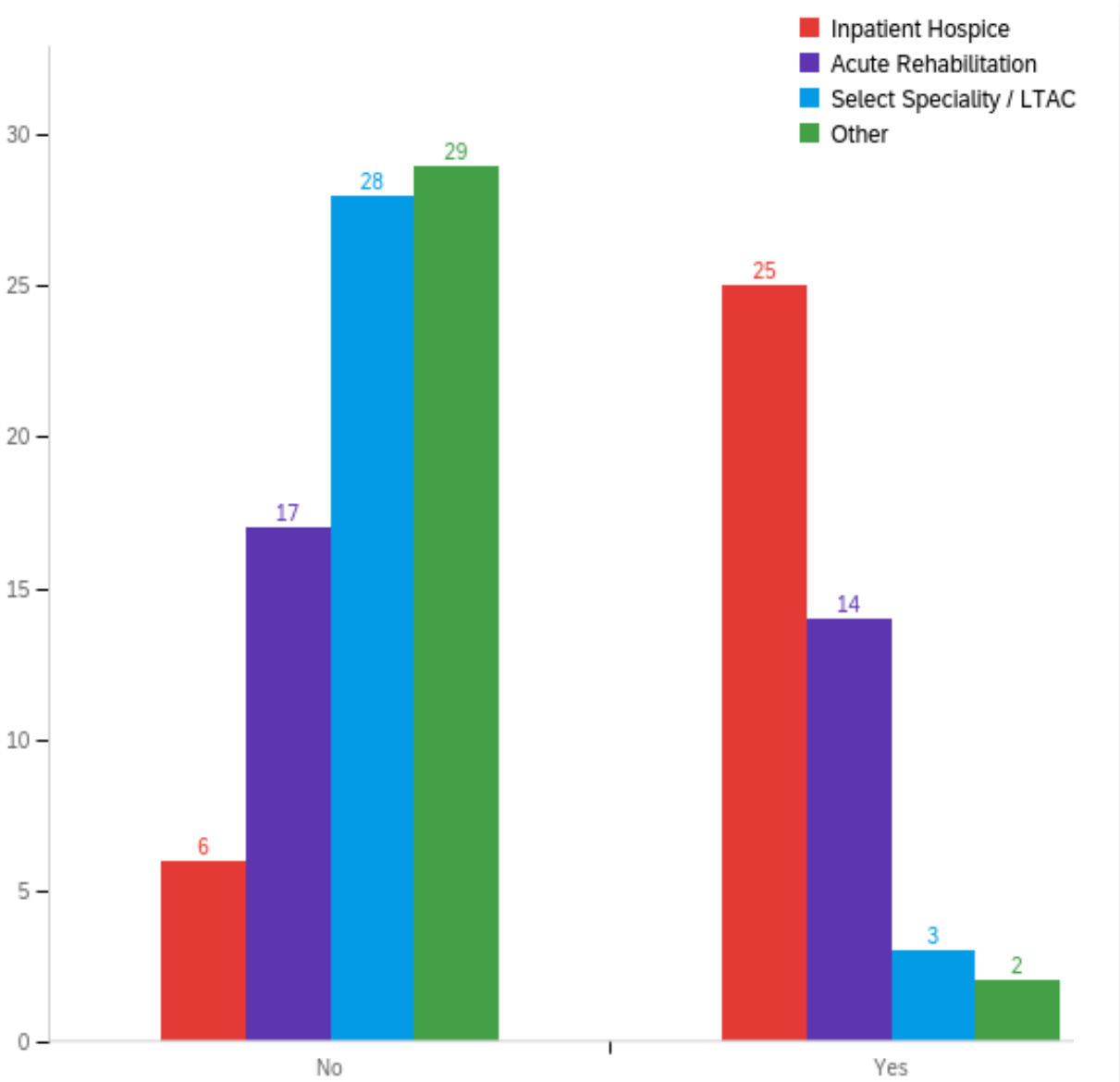
Topics

- ✓ Announcements
- ✓ AIS 2015
- • Phases of care
  New analytics

When does the “stay” end?

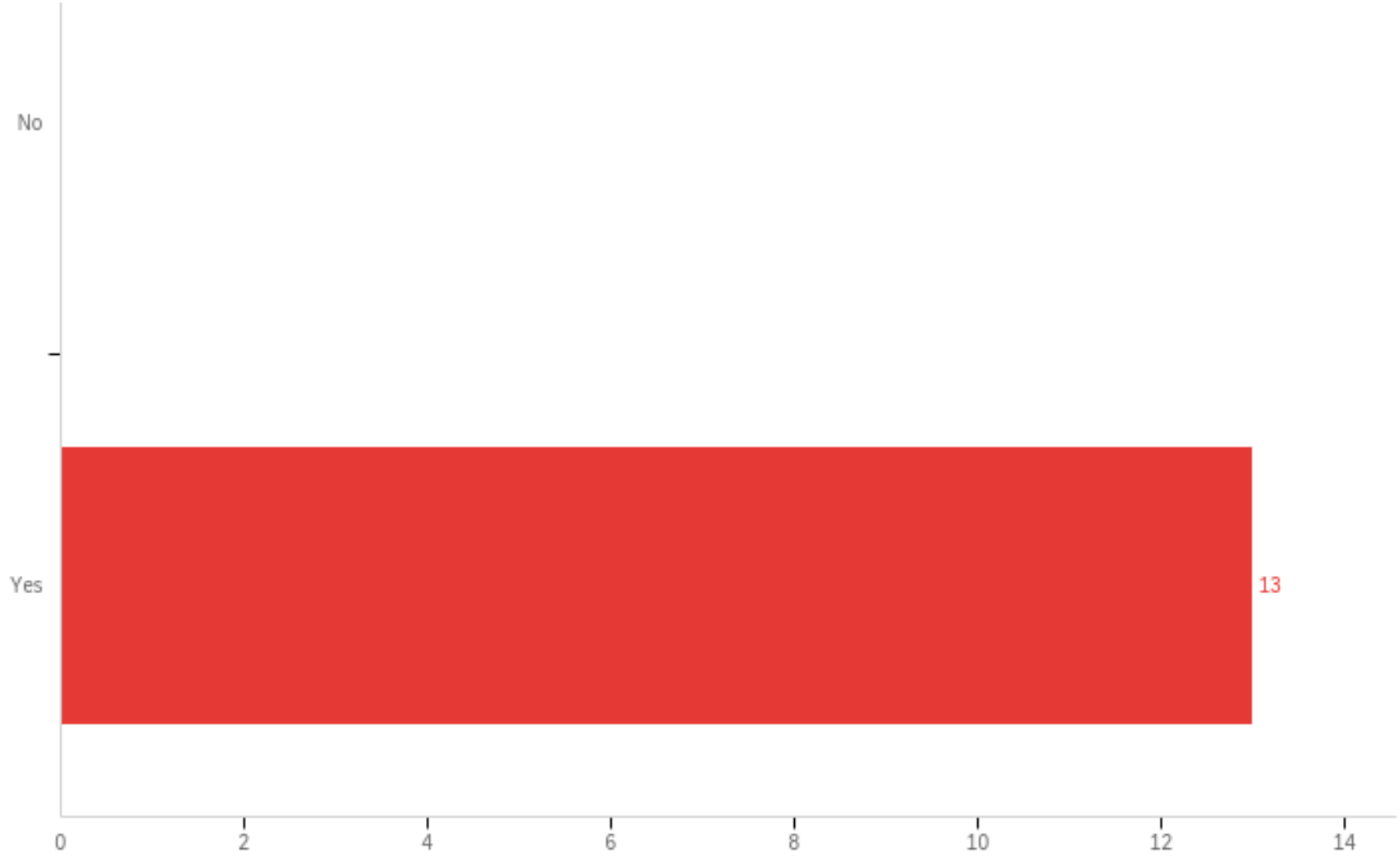
- Share responses
- Highlight variability issue
- Propose solution
- Commentary



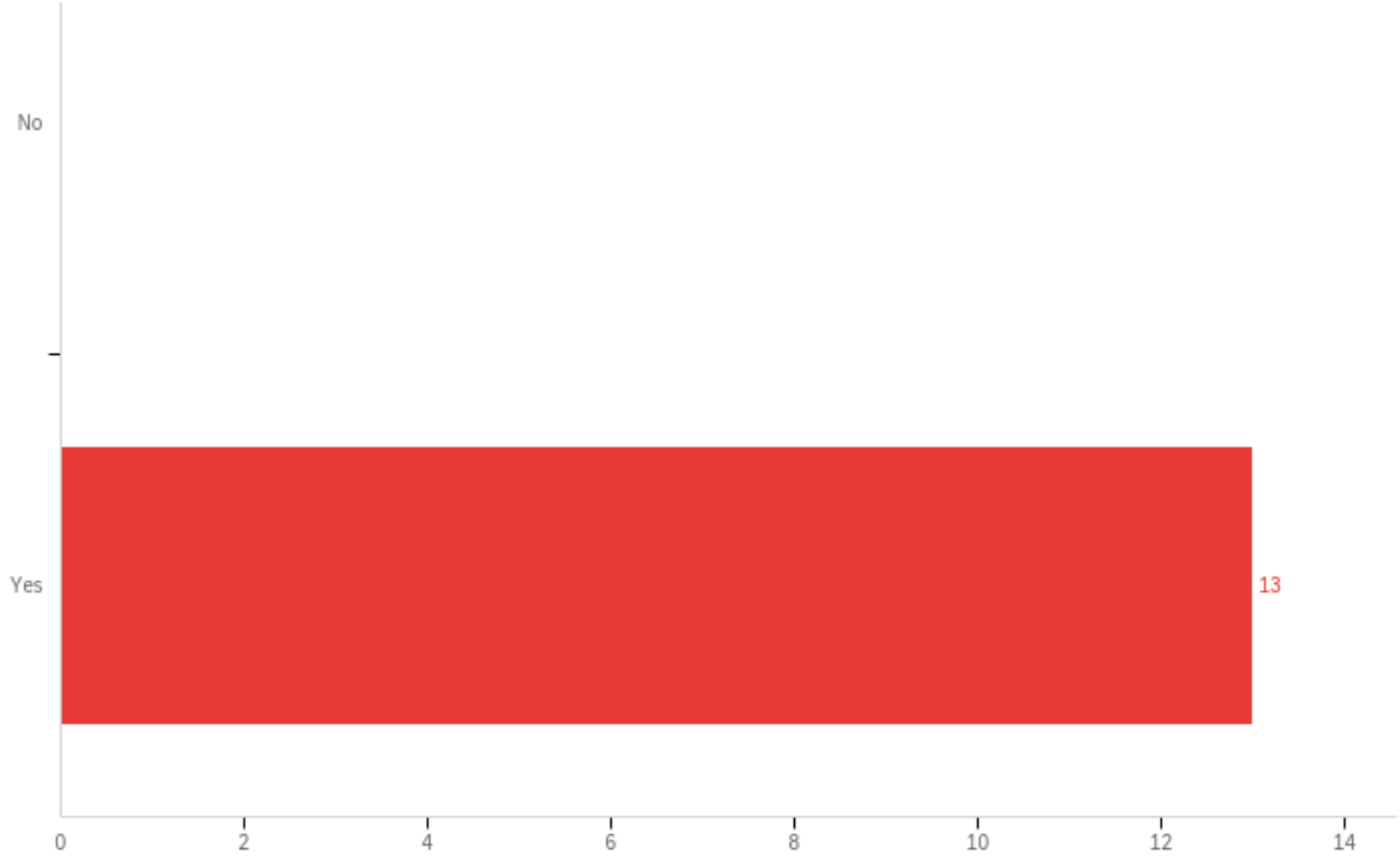


What additional phases of care are available at your hospital?

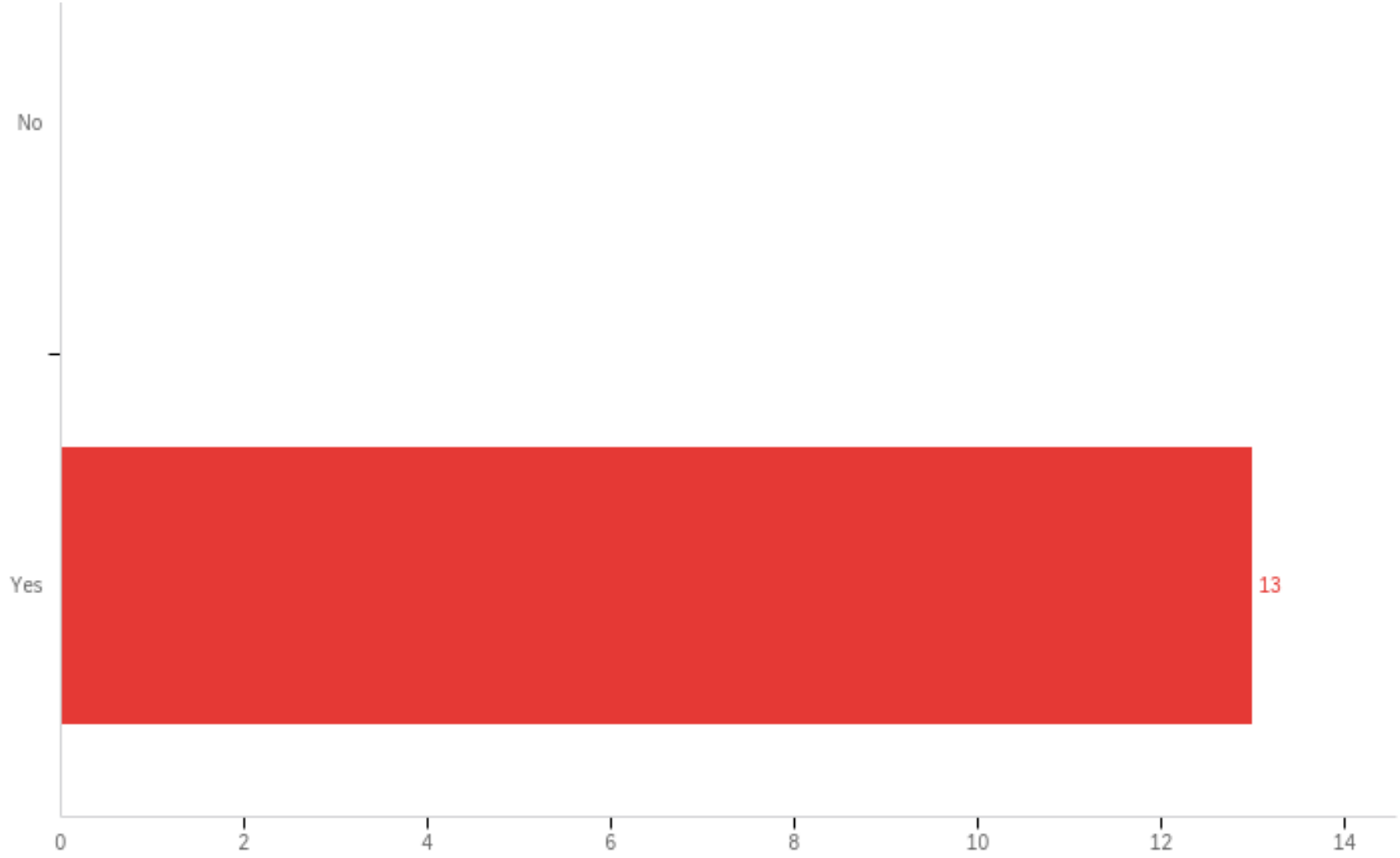
When transitioning to acute rehabilitation, is the encounter/visit number different from the trauma stay?



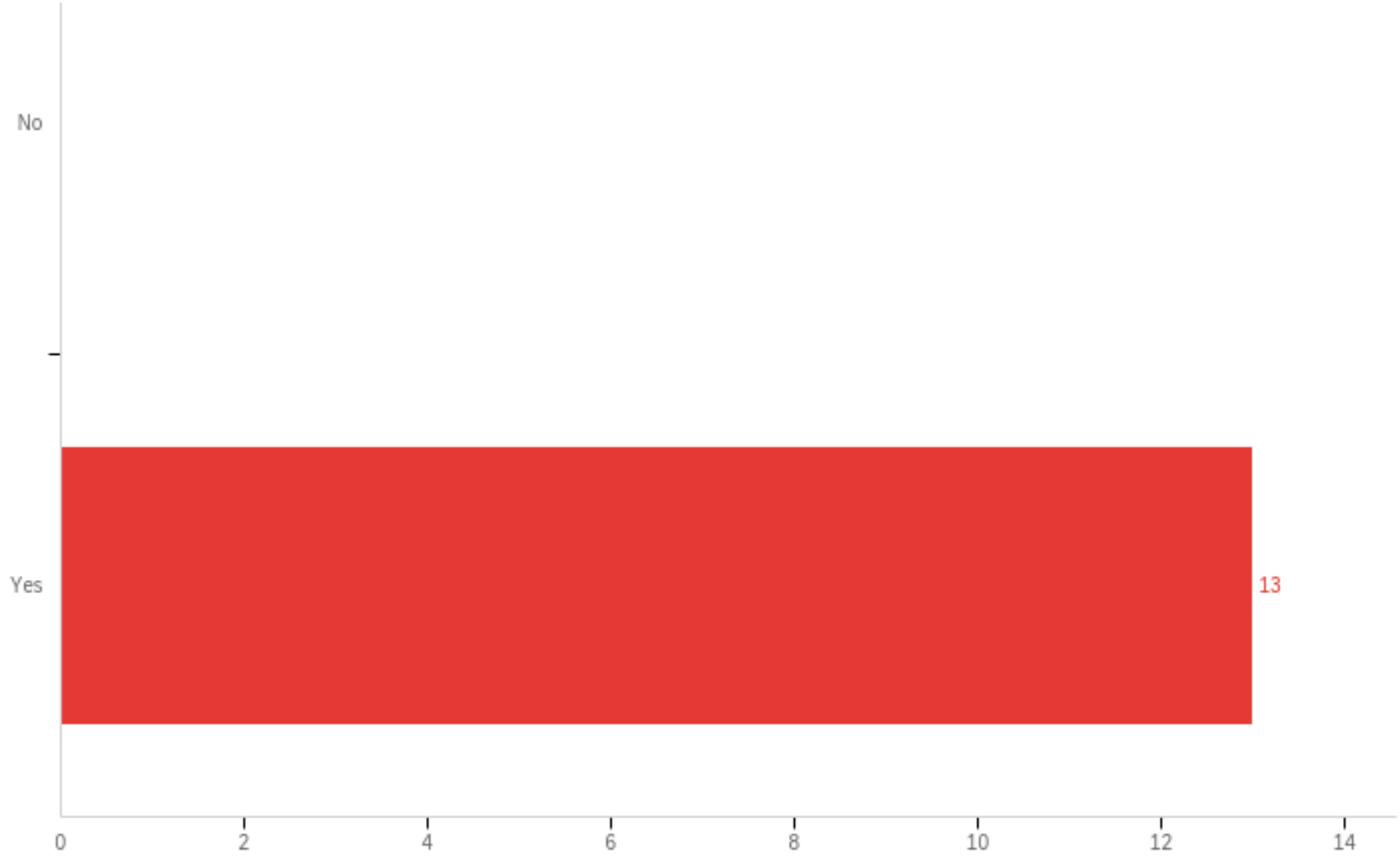
When transitioning to acute rehabilitation, is there a discharge order from the trauma stay?



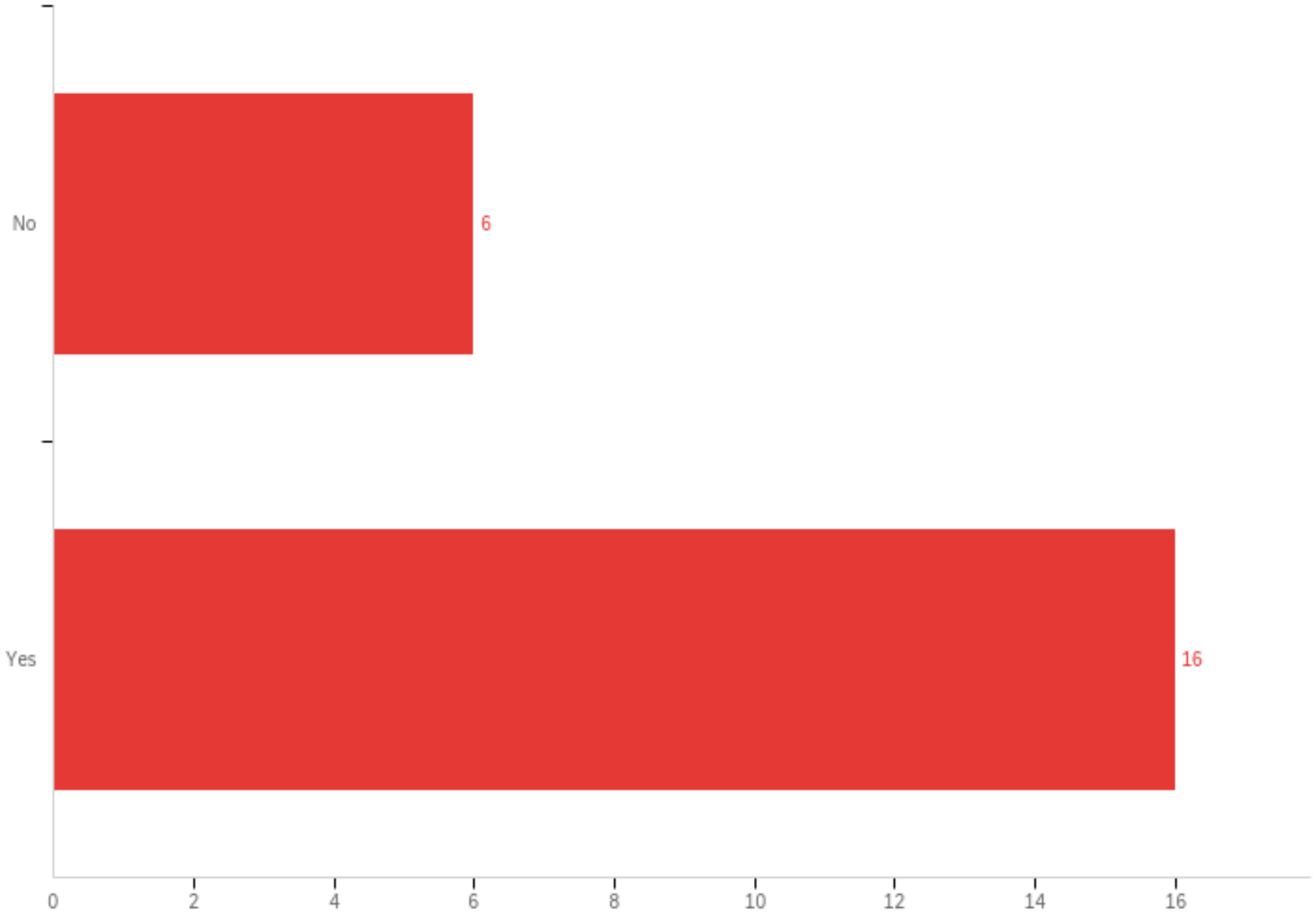
When transitioning to acute rehabilitation, is there a discharge summary from the trauma stay?



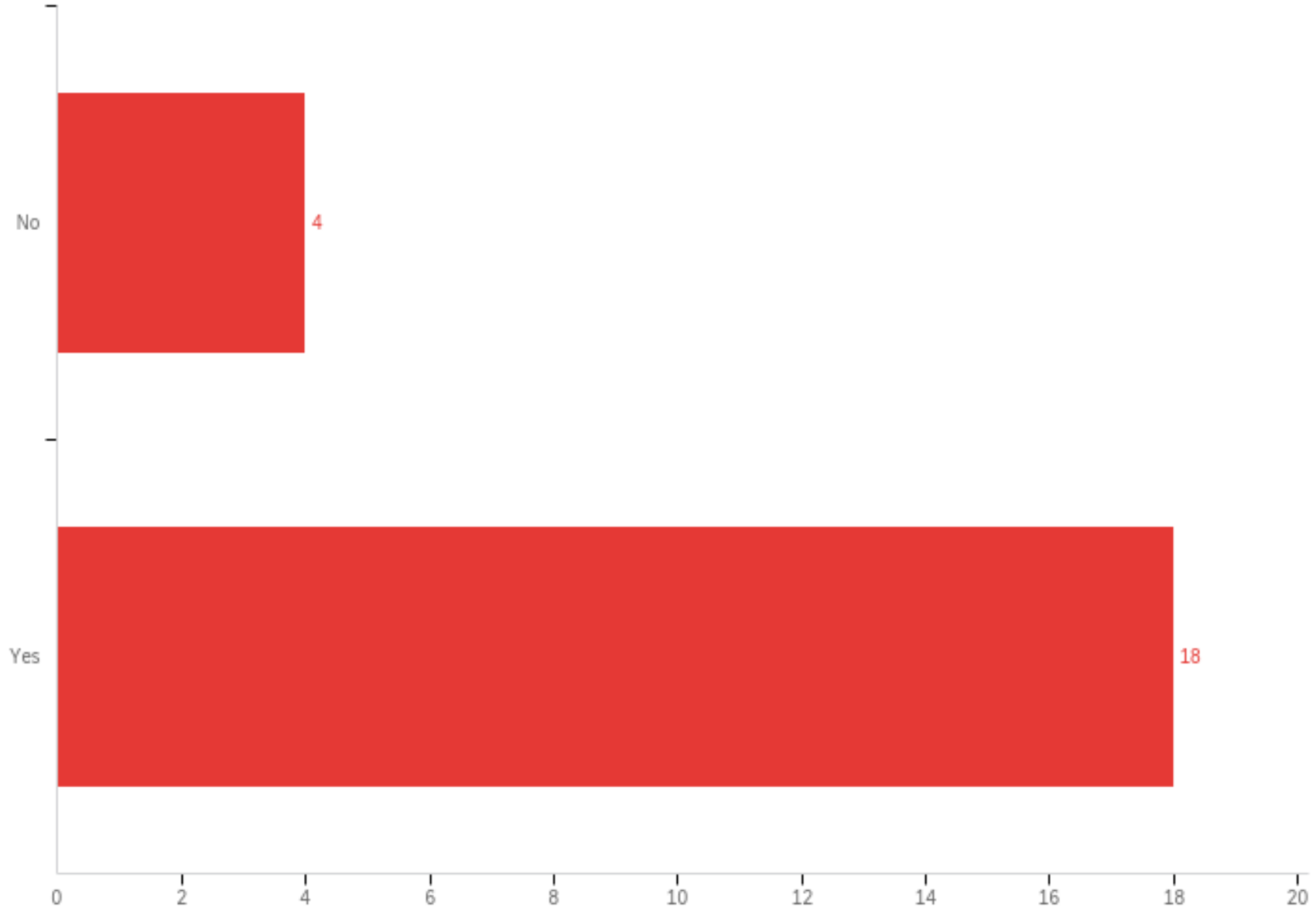
When transitioning to acute rehabilitation, is there an admit order for the rehab service?



When transitioning to inpatient hospice, is the encounter/visit number different from the trauma stay?



When transitioning to inpatient hospice, is there a discharge order from the trauma stay?



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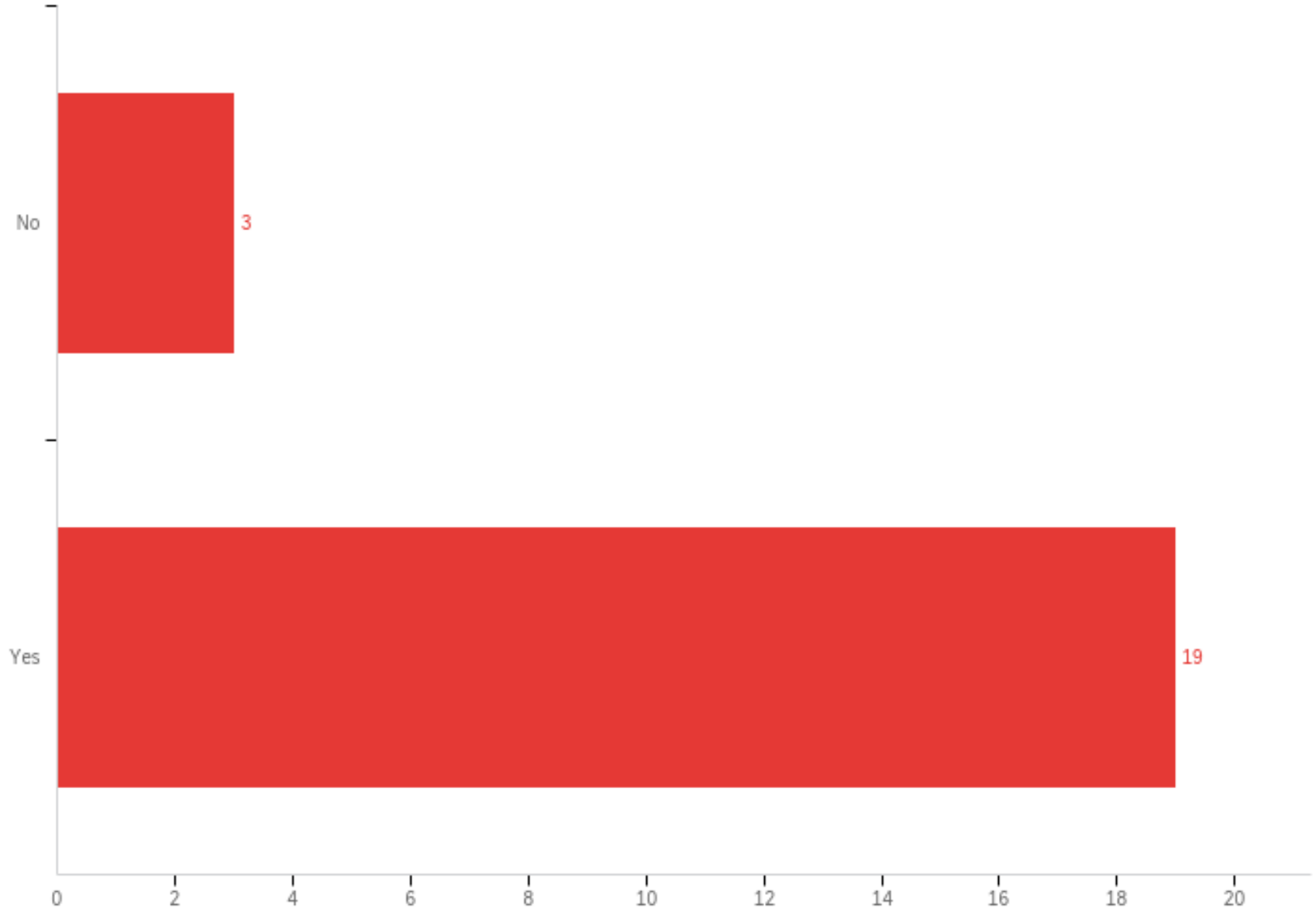
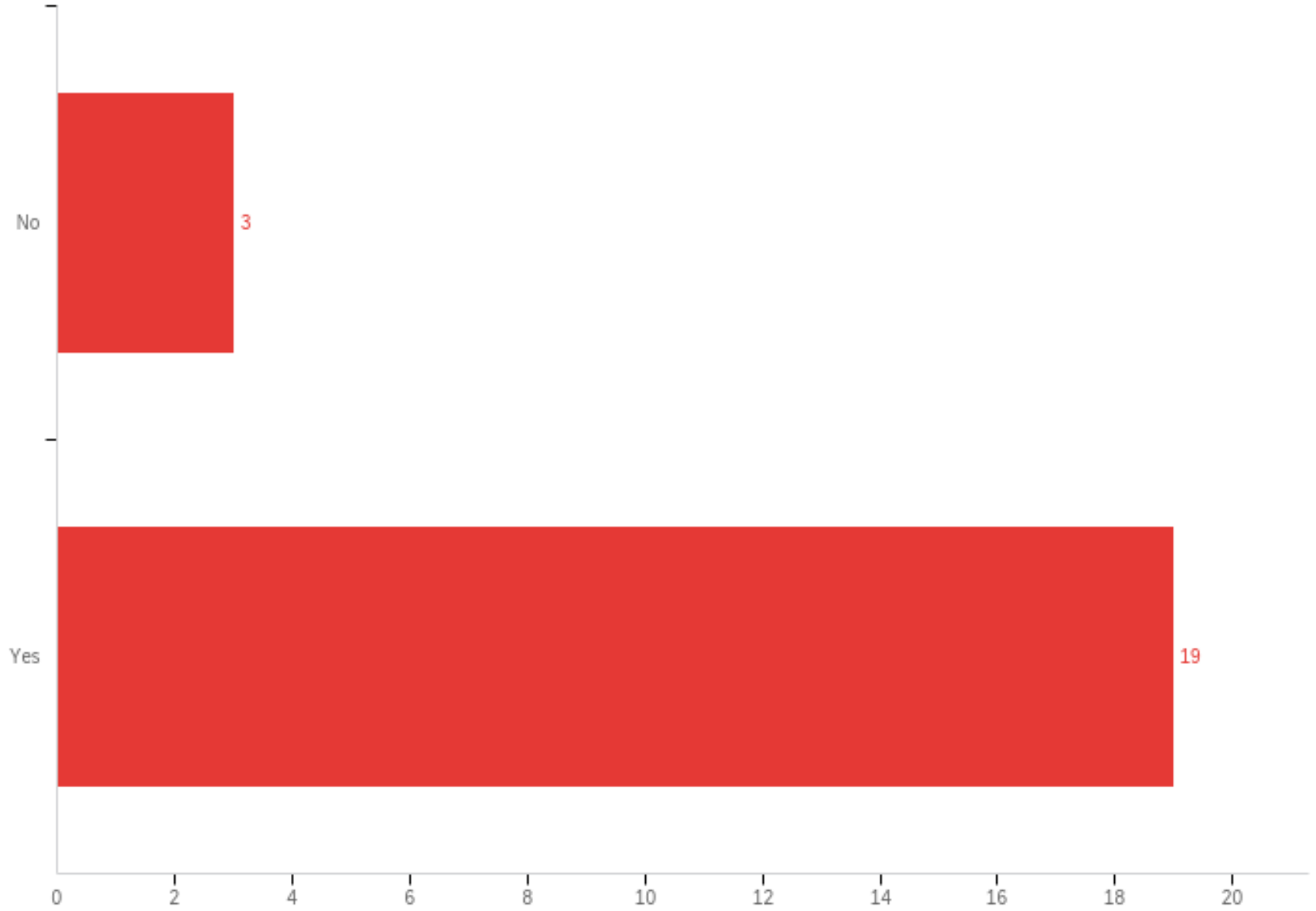
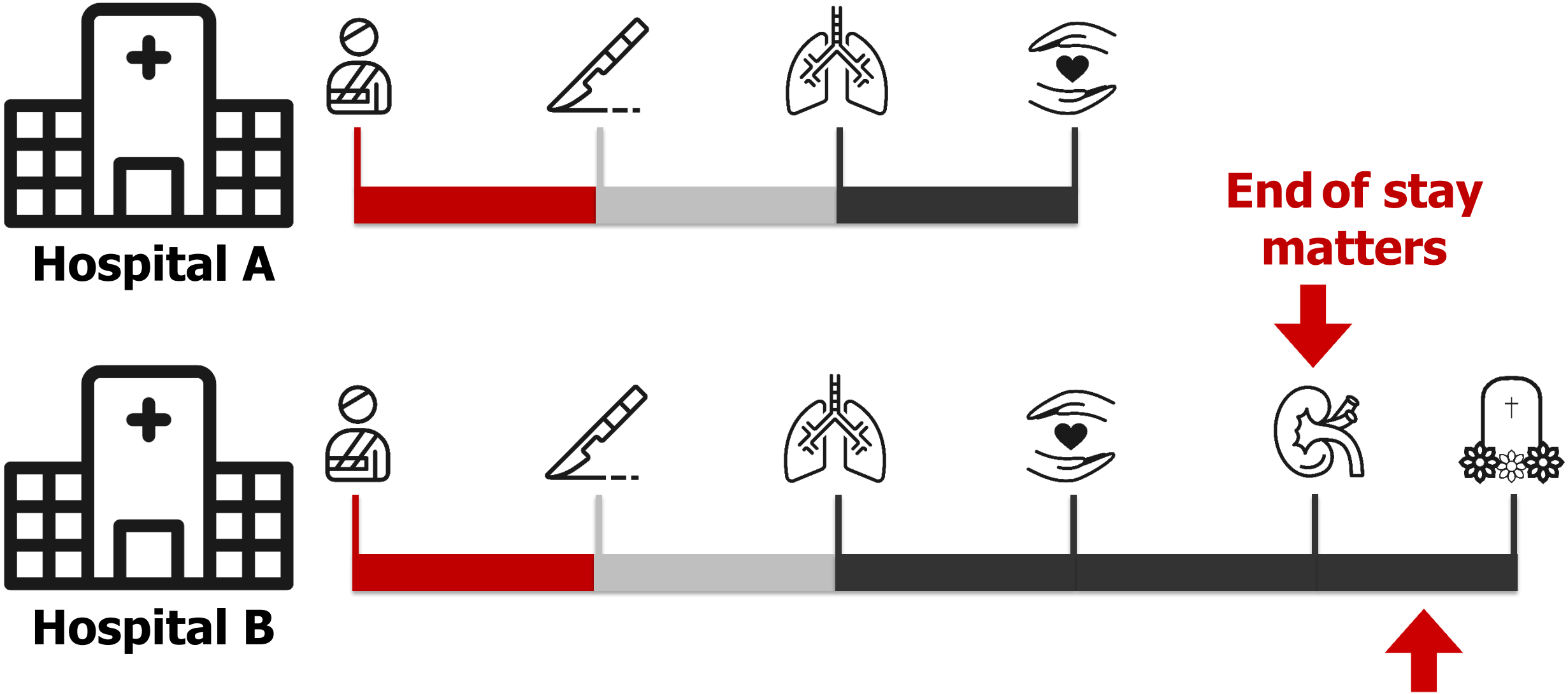


When transitioning to inpatient hospice, is there an admit order for the hospice service?



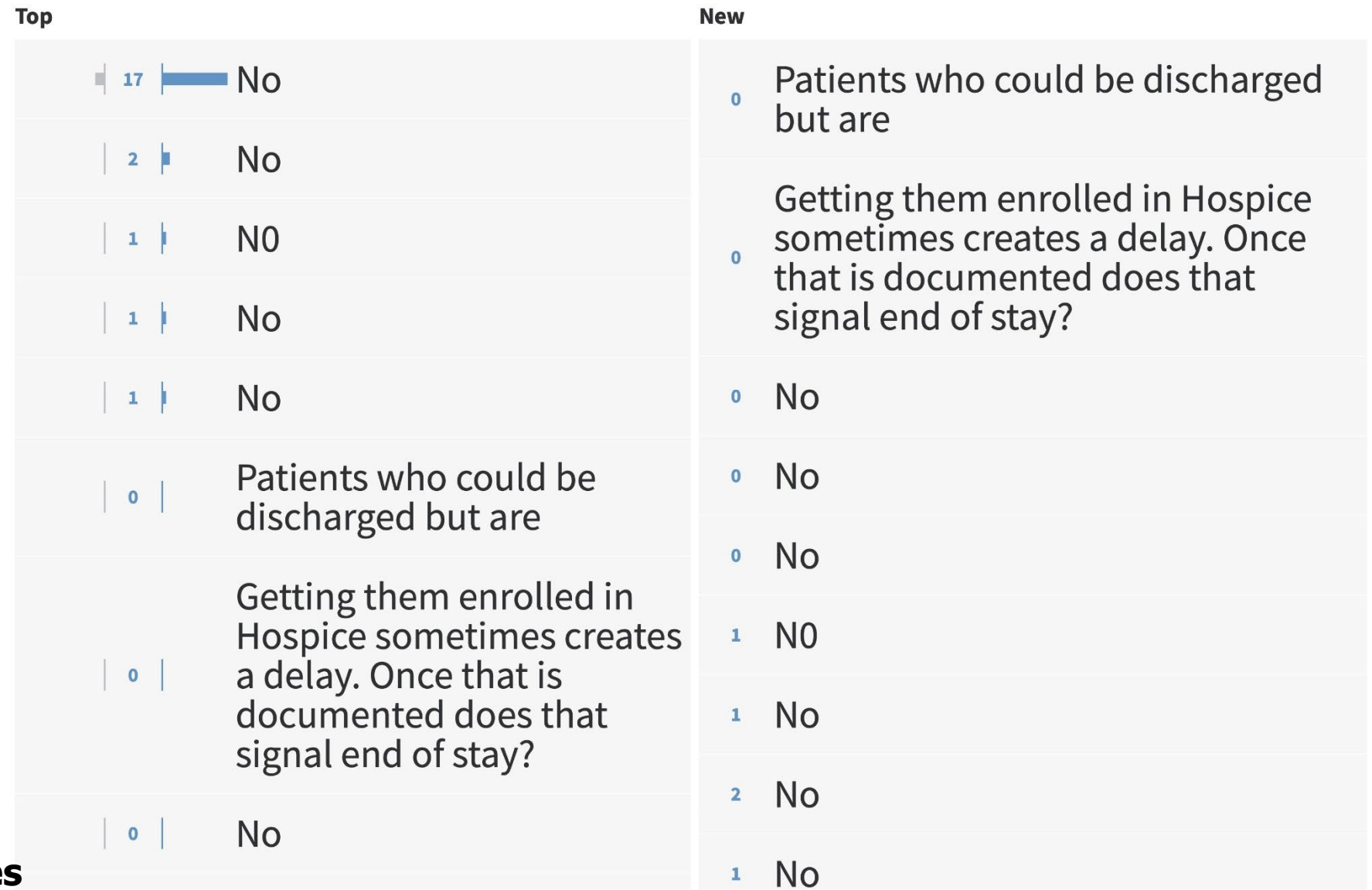
Variability Issue



Proposed solution

- Most centers not impacted
- Only impacting inpatient hospice centers
- Only impacting end of stay non-defined centers
- Clarified 2021 definition
- End of stay = end of acute phase of care
- Not solely comfort care or hospice care

Are there considerations we've missed by clarifying the "end of stay" as the end of the acute phase of care?



10 Responses

Topics

- ✓ Announcements
- ✓ AIS 2015
- ✓ Phases of care
- • New analytics

ArborMetrix Online Analytics – Completed

- **IHF Surgical Repair Timing**

Metrics

Head CT Metric

Surgical Hip Repair

VTE Prophylaxis 2019

VTE Prophylaxis 2020

ArborMetrix Online Analytics – Completed

- **IHF Surgical Repair Timing**
- **PHI**

Patient List

Record #	MRN	First Name	Last Name	Age	ISS

ArborMetrix Online Analytics - Next

- **Triage**
- **PRQ**
- **Your suggestion**

J Trauma Acute Care Surg. 2019 Sep;87(3):658-665. doi: 10.1097/TA.0000000000002402.

Rethinking the definition of major trauma: The need for trauma intervention outperforms Injury Severity Score and Revised Trauma Score in 38 adult and pediatric trauma centers

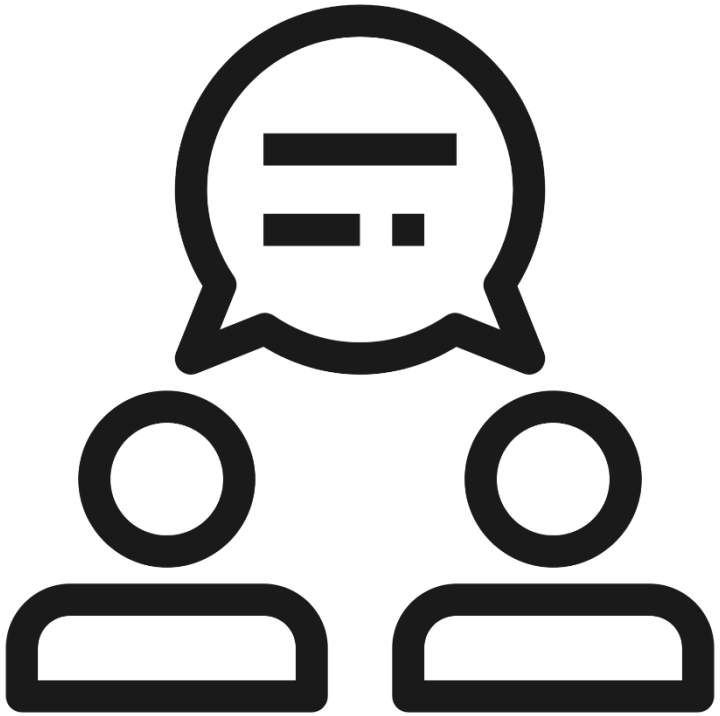
J Surg Res. 2020 Jul;251:195-201. doi: 10.1016/j.jss.2019.11.011. Epub 2020 Mar 10.

Redefining the Trauma Triage Matrix: The Role of Emergent Interventions

What online analytic would you find most valuable?

7 Responses

Discussion Opportunity



MTQIP Program Manager Data Update

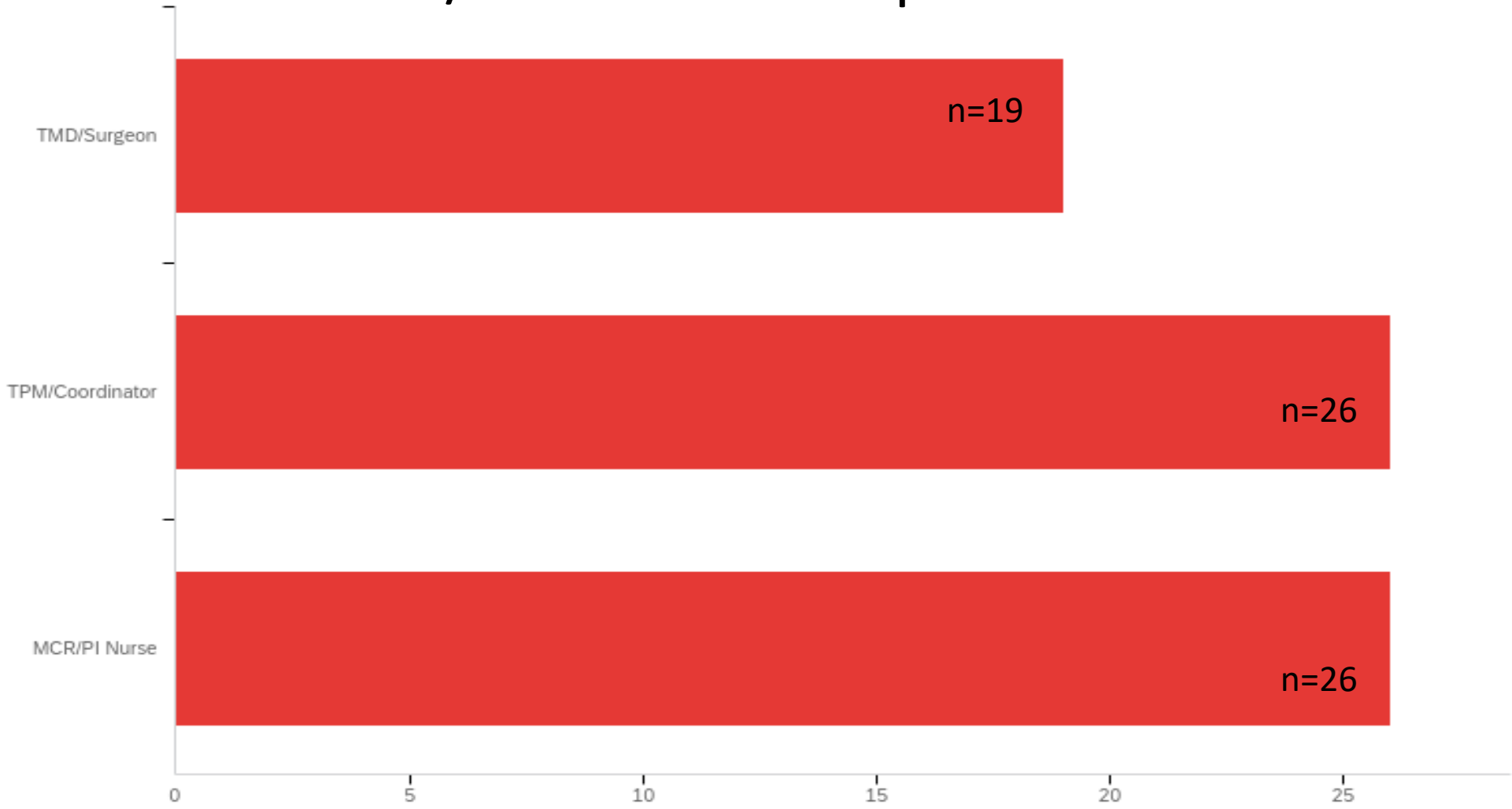
Judy Mikhail, PhD MBA RN

MTQIP COVID Fall 2020 Survey

Impact of COVID on Trauma Program Performance

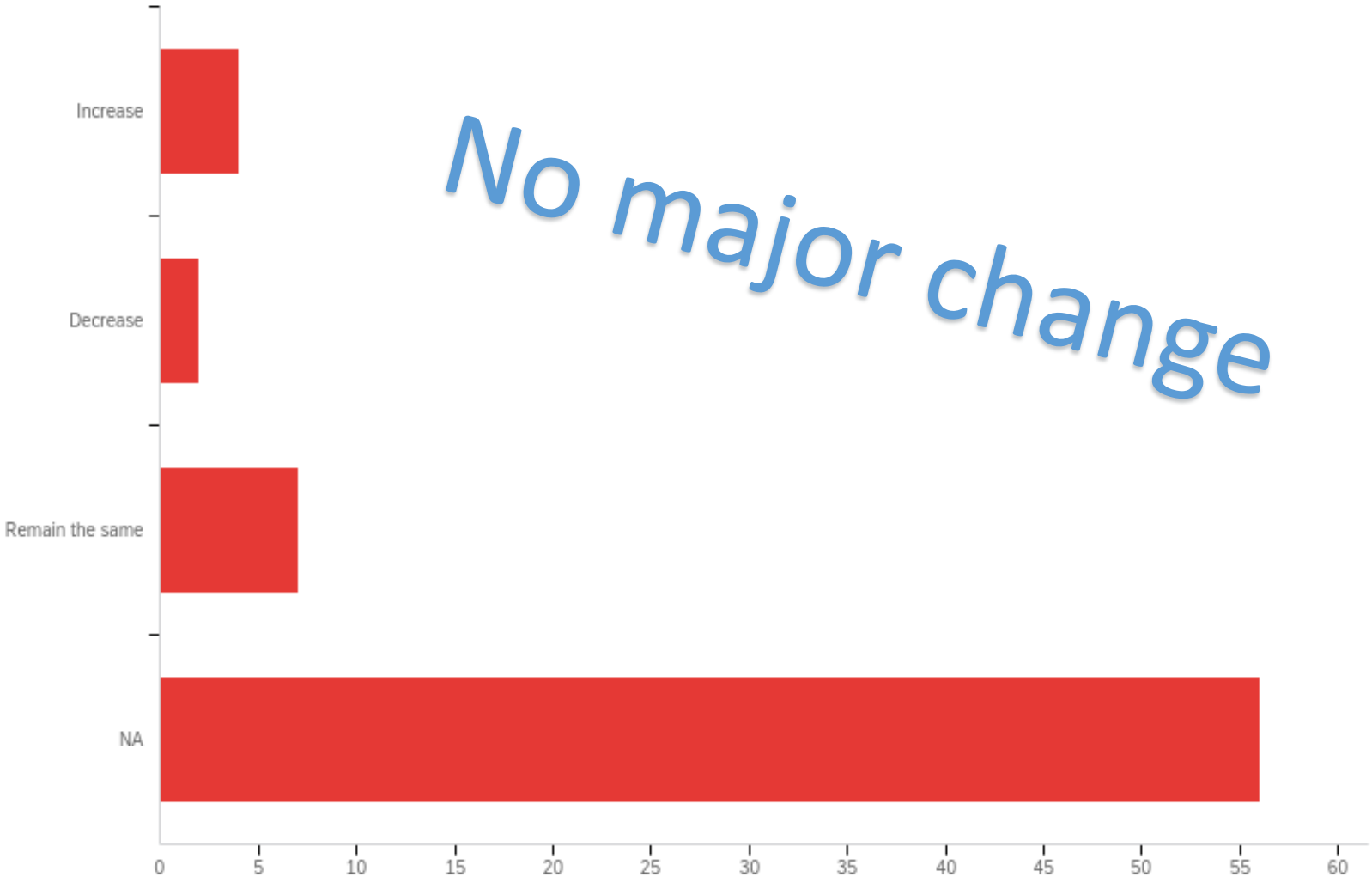
Q1 - Select the position which most closely describes your role:

Total 71/117 = **61%** Response Rate



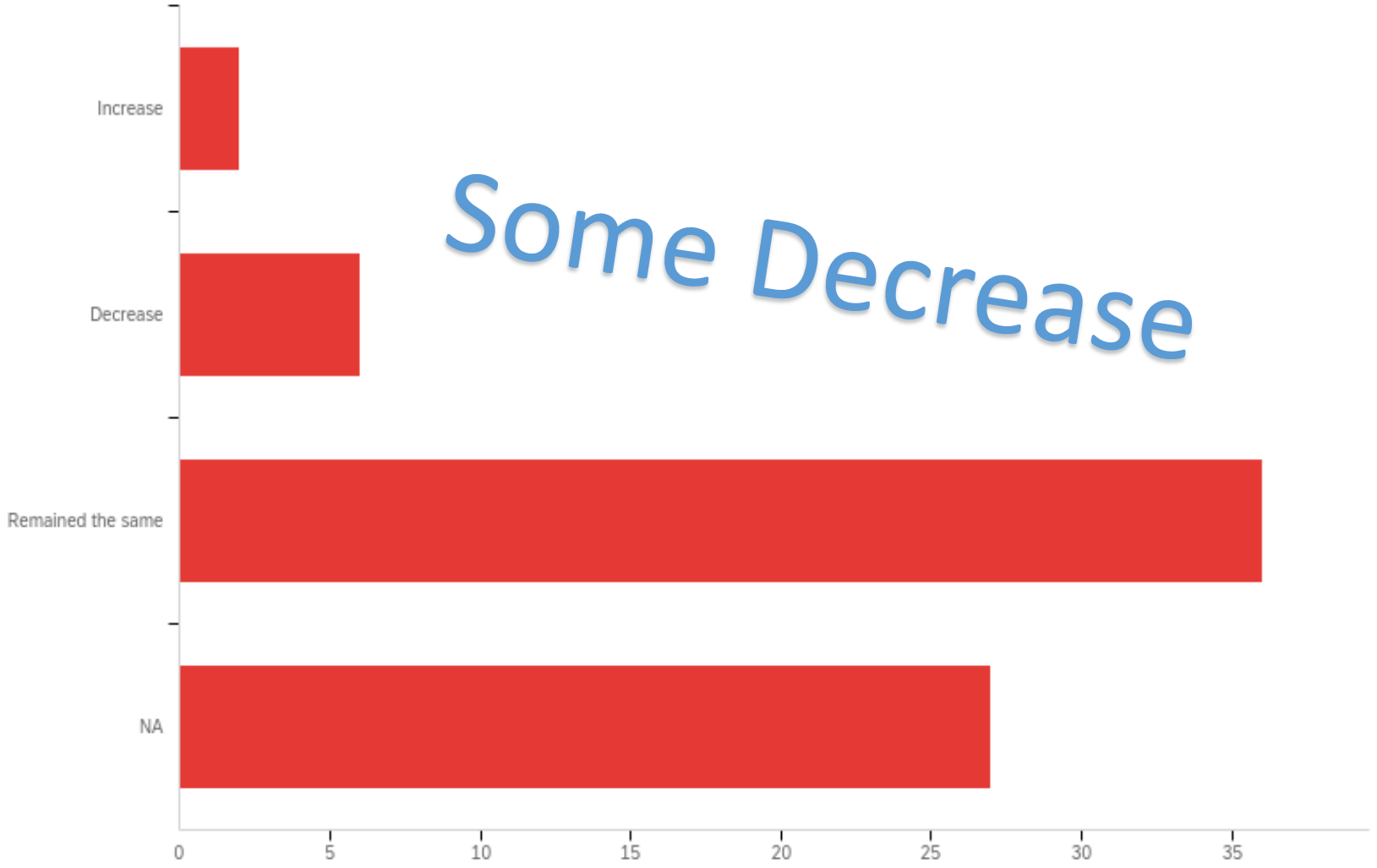
Item	Percent
Converted meetings to virtual	13%
Reassigned staff to work from home	12%
Changed PPE use for activations	10%
Reduced or eliminated program meetings	10%
Redeployed staff to other departments for COVID needs	9%
Furloughed some program staff	8%
Dismissed non-essential staff from trauma activations	7%
Changed trauma rounding protocols	6%
Created contingency/succession plans	6%
Changed trauma staffing schedules	4%
Reduced or eliminated trauma program office space	4%
Ensured staff have family care plans	4%
Employed video review of trauma activations	1%

Q4 - Over the last 6 months, ***<u>for those centers that went on diversion</u>***, did your center's diversion of trauma patients:

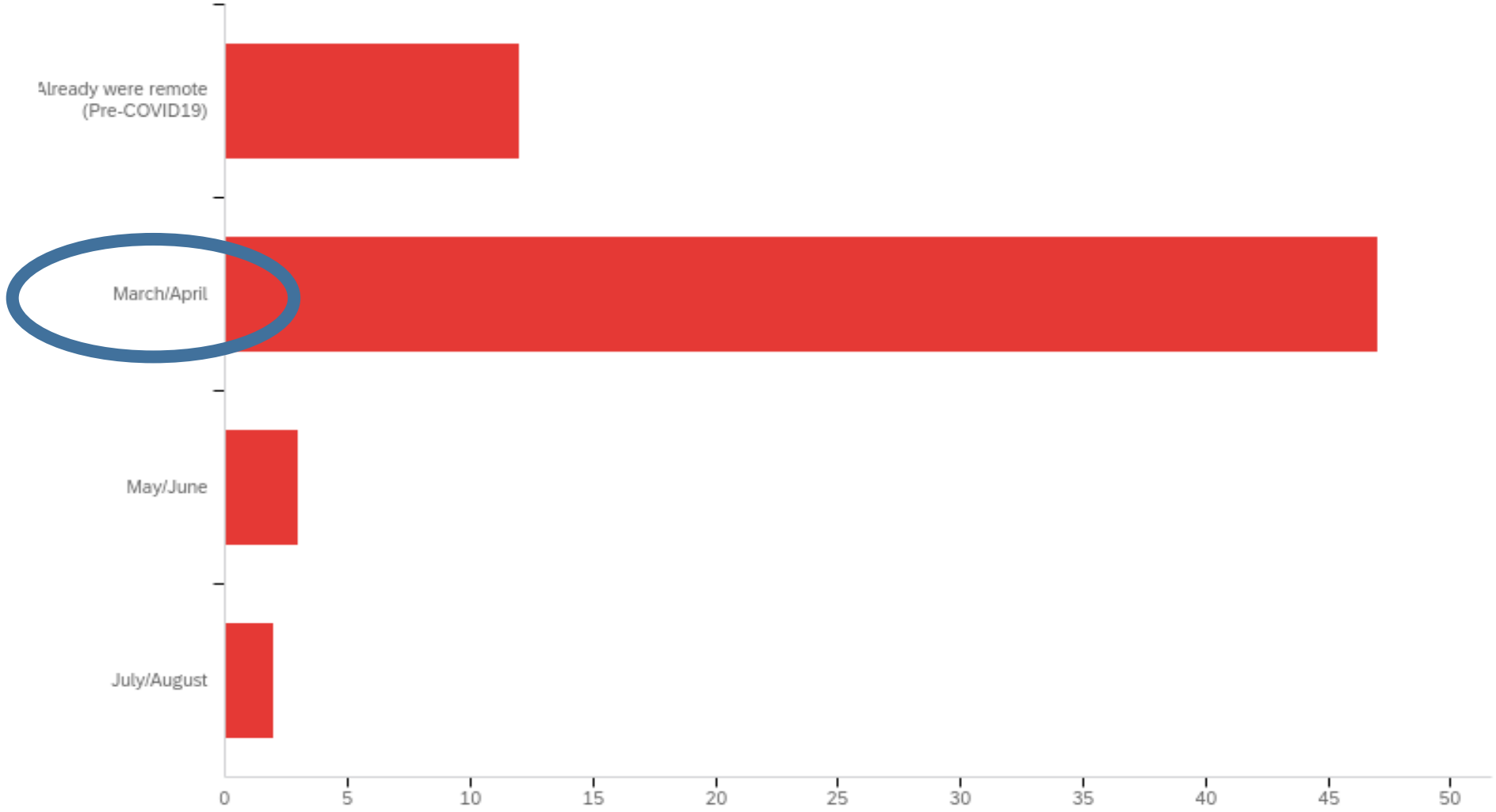


No major change

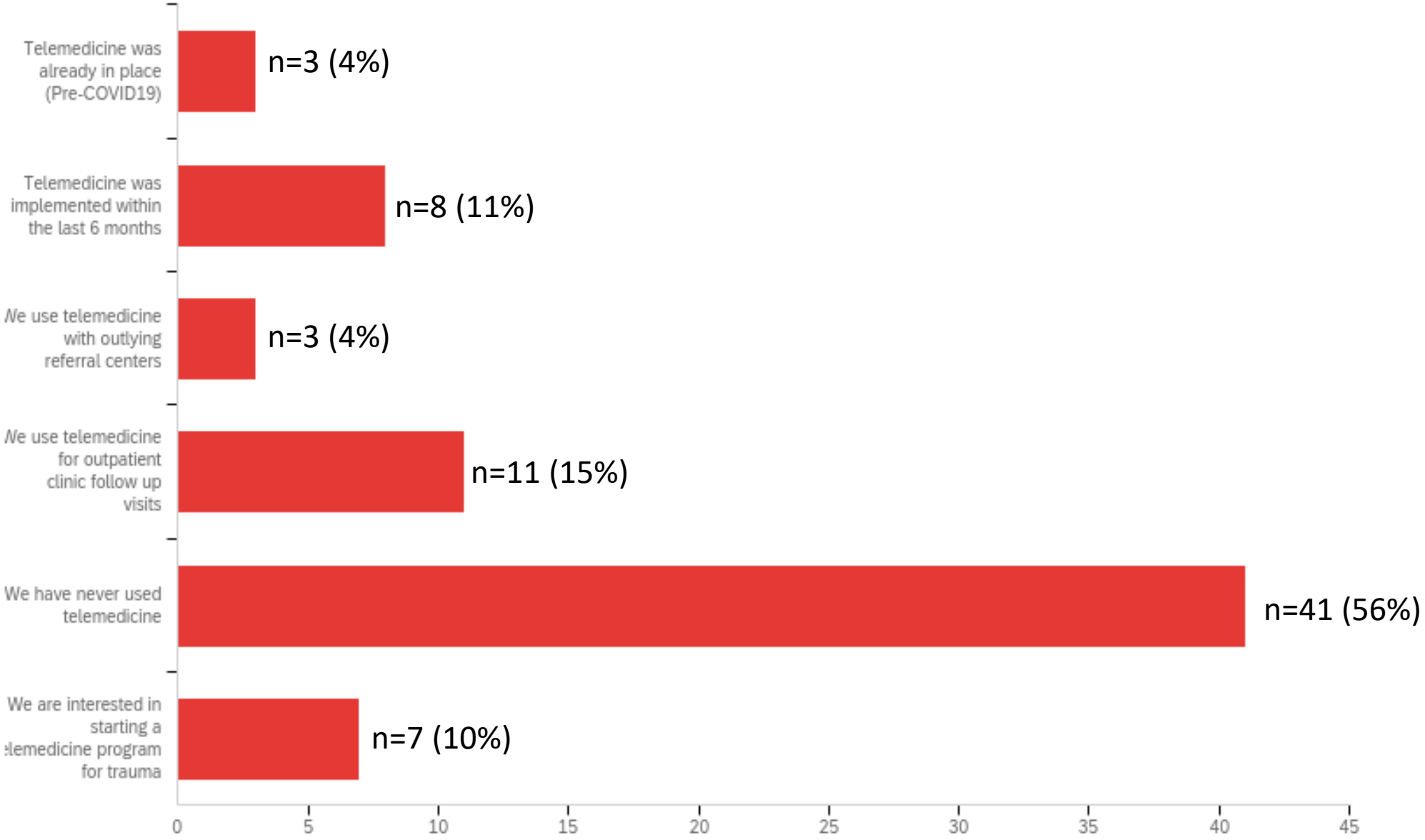
Q5 - Over the last 6 months, ***<u>for those centers that transferred patients</u>*** out, did your transfers:



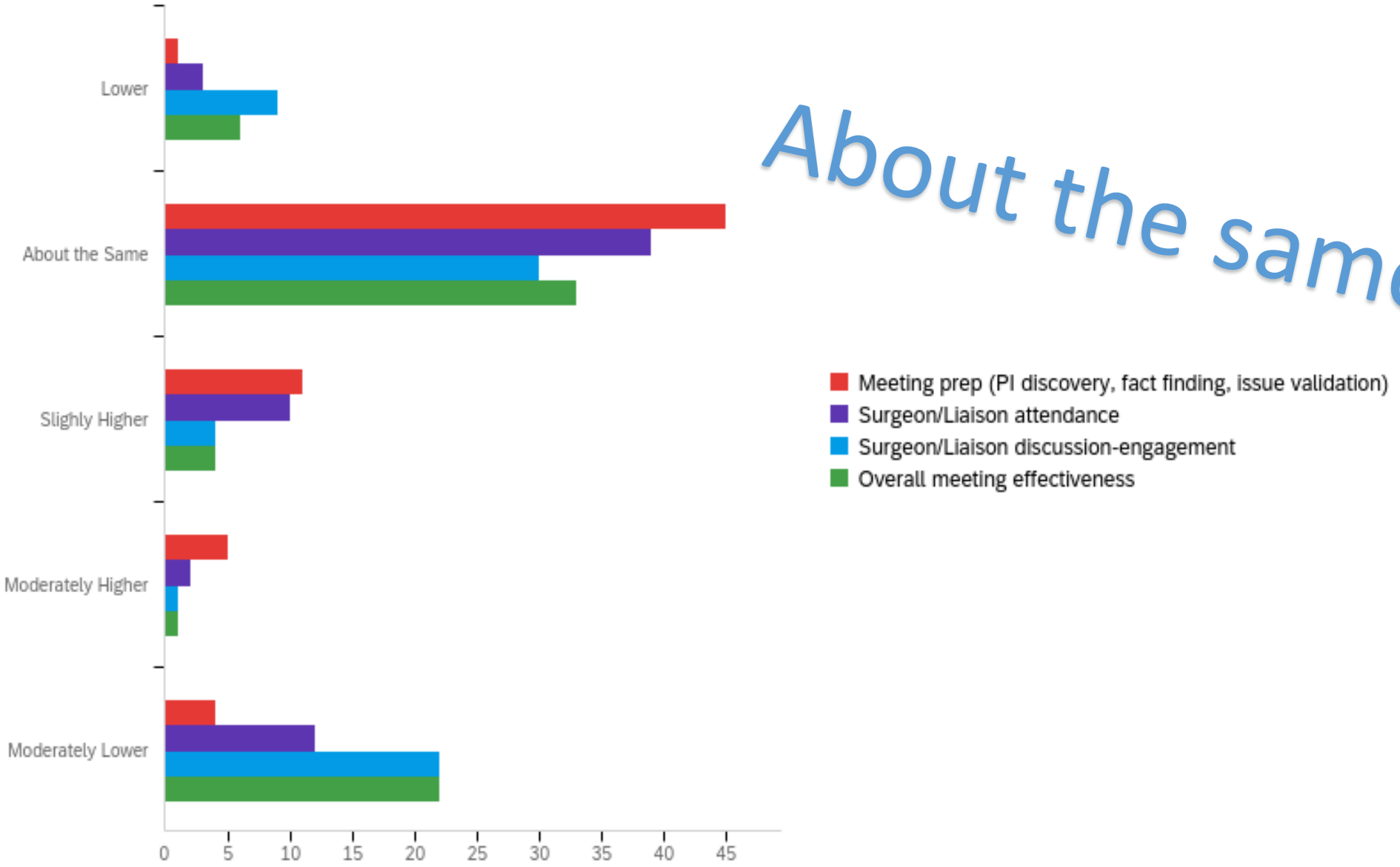
Q6 - By which months did all members of your PI/registry staff have remote connectivity to the EMR and Trauma Registry to continue their work?



Q7 - Describe your centers use of telemedicine for trauma: (click all that apply)

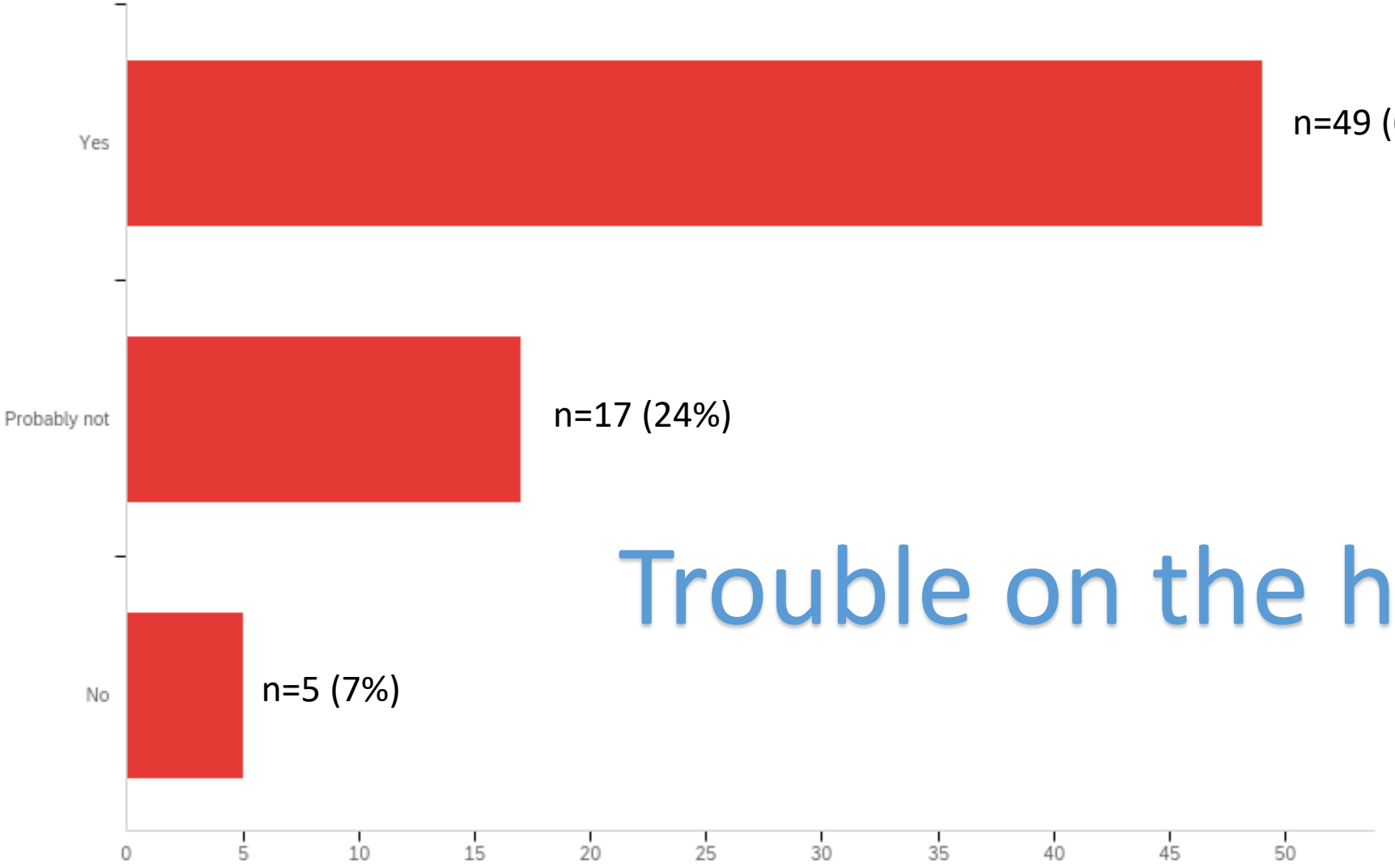


Q8 - Since moving to ***virtual PI meetings***, rate the following:



About the same

Q10 - If your program had an ACS verification visit today, would your center have the necessary infrastructure and resources to meet the Orange book requirements?



Trouble on the horizon?

COVID Insights/Lessons Learned

Issue	Comments
Volume	Surge in patients with complex pathology Volumes have 20%
	Volume increased over our previous volumes
	June, July, August increased over historical numbers
	Overall volume remained the same
	Slower in March/April Increase in penetrating trauma 2X normal for May-July On diversion twice -OR couldn’t handle increased penetrating volume

COVID INSIGHTS

Issue	Comments
Region Impact	COVID info sharing for Region 2 South and 2 North helpful with MTQIP/ Dr. Hemmila's collaboration

COVID INSIGHTS

Issue	Comments
Teaching	Limited rounding with residents Limited resident presence at activations
	ATLS very challenging
Remote	Registrars working from home increased morale and efficiency
	Remote work advantageous, but still have opportunity for face to face meetings with TMD
	Remote work is effective
	We can cut cost and be productive by working remote

COVID INSIGHTS

Issue	Comments
Staffing	Hospital furloughed half of the trauma staff Refused to bring back until mid-July despite June explosion of trauma
	3 of our nurses volunteered to participate in COVID related activity We thought we were doing the correct thing.. In the end, we only got further behind in trauma…
	The trauma registry is woefully behind… We’re still doing PI but things are probably being missed….

COVID INSIGHTS

Issue	Comments
Staffing	Operating with inadequate staff greatly affects program quality
	Admin not supportive of program attempts to hold weekly PI mtgs
	Lack of admin support of call in system
	Working to find creative solutions to address our registry backlog
	Doing more with less. Using teamwork to survive
	We pleaded to allow trauma personnel to return to work full time
	We need more adv. practitioners for increased volume and acuity

COVID INSIGHTS

Issue	Comments
Staffing	Still struggling to get staff back Behind in registry
	Poor admin support Margin over program
	During March-June both TPM and MCR furloughed without option to remote from home. We are behind in abstracting and PI
	Registrar redeployed and MCR furloughed. All abstraction stopped. Catching up on 3 months worth of data and PI challenging C Suite does not understand

COVID INSIGHTS

Issue	Comments
Care	Patients displayed to non-trauma units suffered for lack of (PT, MSW, Case Manager, etc)
	We learned to recognize and mitigate staff members fatigue and anxiety due to exposure.
	Incident command structure functioned well, respected by staff
	Anesthesia/CRNA support on COVID units was key
	Hospitalist coverage of non-critical patients extremely helpful

COVID INSIGHTS

Issue	Comments
Adapt	We over-prepared to manage ICU overflow Thankfully never needed to open (yet)
	We learned that many things can be done remotely, including meetings, education and rounds.
	We continue to work on alternative ways to meet injury prevention needs of the community
	The trauma program is flexible, we alternate between in person and remote work without problem

COVID INSIGHTS

Issue	Comments
Adapt	PI prep meeting is run effectively remotely Surgeons are beginning to send issues for PI review
	Virtual meetings can be as effective as in person meetings. Well attended, more efficient.
	We have moved to remote for all registrars and MCRs. We reduced use of paper abstracts and printed charts. We embrace virtual conferencing.

Survey Discussion

Questions?

Meeting CME/Evaluation

- Evaluation will sent following meeting

- Annual 4 question evaluation of MTQIP from BCBSM

Conclusion

- Thank you for attending
- Evaluations
  - Fill out electronically
  - Will be e-mailed to you
- Questions?
- See you in February

Meeting Logistics

- **Please sign the electronic confidentiality agreement to receive attendance points**

https://umich.qualtrics.com/jfe/form/SV_ahQcb5OMpSCATT7 **or**