

The Michigan Trauma Quality Improvement Program

**Traverse City, MI
May 16, 2018**



Disclosures

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

Introductions

- ◆ Erin C. Hall, MD MPH
 - MedStar Washington Hospital Center, Washington DC
 - Assistant Professor
- ◆ Rebecca Tyrrell RN CCCTM
 - R Adams Cowley Shock Trauma Center, University of Maryland School of Medicine, Baltimore
 - Transitional Care Coordinator

Introductions

- ◆ Georgia Collaborative
- ◆ Chris J. Dente, MD
 - Emory University, Grady Hospital
 - Professor of Surgery
- ◆ Kara Allard, MPH
 - Emory University
 - Manager of Research Projects

New MTQIP Trauma Center

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

Data Submission

- ◆ Data submitted April 6, 2018
 - Every 2 months
 - 3 week turnaround
- ◆ Additional NTDS data elements
 - DI and CDM, ? Lancet
- ◆ Level 3 trauma centers
 - DI and CDM
 - Imagetrend - NTDB xml
- ◆ Next data submission
 - June 1, 2018

MTQIP/MANS Neurosurgery Meeting

- ◆ June 2018
 - Friday June 8, 2018
 - Crystal Mountain, MI
 - 12n to 4:30p
- ◆ Pending
 - Agenda
 - Survey

MTQIP/Orthopedic Surgery Meeting

- ◆ Fall 2018
 - Thursday October 11, 2018
 - Ypsilanti, EMU Marriott
 - 10a to 3p
- ◆ Suggestions
 - Topics
 - Planning

Data Analytics Update

Jill Jakubus, PA-C



Data Use Agreement – Complete Status

Long-Term Outcomes

**When will I get
back to baseline?**

What will my **quality of life
be like after I recover?**

**Am I going to have pain
for the rest of my life?**

Long-Term Outcomes - Questions

- **Unclear baseline**
- **Unclear long-term impact of care provided**
- **Unclear quality of life post-injury**

Long-Term Outcomes – **Challenges**

- **Abstractor burden**
- **Abstraction cost**
- **Need for validated, meaningful data**
- **IRB approval**

Long-Term Outcomes – **Current State**

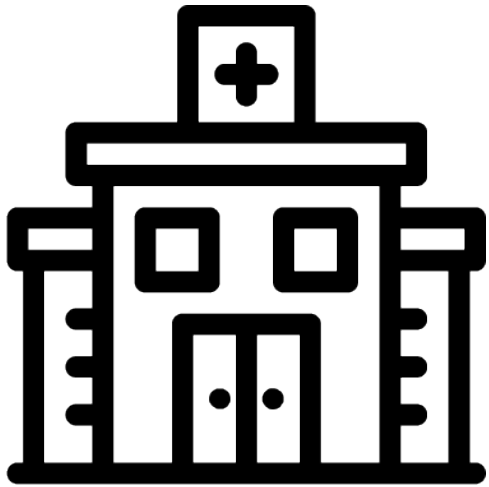
- **Other collaboratives**



Long-Term Outcomes – Proposed Solution

- **Anesthesia collaborative (ASPIRE) app**
- **Active and passive data collection**
- **Employs NIH and WHO validated measures**

Long-Term Outcomes – **Implementation**



Discharge



App Store



MyDataHelps

Long-Term Outcomes – **Security**

- **Physical, organizational, technical safeguards**
- **Data encryption during storage and transmission using National Institutes of Standards and Technology (NIST)**

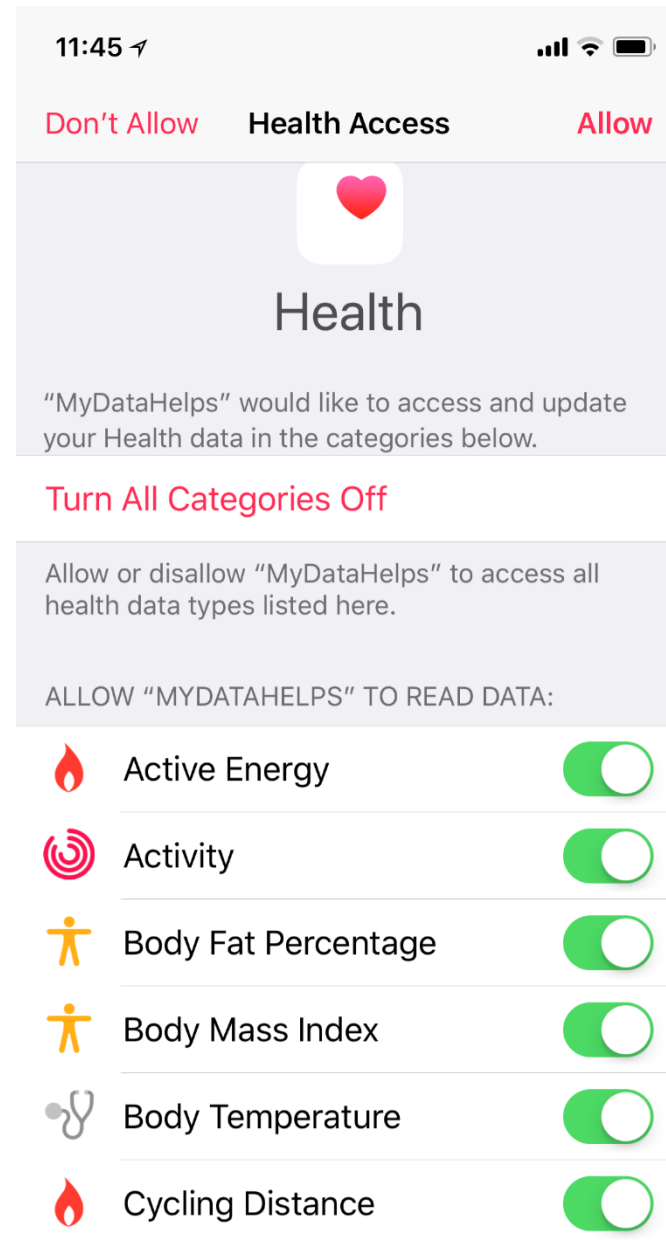
Long-Term Outcomes – PHI

- **ResearchKit consent framework**

We're working with an
accomplished medical community.



Long-Term Outcomes – **Passive Data**



Long-Term Outcomes – **Passive Data**

11:45 ↗	📶	🔋
Don't Allow	Health Access	Allow
🩺	Diastolic Blood Pressure	<input checked="" type="checkbox"/>
🔥	Exercise Minutes	<input checked="" type="checkbox"/>
🔥	Flights Climbed	<input checked="" type="checkbox"/>
🩺	Heart Rate	<input checked="" type="checkbox"/>
🧑	Height	<input checked="" type="checkbox"/>
🧑	Lean Body Mass	<input checked="" type="checkbox"/>
🔥	NikeFuel	<input checked="" type="checkbox"/>
🔥	Pushes	<input checked="" type="checkbox"/>

🩺	Respiratory Rate	<input checked="" type="checkbox"/>
🔥	Resting Energy	<input checked="" type="checkbox"/>
🌙	Sleep Analysis	<input checked="" type="checkbox"/>
🔥	Stand Hours	<input checked="" type="checkbox"/>
🔥	Steps	<input checked="" type="checkbox"/>
🩺	Systolic Blood Pressure	<input checked="" type="checkbox"/>
🔥	Walking + Running Distance	<input checked="" type="checkbox"/>
🧑	Weight	<input checked="" type="checkbox"/>
🔥	Wheelchair Distance	<input checked="" type="checkbox"/>
🔥	Workouts	<input checked="" type="checkbox"/>

Long-Term Outcomes – Active Data

Surveys

DUE THURSDAY, MARCH 22, 2018

Disability Assessment

12 questions — PROSPER

Global Health

10 questions — PROSPER

Sleep quality

8 questions — PROSPER

Social Roles and Activities

8 questions — PROSPER

Cognitive Function

4 questions — PROSPER

Emotional Distress

4 questions — PROSPER

Pain Intensity

3 questions — PROSPER

7

Surveys

Dashboard

Studies

Long-Term Outcomes – **Next Steps**

- IRB amendment (MTQIP coordinating only)
- CareEvolution build
- App info provided to interested centers

Feedback

Meeting Reports – **New Report Formatting**

- Center feedback
- Improved consistency
- Intuitive messaging

Legend



Low-outlier status (better performance)



Non-outlier status (average performance)



High-outlier status (worse performance)

Meeting Reports – New Report Section

Contents

Description of Cohorts	2
Statistical Methods	8
Mortality Graphs	9
Trends	20
Outcomes	21
Resource Utilization	29
System Efficiency	35
Process Measures	38
CQI Performance Index	40
Isolated Hip Fracture – NEW	44

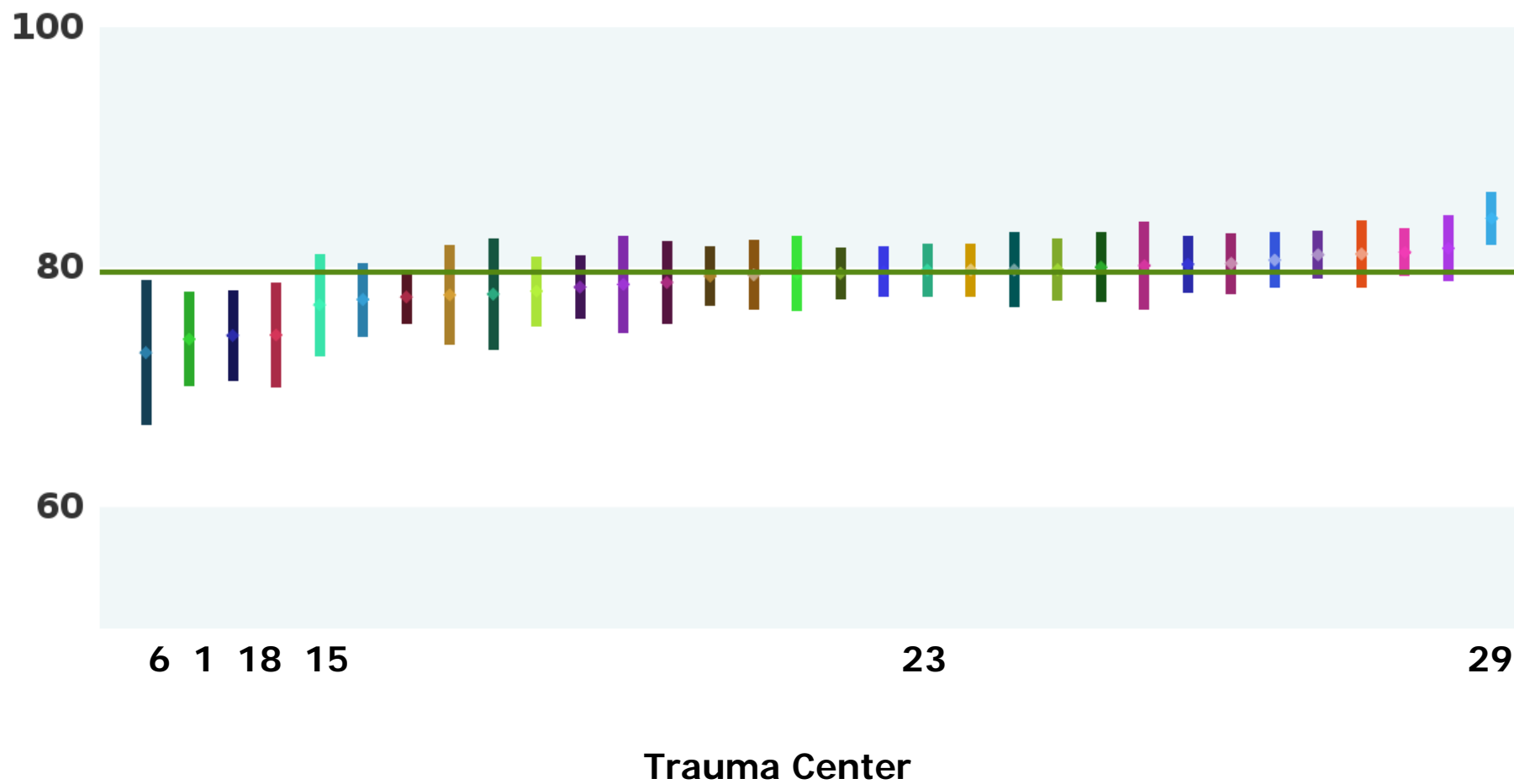
Cohort 8 (Isolated Hip Fracture)

- 1) Mechanism derived from extrenal cause code = Fall
- 2) AIS 98 code = 851810.3 (femur, fracture, intertrochanteric), 851812.3 (femur, fracture, neck), 851818.3 (femur, fracture, subtrochanteric), or 853171.3 (femur, fracture, femoral head)
- 3) All other injuries must be in AIS external body region (i.e., bruise, abrasion or laceration)

Isolated Hip Fracture

I have the **oldest** patients

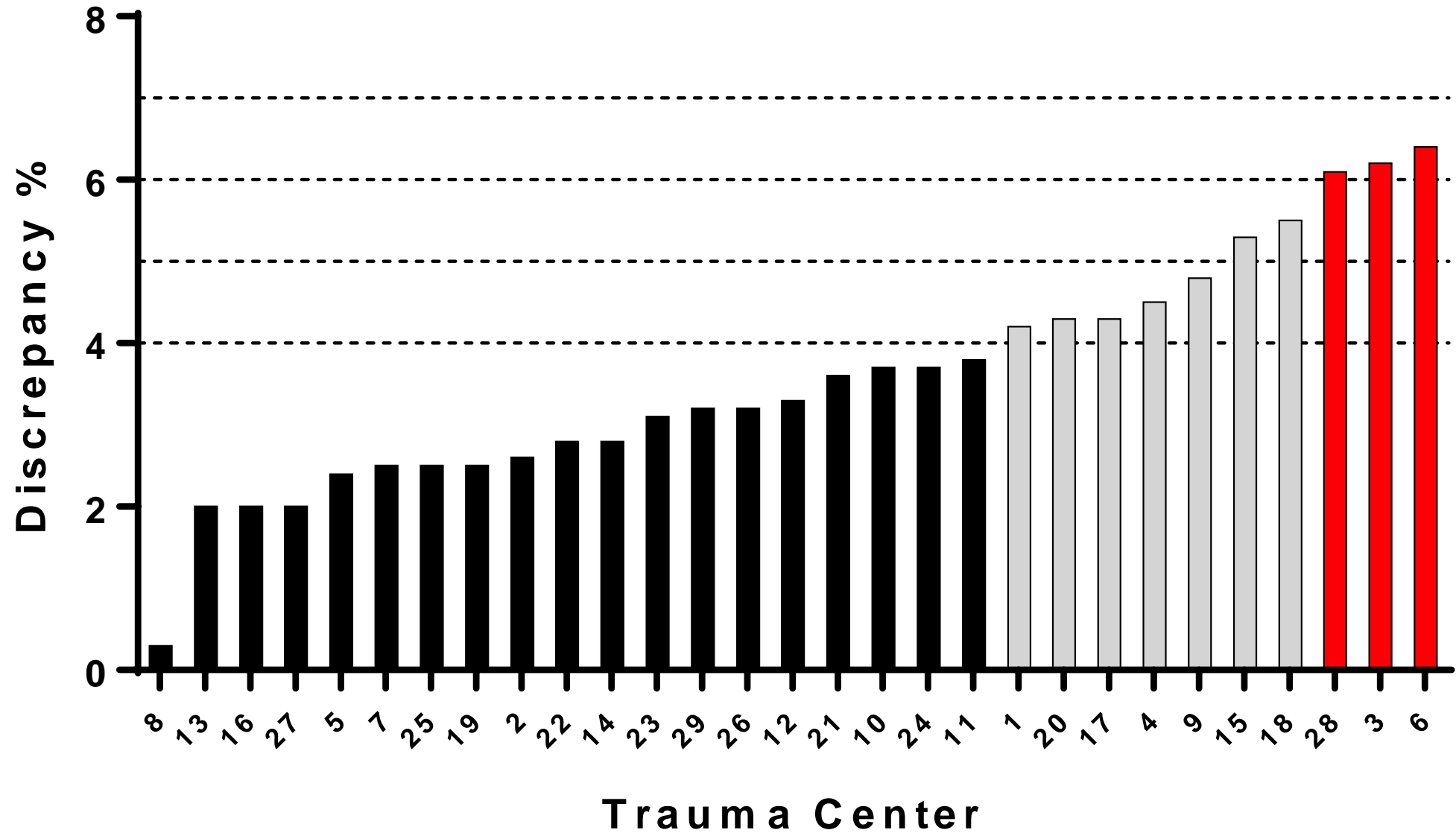
Mean Age – Cohort 8 w/o DOA Isolated Hip Fracture



The data is wrong

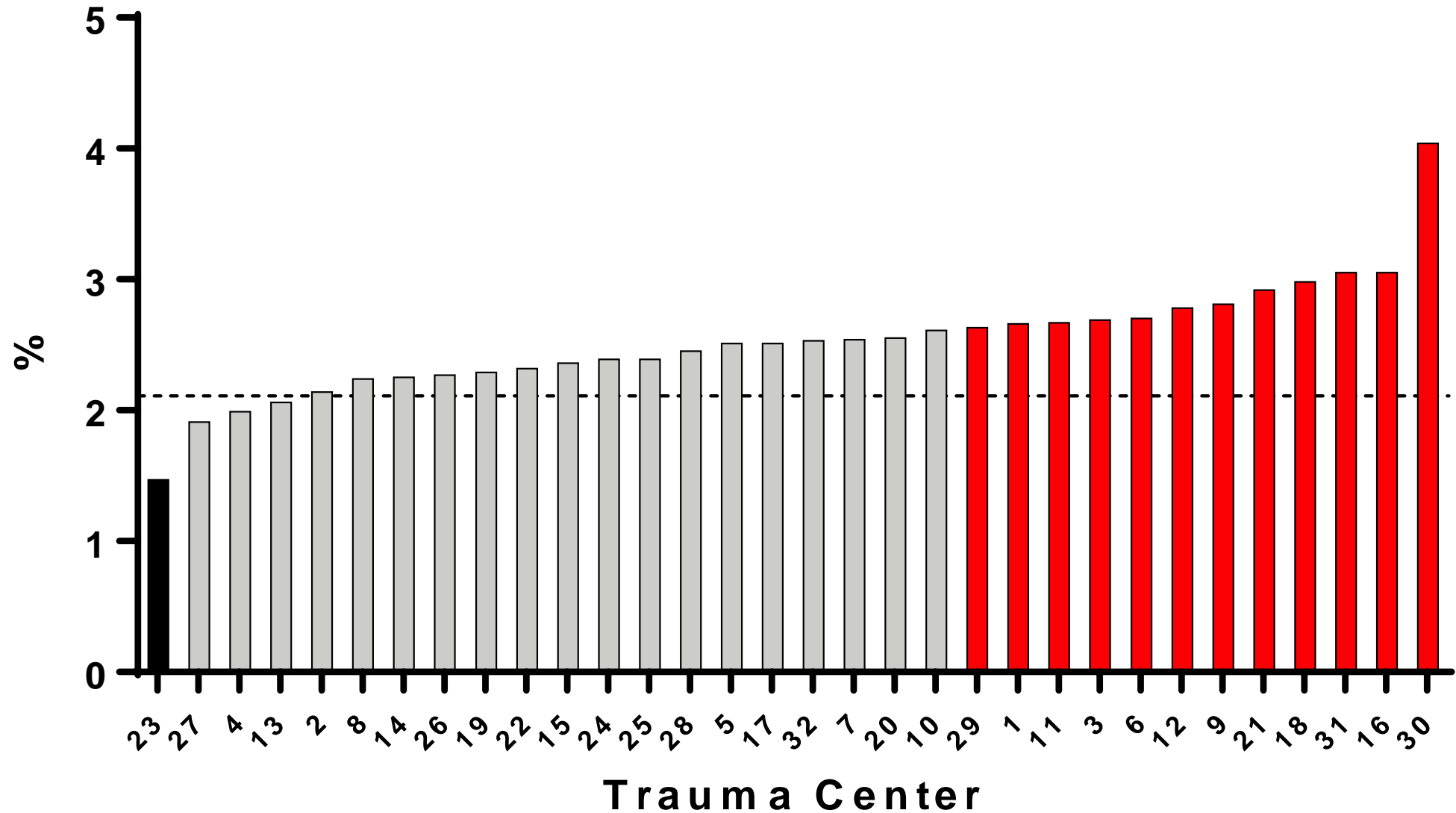
Data Validation

Last Processed Report



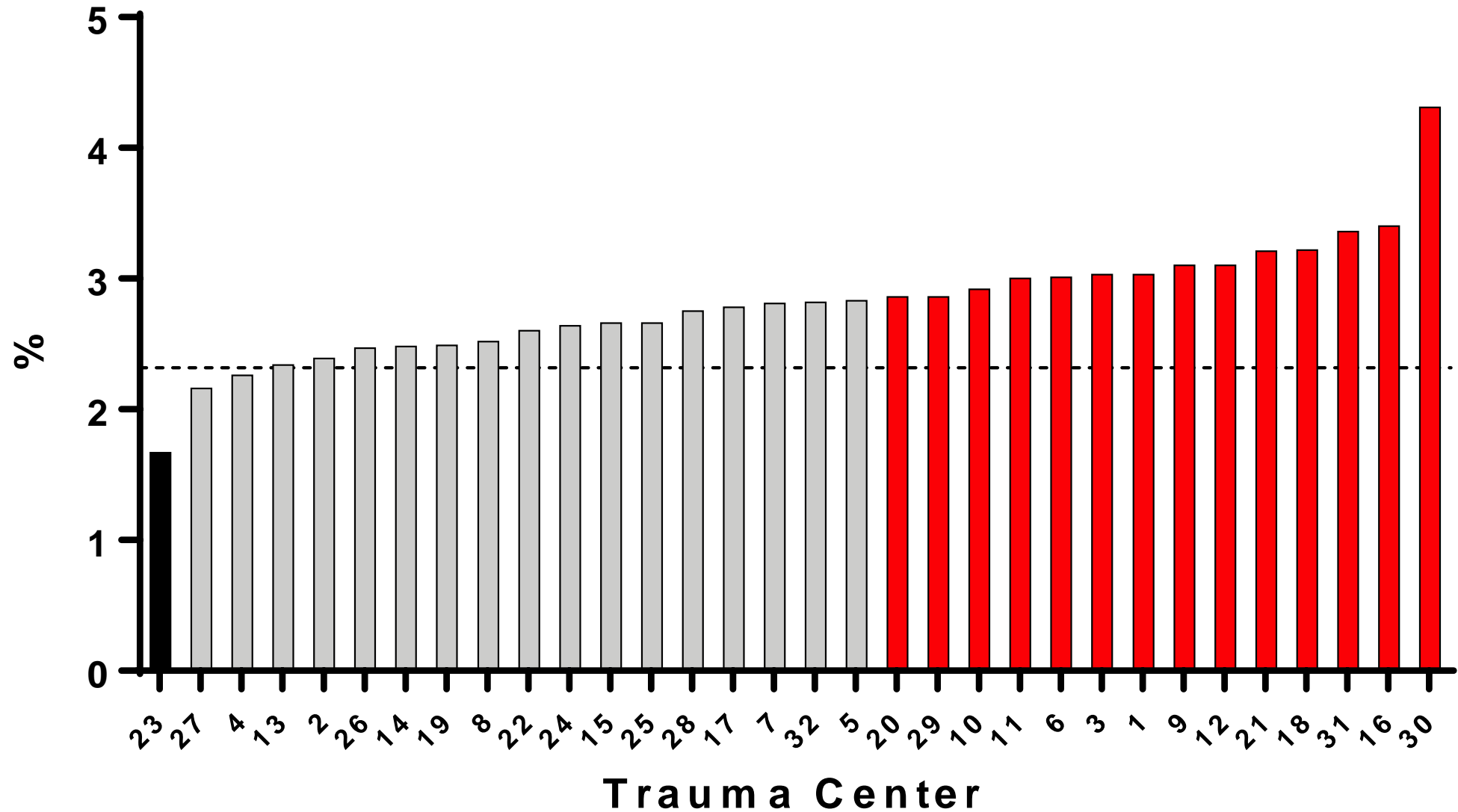
Mortality - Cohort 8 w/o D O A

Isolated Hip Fracture



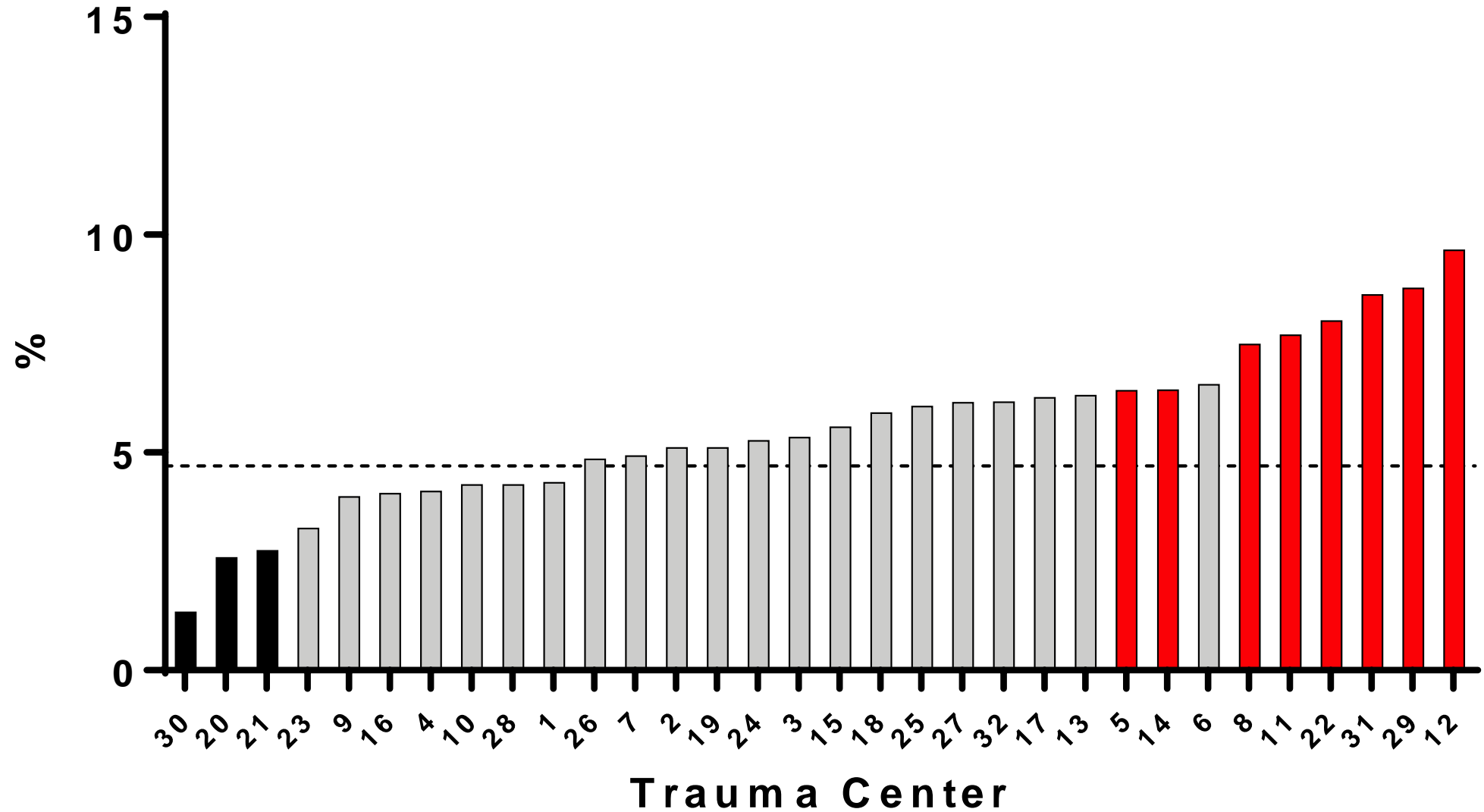
Mortality - Cohort 8 w/o D O A , Age \geq 65

Isolated Hip Fracture



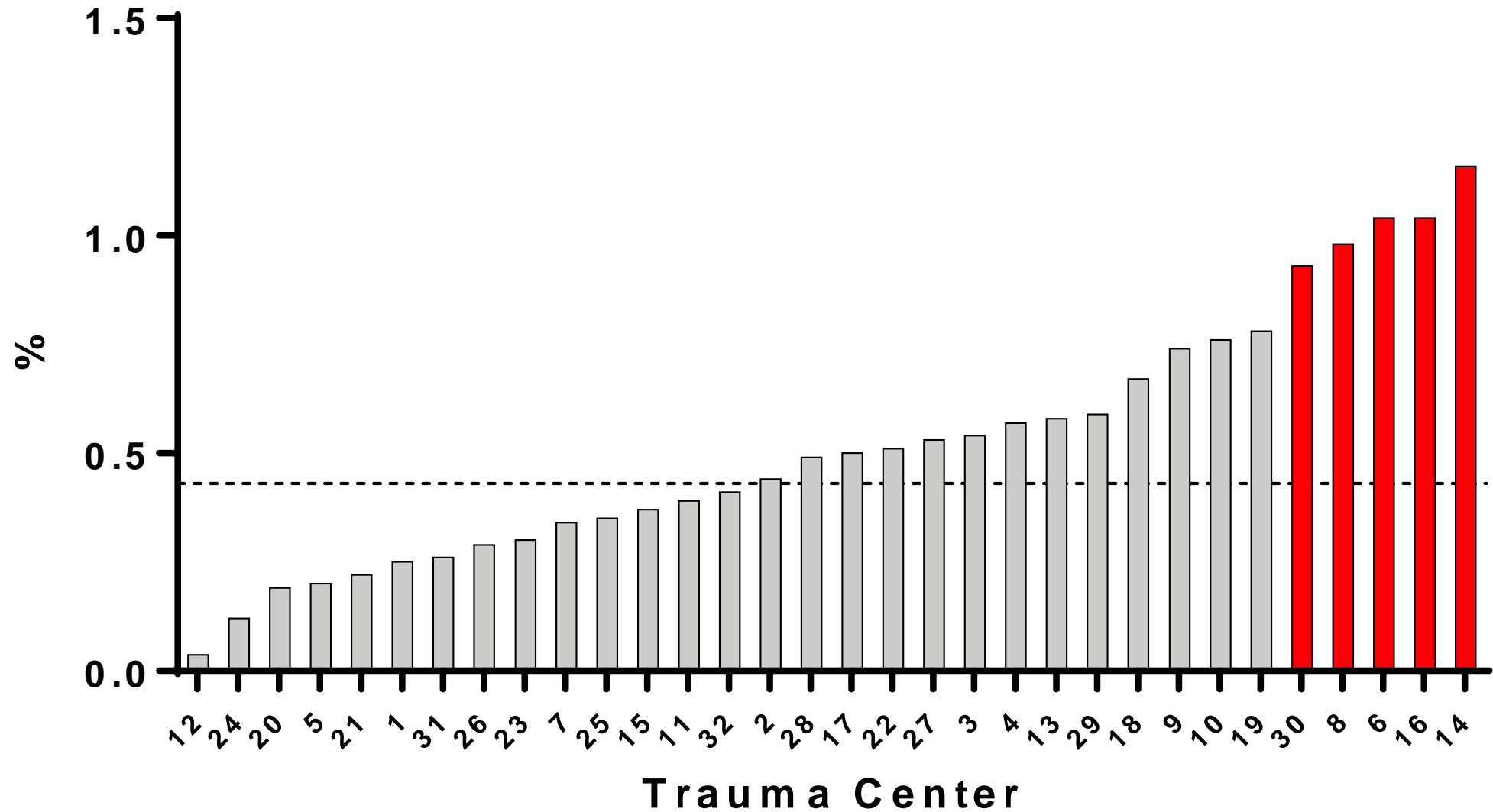
Serious Complications - Cohort 8

Isolated Hip Fracture



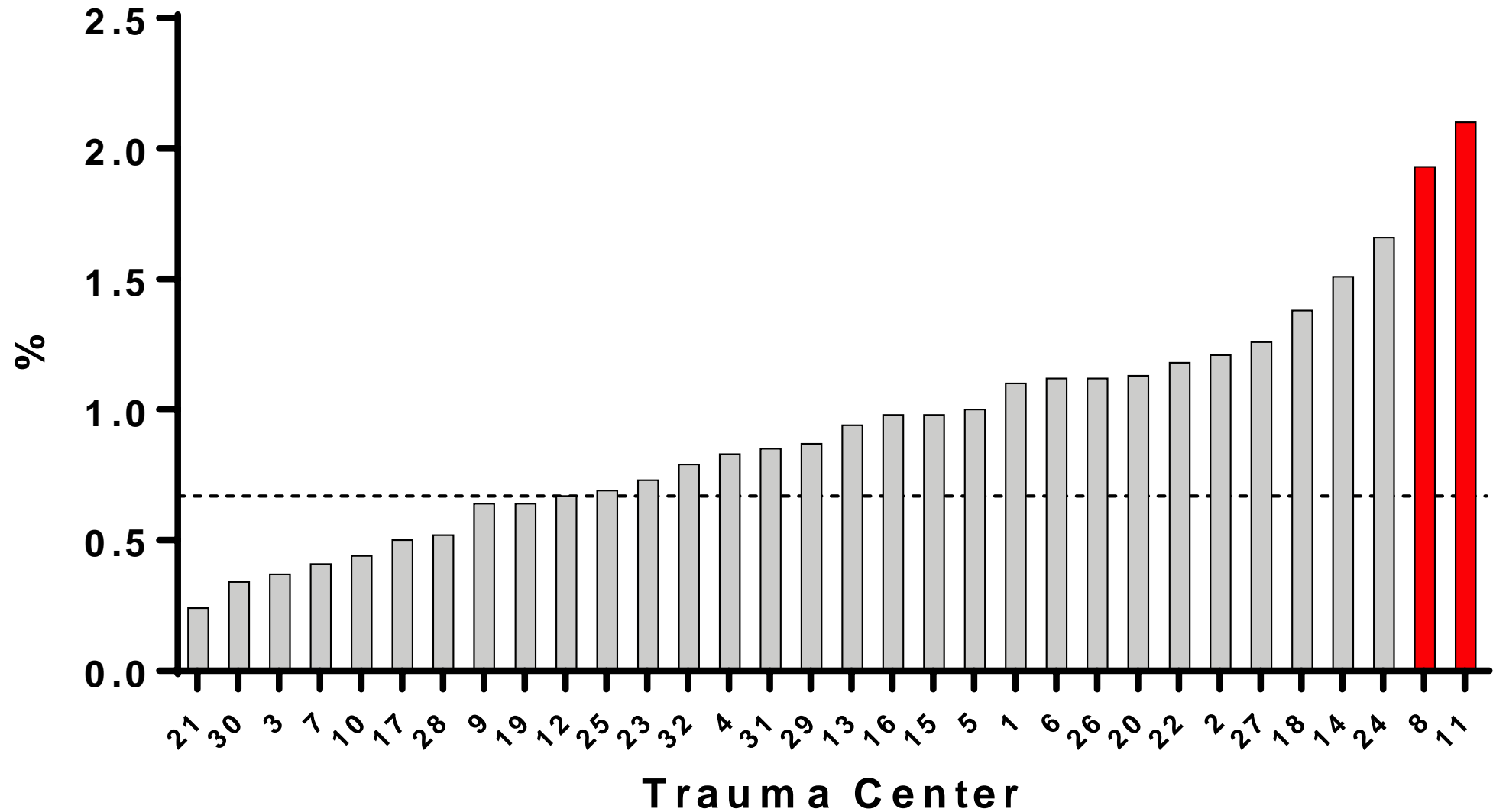
Cardiac Arrest with CPR - Cohort 8

Isolated Hip Fracture



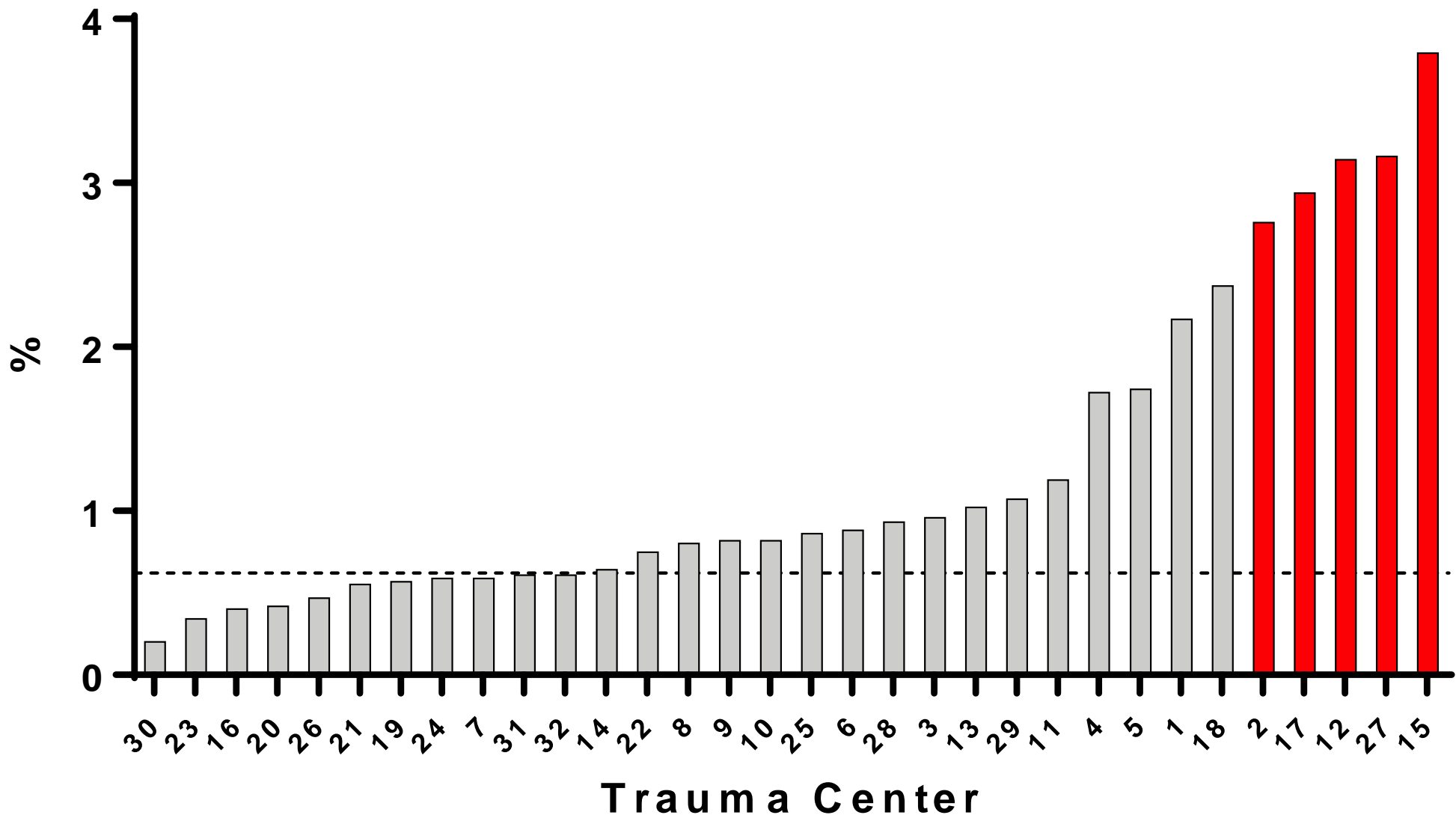
Myocardial Infarction - Cohort 8

Isolated Hip Fracture



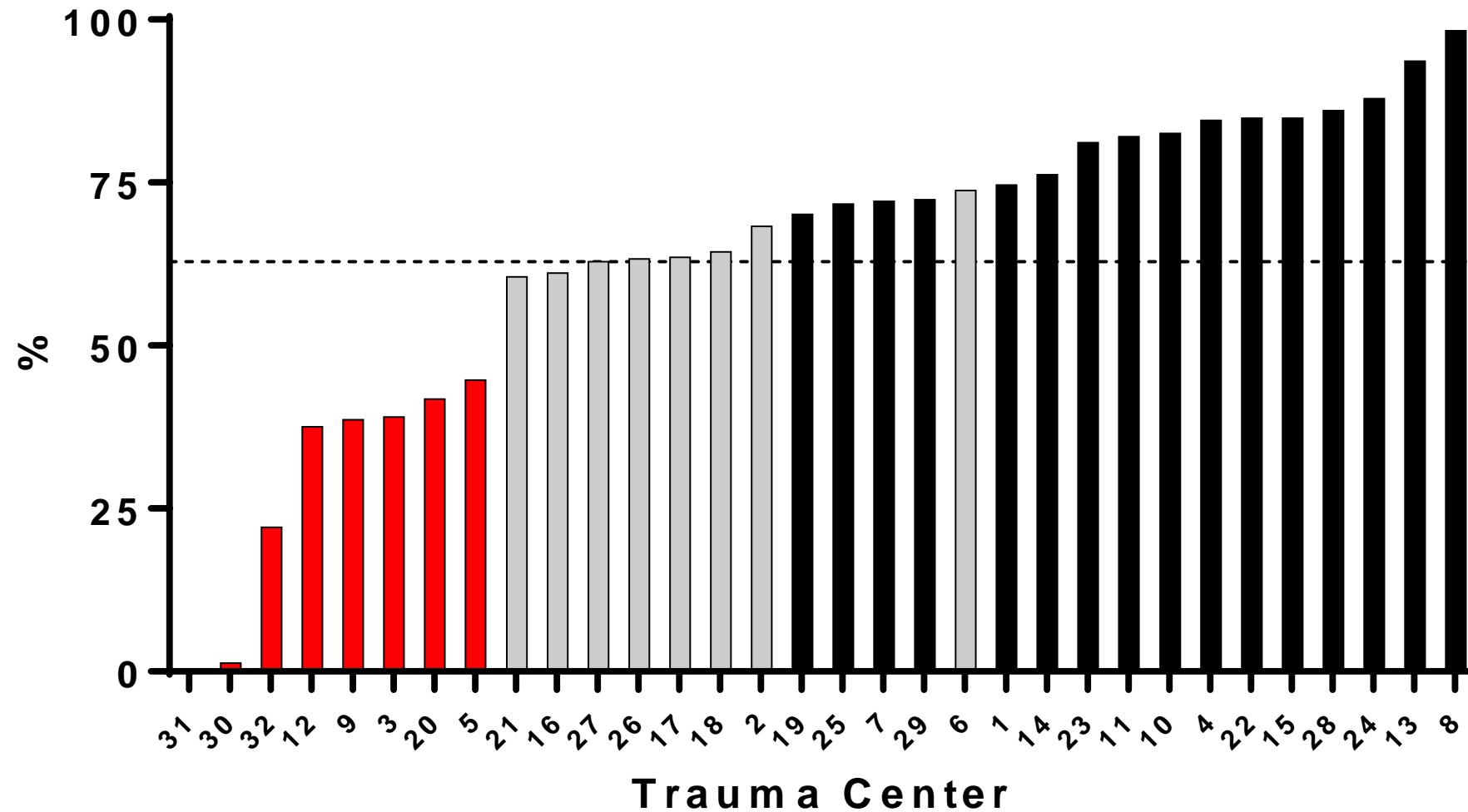
CAUTI - Cohort 8

Isolated Hip Fracture



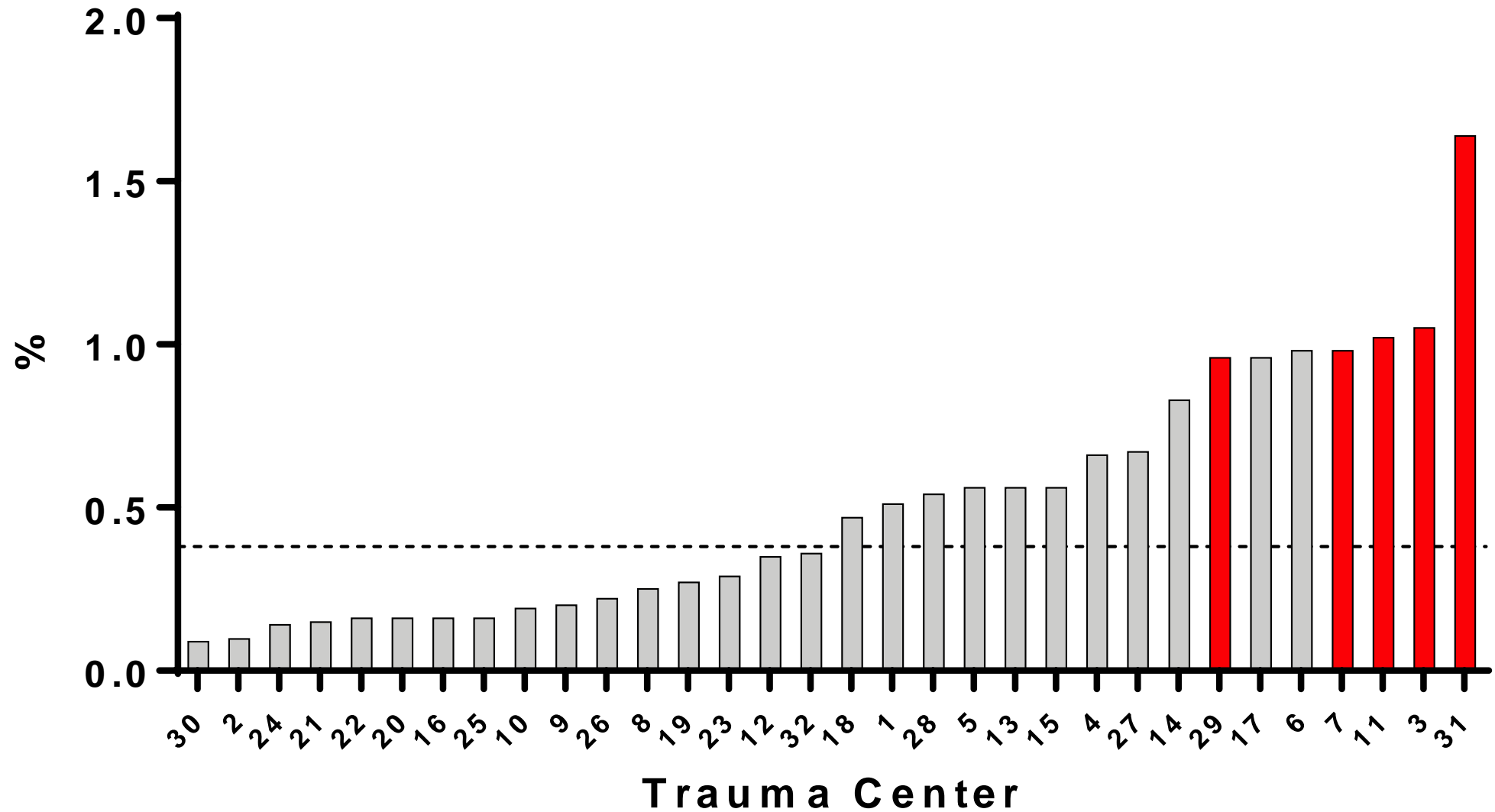
VTE Prophylaxis Heparin, LMWH \leq 48 hrs - Cohort 8

Isolated Hip Fracture



DVT - Cohort 8

Isolated Hip Fracture



Trauma Transitional Care Coordination

Erin Hall, MD

Rebecca Tyrrell, RN





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Accession: 01586154-201805000-00004

Keywords: Transitional care coordination, trauma 30-d

AAST 2017 PODIUM PAPER

Trauma transitional care coordination: A mature system at work

Erin C. Hall, MD, Rebecca L. Tyrrell, RNCCCTM, Karen E. Doyle, RN,
Thomas M. Scalea, MD, and Deborah M. Stein, MD, Baltimore, Maryland

BACKGROUND:	We have previously demonstrated effectiveness of a Trauma Transitional Care Coordination (TTCC) Program in reducing 30-day readmission rates for trauma patients most at risk. With program maturation, we achieved improved readmission rates for specific patient populations.
METHODS:	TTCC is a nursing driven program that supports patients at high risk for 30-day readmission. The TTCC interventions include calls to patients within 72 hours of discharge, complete medication reconciliation, coordination of medical appointments, and individualized problem solving. Account IDs were used to link TTCC patients with the Health Services Cost Review Commission database to collect data on statewide unplanned 30-day readmissions.
RESULTS:	Four hundred seventy-five patients were enrolled in the TTCC program from January 2014 to September 2016. Only 10.5% (n = 50) of TTCC enrollees were privately insured, 54.5% had Medicaid (n = 259), and 13.5% had Medicare (n = 64). Seventy-three percent had Health Services Cost Review Commission severity of injury ratings of 3 or 4 (maximum severity of injury = 4). The most common All Patient Refined Diagnosis Related Groups for participants were: lower-extremity procedures (n = 67, 14%); extensive abdominal/thoracic procedures (n = 40, 8.4%); musculoskeletal procedures (n = 37, 7.8%); complicated tracheostomy and upper extremity procedures (n = 29 each, 6.1%); infectious disease complications (n = 14, 2.9%); major chest/respiratory trauma, major small and large bowel procedures and vascular procedures (n = 13 each, 2.7%). The TTCC participants with lower-extremity injury, complicated tracheostomy, and bowel procedures had 6-point reduction (10% vs. 16%, $p = 0.05$), 11-point reduction (13% vs. 24%, $p = 0.05$), and 16-point reduction (11% vs. 27%, $p = 0.05$) in 30-day readmission rates, respectively, compared to those without TTCC.
CONCLUSION:	Targeted outpatient support for high-risk patients can decrease 30-day readmission rates. As our TTCC program matured, we reduced 30-day readmission in patients with lower-extremity injury, complicated tracheostomy and bowel procedures. This represents over one million-dollar savings for the hospital per year through quality-based reimbursement. (<i>J Trauma Acute Care Surg.</i> 2018;84: 711–717. Copyright © 2018 American Association for the Surgery of Trauma. All rights reserved.)
LEVEL OF EVIDENCE:	Therapeutic/care management, level III.
KEY WORDS:	Transitional care coordination; trauma 30-day readmission; trauma health disparity; protecting vulnerable trauma patient.



UNIVERSITY *of* MARYLAND
MEDICAL CENTER

***Decreasing Readmissions Rates Using
Transitional Care Coordination Model***

Michigan Trauma QI Program, May 16, 2018

Rebecca Tyrrell, RN, CCCTM, Erin C. Hall, MD MPH

R Adams Cowley Shock Trauma Center

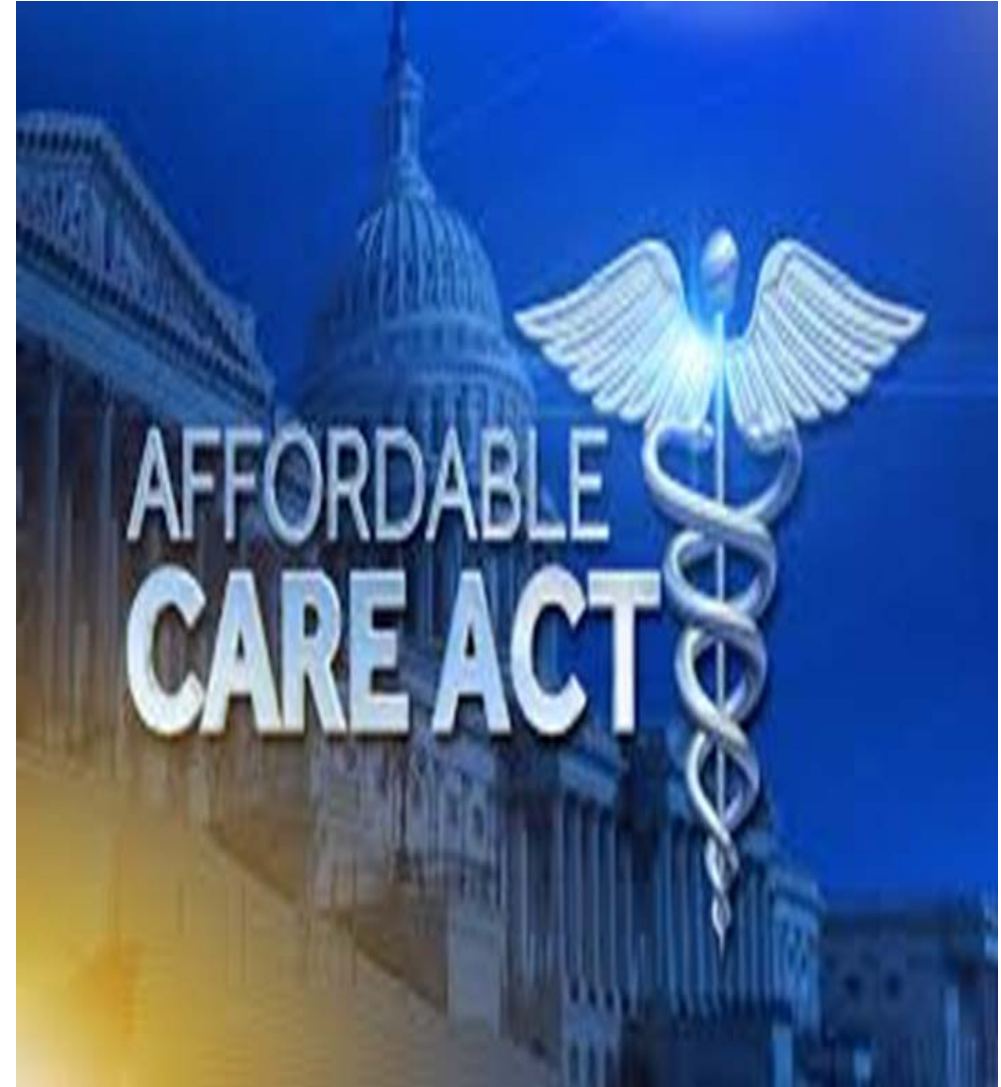
Objectives

At the end of this presentation:

- Describe Transitional Care Coordination (TCC)
- Demonstrate the application of a traditional TCC program on a trauma patient population
- Demonstrate the elements of a Trauma TCC program to improve patient outcomes
- Describe the impact of a Trauma TCC program on reducing readmissions

Significance of a Readmission

- Affordable Care Act 30 day readmission rate
- Quality indicator
- Healthcare costs



Unplanned 30-day readmissions after trauma

- 2-fold increase in 1-year risk of death
- 3-fold increase in per-patient expense

One fourth of annual Medicare expenditures

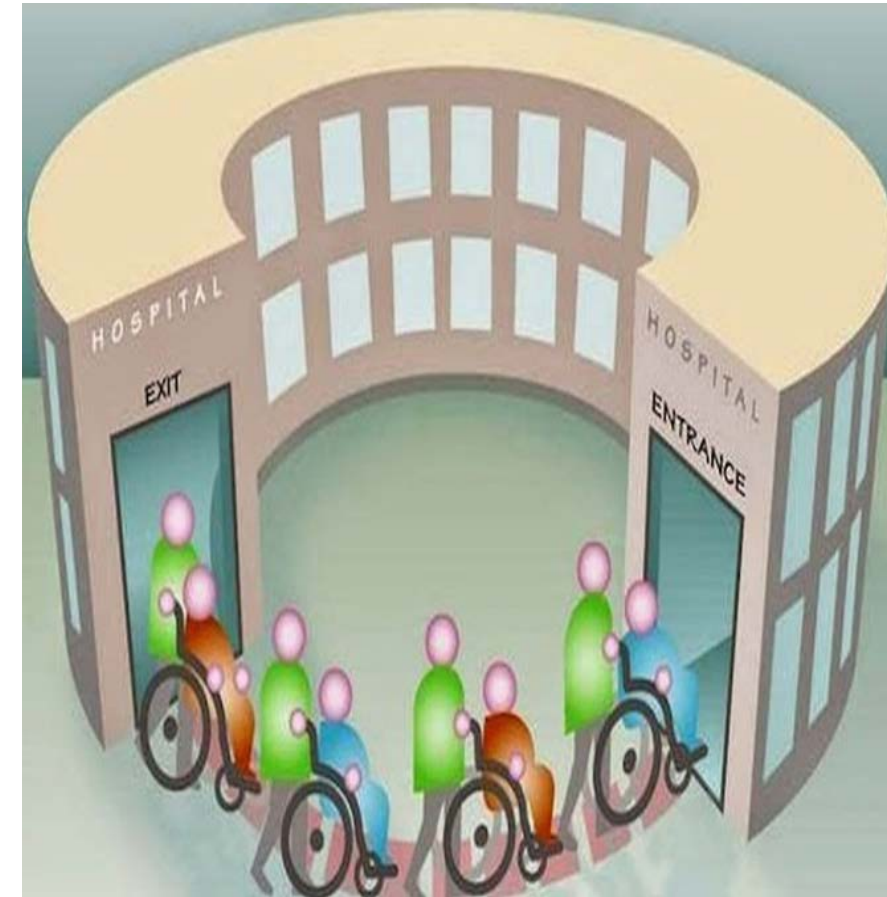
- Hospital Readmission Reduction Program
- Introduced in 2012

Already expanded to

- *Heart attack/failure*
- *Pneumonia*
- *COPD*
- *Hip/knee replacement*
- *CABG*

Shock Trauma Center Readmissions

- 15.1% readmission rate in 2012
- 1 in 7 patients readmitted to the acute care setting
- Opportunity for nursing to improve the quality of recovery and decrease readmissions



Transitional Care Coordination

- Focuses on highly vulnerable, chronically ill patients
- Time-limited
- Emphasis on education of patients and family caregivers

Transitional Care Coordination

Proven effective in reducing 30-day readmission rates in patients with complex medical conditions

In particular:

- *Active care coordination by a nurse*
- *Active medication reconciliation*
- *Communication between PCP and hospital*
- *Home visit*

Transitional Care Coordination

Definition:

“...the ongoing support of patients and their families over time as they navigate care and relationships among more than one provider and/or more than one health care service (Haas,Swan & Haynes,2014, p.3).


Transitional Care Coordination process definition:

“...care coordination and transition management necessitates professional assessment, patient risk identification and stratification, and identification of individual patient needs and preferences...”

(Coleman & Boulton,2003,p.556)

The Transitional Care Coordination Model

- Standardized by the American Academy of Ambulatory Care Nurses (AAACN)
- Support along a recovery continuum
- Professional assessment
- Risk stratification for readmission
- Identification of needs and resources



Trauma is increasingly
becoming a chronic disease



Trauma is increasingly becoming
a chronic disease

Could we design and implement
a TRAUMA transitional care
coordination program?

Objectives

- Identify trauma patients at high risk for readmission
- Enroll in specially designed Trauma Transitional Care Coordination program

Primary Outcome

Reduce 30-day readmission rate

Secondary Outcomes

Trauma clinic follow-up

Primary care provider follow-up

Patient perception of program and ability to care for self

Trauma Transitional Care Coordination

- Meet identified patient prior to discharge
- Call to patient (or caregiver) within 72 hours of discharge to identify barriers to care
- Complete medication reconciliation
- Coordination of medical appointments or home visits
- Individualized problem solving

Identifying patients at high risk for readmission

Literature review

Expert opinion

- *Nurses*
- *Case managers*
- *Intensivists*
- *Trauma surgeons*

- Collected information on all 30-day readmissions
- Rate was compared to population, risk-adjusted benchmark for 30-day readmission rate
 - Staudenmayer et al
 - Trauma readmissions linked across California, stratified by injury severity

Methods

- Collected data on completed outpatient trauma and primary care provider appointments
- 10-item exit-questionnaire completed over the phone



Results

*“I would not have gotten through
without the TTCC program”*

What we found

Common themes

- Lack understanding of disease management
- Unable to navigate the health care system
- No knowledge of community resources
- No primary care physician (PCP)



Identified Risk Factors

Social Factors

Any previous readmission

Poor or absent home assistance or home care services

Poor or absent insurance

Medical History

Psychiatric disease

Drug abuse

Multiple co-morbidities without primary care

Trauma Sequelae

Pulmonary embolism without PCP

Vascular injury without PCP

New tracheostomy

New traumatic brain injury

High output fistula

Large, open wounds before definitive closure

“I had so many doctors it was too hard for me to remember everything. TTCC helped me with a system to remember what I needed to do for each doctor and problem”

“TTCC showed me a better way to stretch out my pain meds and made me understand the importance of taking my Coumadin”

260 enrollees between January 2014-September 2015

33.3% uninsured

45.4% current substance abuse

29.1% current psychiatric diagnosis

60% had multiple co-morbidities without a primary care provider

260 enrollees between January 2014-September 2015

Average age = 41 y/o

Mean ISS = 14.6

Mean length of stay = 11 days

53% White

73% Blunt trauma

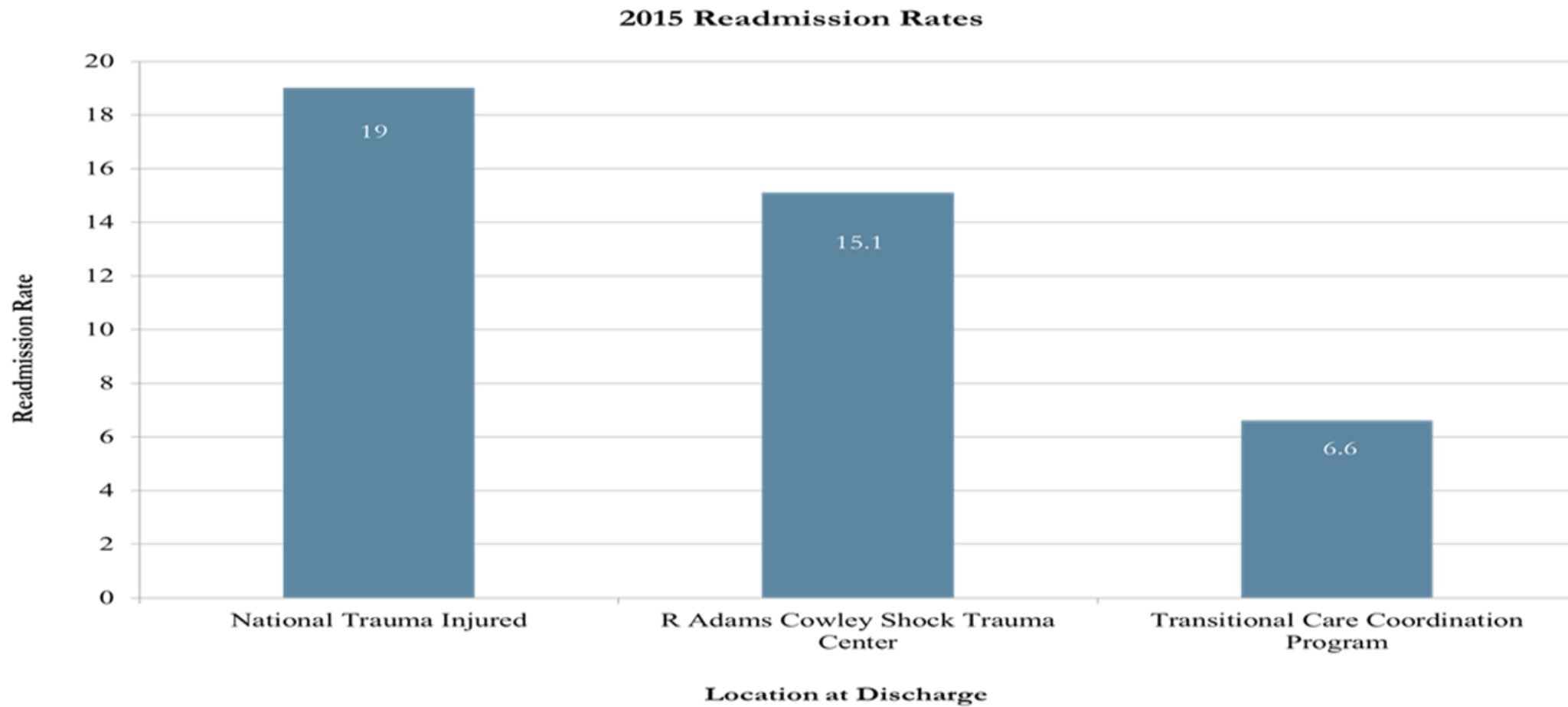


96.6% Follow-up

Only 9 patients of 260 lost to follow up

“I had 9 doctors I was supposed to follow up with after rehab. TTCC sorted it all out and even doubled up on some of them”

“TTCC showed me how to get transportation help. I don’t know what we would have done.”



Results

- 30-day readmission rate was 6.6% (n=16)
- Population, risk adjusted benchmark = 17%
- $p < 0.001$

Results

- 16 patients with 30-day readmissions
- 8 Preventable Readmissions

Inadequate culture follow-up (1)

Symptomatic pleural effusion (1)

Incorrect discharge medications (1)

Inappropriate discharge location (5)

Results

74% attended outpatient trauma clinic within 14 days of discharge

44% attended new primary care provider appointments within 30 days of discharge

“I would not be better today if it had not been for the TTCC. She was a tremendous help”

“Sometimes it seemed like it would have been easier to go to the ED, but I did learn how to take care of myself”

Results

- 61.7% completed the exit questionnaire
- All agreed “I feel more prepared and in more control of my new healthcare needs. I am able to take care of myself and my new normal”
- All also agreed
 - *TTCC helped understand medications and how to take them*
 - *TTCC helped sort out multiple appointments*

“I have many problems that I will have for a lifetime I am sure. The TTCC made it so I could handle my issues one at a time. Life isn’t so bad. I can do this.”

Comparison population

Variability in reported readmission rates

- *Collection method (single-center vs. population based)*

Risk stratification

- *Injury severity alone*
- *Did not take into account added risk associated with*
 - Previous hospital admissions
 - Increased number of comorbidities
 - Lack of resources
 - Psychiatric history

Potential Financial Impact

University of Maryland Medical Center

- Up to 1% reward or 2% penalty of at risk revenue
- Based on comparison to hospital's previous performance

Posted a loss of \$860,116 (based on 2013 readmissions)

Potential Financial Impact

Total yearly budget for TTCC: \$310,000

On track to receive \$3,000,000 REWARD

Conclusions

- Significantly lower 30-day readmission rates (6.6% vs. 17%)
- Long-term follow-up is feasible
- Better outpatient resource utilization
- High patient satisfaction
- Cost effective

*“I felt like I had a fairy
godmother looking out for
me”*

Trauma TCC Process

- Establish patient's recovery goals within 7 days
- Call patient/caregivers 24 to 72 hours after discharge
- Medication review/reconciliation
- Attend follow-up appointments
- Patient preparation for the next 21 days

Days 1 through 7:

- Develop patient and TCC relationship
- Work with patient on goals
- Establish needs and resources
- Transportation
- Insurance
- Ensure accessibility to PCP

Days 8 through 15:

- Integrate community resources
- Assure patient attendance at the follow-up
- Review treatment plan
- Observe for patient activation measures

Days 16 through 30:

- Observe patient's level of self care
- Ensure PCP appointment attended or made
- Address needs and resources
- Review goals
- Prepare for hand-off

Case Review

52 year old male

Moped crash

Found face down,
unconscious, shallow
respirations

Temperature 38 degrees F



Injuries

- Closed head injury, subarachnoid hemorrhage, subdural hematoma
- Complex facial lacerations with facial droop
- Skull, facial, sternum, ribs, left hand, left femur, left tibia and fibula fractures

Hospital Course & Treatment

- Emerged agitated, uncontrollable
- Geodon, sitters
- 9 consulting services
- Future surgeries and procedures planned
- New diagnoses of uncontrolled hypertension and hepatitis C

- Financial
- Uninsured
- Employer paid weekly in cash, not documented

Psychosocial Issues

- Lives with mother
- Criminal history
- History of suicide attempts
- History of depression/anxiety
- Court-ordered to take Celexa, has parole officer

Medical/Surgical Complexity

- 9 consulting services for follow-up
- Multiple surgeries remaining
- Traumatic brain injury
- Post concussive syndrome
- New diagnoses of hypertension and Hepatitis C

Discharge Preparation

- Reviewed clinical picture with the treatment team
- Met with patient and mother
- Developed patient's needs and resources
- Planned for transfer to inpatient traumatic brain injury rehab

- Post Discharge Day #12
- “My mother says I should talk to you”
- TBI rehab planning discharge to home in 2 days
- Briefly discussed tasks for the next week

- Phone conversations
- Assessed as being a face to face learner
- Unable to process a lot of information
- Set up nurse visit with TCC

Motivational Interviewing

- Listening
- Observing breathing pattern
- Watching eye movements
- Understanding word choices

Nursing Assessment

- Patient did not know:
- How to call for an appointment
- He had to arrive on time
- How to manage bad news
- How to handle his fear of physical pain

Patient-Identified Recovery Goals

- “Not drink”
- “Get rid of headache pain”
- “Go back to riding the motorcycle”
- “Take Celexa”
- “A better relationship with my son”

Positive Outcomes

- Attended every appointment
- Obtained insurance, transportation
- Patient activation measures/ Goals
- Established a PCP and new psychiatrist
- All surgeries planned and scheduled

Quality Indicators

- No readmission within 30 days
- Not lost to follow-up
- Attended all follow-up appointments
- Attended PCP and psychiatry appointments
- Completed 30 day TCC program

Long term impact

- No unplanned readmissions at 3 months, 6 months
1 year following injury
- Established relationship with PCP, psychiatrist
- Learned how to navigate the healthcare system
- Understood limitations of insurance benefits

Independence Restored

- Successful return to:
- Part-time work as a cabinet maker
- Driving, legally
- Painting and copper art

Future for Trauma TCC

- Hardwire referral process
- Improve use of technology supporting patients and the TCC program
- Develop a trauma-specific predictive readmission risk tool
- Evaluate trauma patient healthcare literacy pre- and post-program enrollment

Contact Information

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Questions ?

Thank you for your time

MTQIP Data

Mark Hemmila, MD



State of Michigan

◆ Status

■ Level 1 and 2

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

■ Level 3

- ◆ Data submission - First Submission, 5 Hospitals
- ◆ Data submission - Second Submission, June 1
- ◆ Report development, provision 2x/year - Pending
- ◆ Education - June

State of Michigan

- ◆ Level 3 Reporting
- ◆ Comparison of patient characteristics
- ◆ Comparison of admissions and transfers
- ◆ Risk adjusted outcomes
 - All admitted patients
 - ≥ 65 yo
 - Isolated hip fracture
 - Mortality, mortality or hospice, major complication, Transfer < 12 hrs

Metrics



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

2018 CQI Scoring Index Data



#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

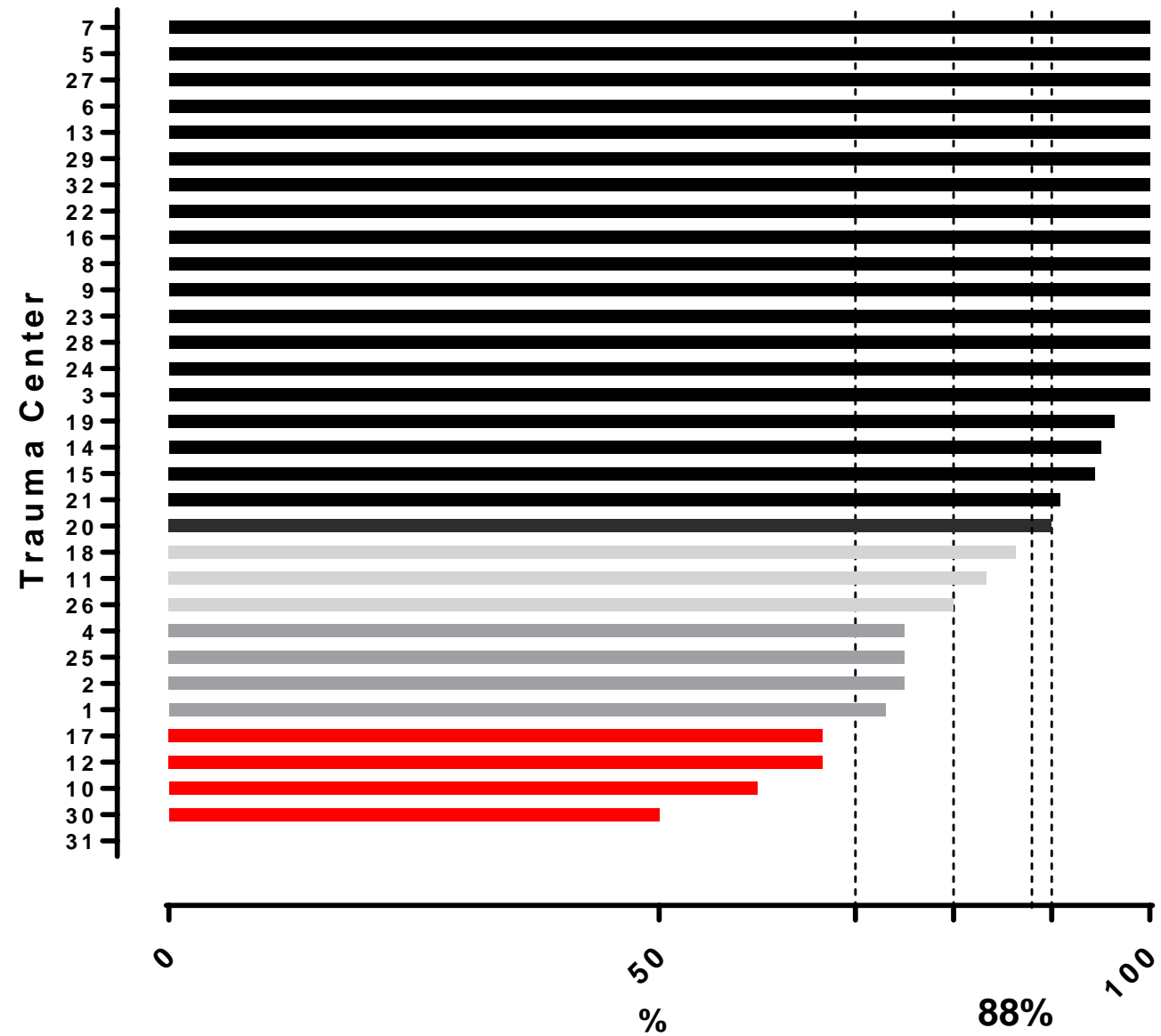
#9 Open Fracture Antibiotic Usage

- ◆ 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

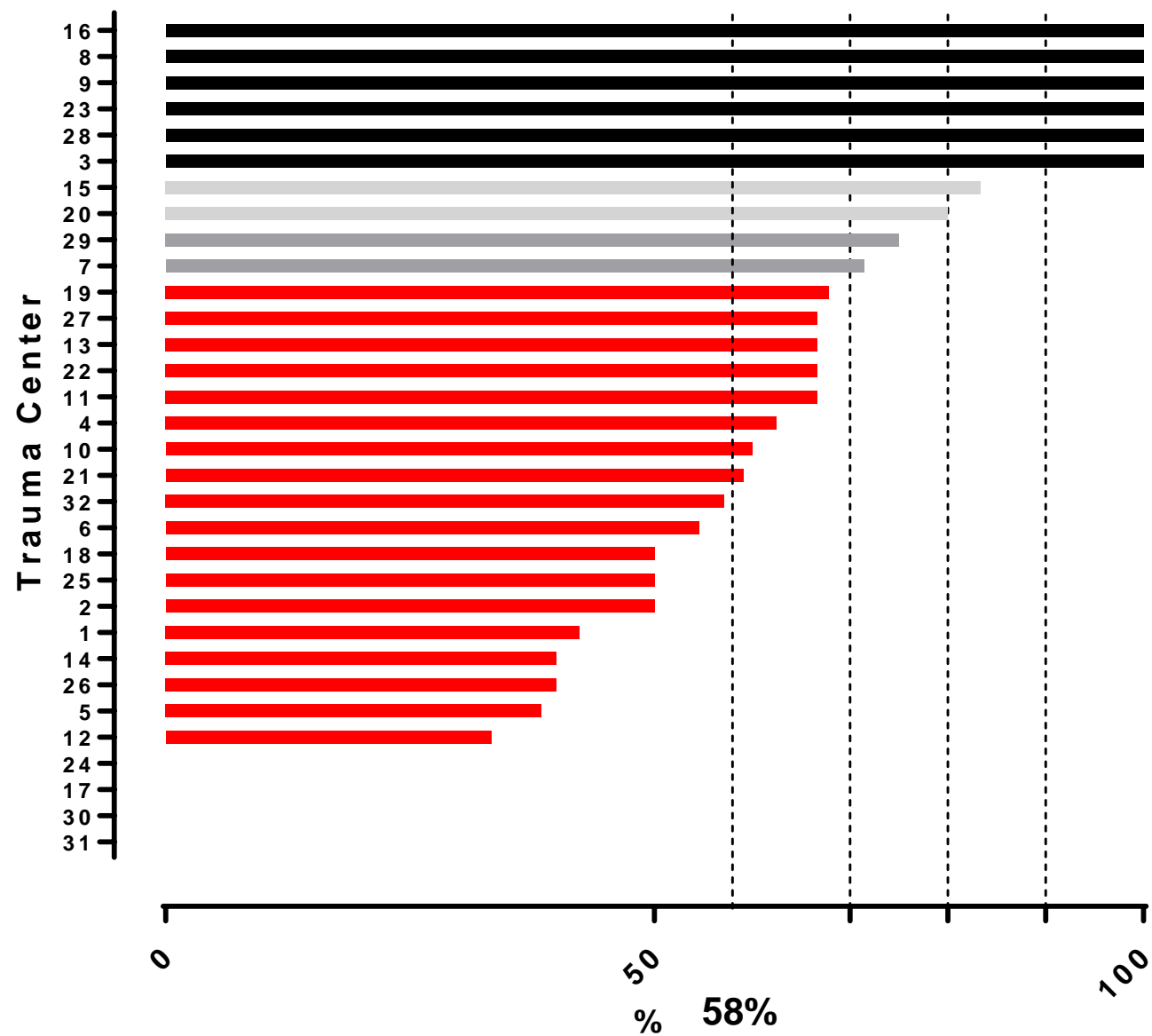
Trauma C	N	Data OK	< 60	61 to 120	> 120	% OK	% < 60	% 61-120	% > 120
31	8	0	0	0	0	0	0	0	0
8	4	4	4	0	0	100	100	0	0
3	1	1	1	0	0	100	100	0	0
9	3	3	3	0	0	100	100	0	0
5	13	13	5	6	2	100	38	46	15
1	26	19	11	5	3	73	42	19	12
12	3	2	1	1	0	67	33	33	0
11	12	10	8	1	1	83	67	8	8
23	2	2	2	0	0	100	100	0	0
18	22	19	11	3	5	86	50	14	23
10	5	3	3	0	0	60	60	0	0
29	8	8	6	2	0	100	75	25	0
13	9	9	6	1	2	100	67	11	22
2	4	3	2	0	1	75	50	0	25
26	10	8	4	1	3	80	40	10	30
32	7	7	4	1	2	100	57	14	29
24	1	1	0	0	1	100	0	0	100
16	5	5	5	0	0	100	100	0	0
20	10	9	8	1	0	90	80	10	0
22	6	6	4	1	1	100	67	17	17
14	20	19	8	4	7	95	40	20	35
6	11	11	6	1	4	100	55	9	36
15	18	17	15	0	2	94	83	0	11
21	22	20	13	4	3	91	59	18	14
7	14	14	10	2	2	100	71	14	14
17	3	2	0	1	1	67	0	33	33
25	4	3	2	1	0	75	50	25	0
19	28	27	19	4	4	96	68	14	14
30	2	1	0	1	0	50	0	50	0
27	12	12	8	3	1	100	67	25	8
28	1	1	1	0	0	100	100	0	0
4	8	6	5	0	1	75	63	0	13
	302	265	175	44	46	88%	58%	15%	15%

Open Fracture - Abx Type and Date/Time

7/1/17 - 1/31/18



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



#9 Open Fracture Antibiotic Usage

◆ Cephalosporin

- 229 Patients
- Ceftriaxone – grade 3, Kefzol – grade 1,2

◆ Other

- 36 Patients
- Nafcillin, Clindamycin, Gentamycin, Aztreonam, other

◆ Combo

- 58 Patients Cephalosporin and Aminoglycoside
- 11 Patients Cephalosporin and Other
- 5 Clindamycin and Aminoglycoside

◆ None

- 37 Patients

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

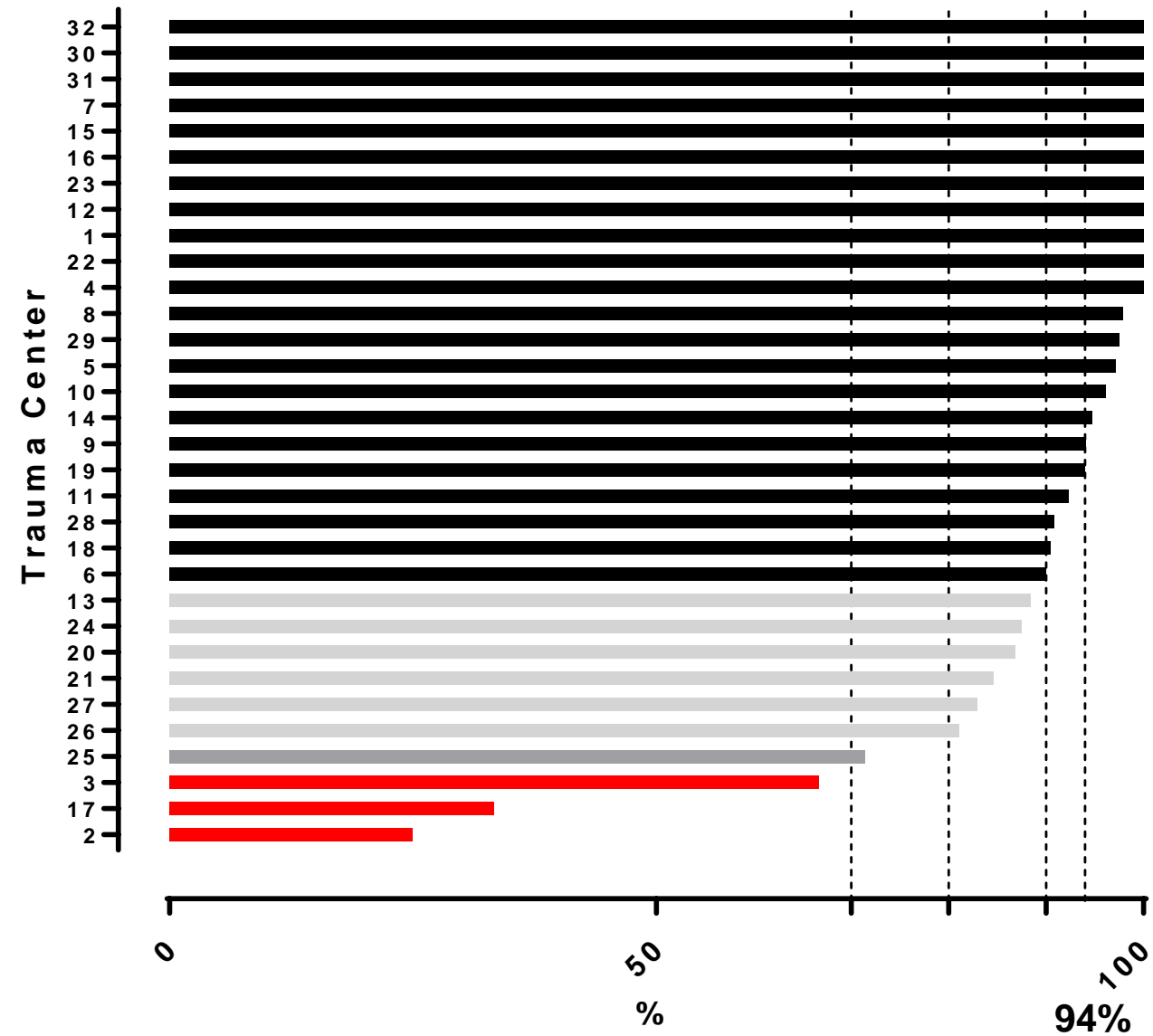
- ◆ Head CT date and time from procedures
- ◆ Presence of prehospital anticoagulation or anti-platelet use
- ◆ TBI (AIS Head, excluding NFS, scalp, neck, hypoxia)
- ◆ Cohort1, Blunt mechanism
- ◆ Exclude direct admissions and transfer in
- ◆ No Signs of Life = Exclude DOAs
- ◆ Transfers Out = Include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

#10 Head CT

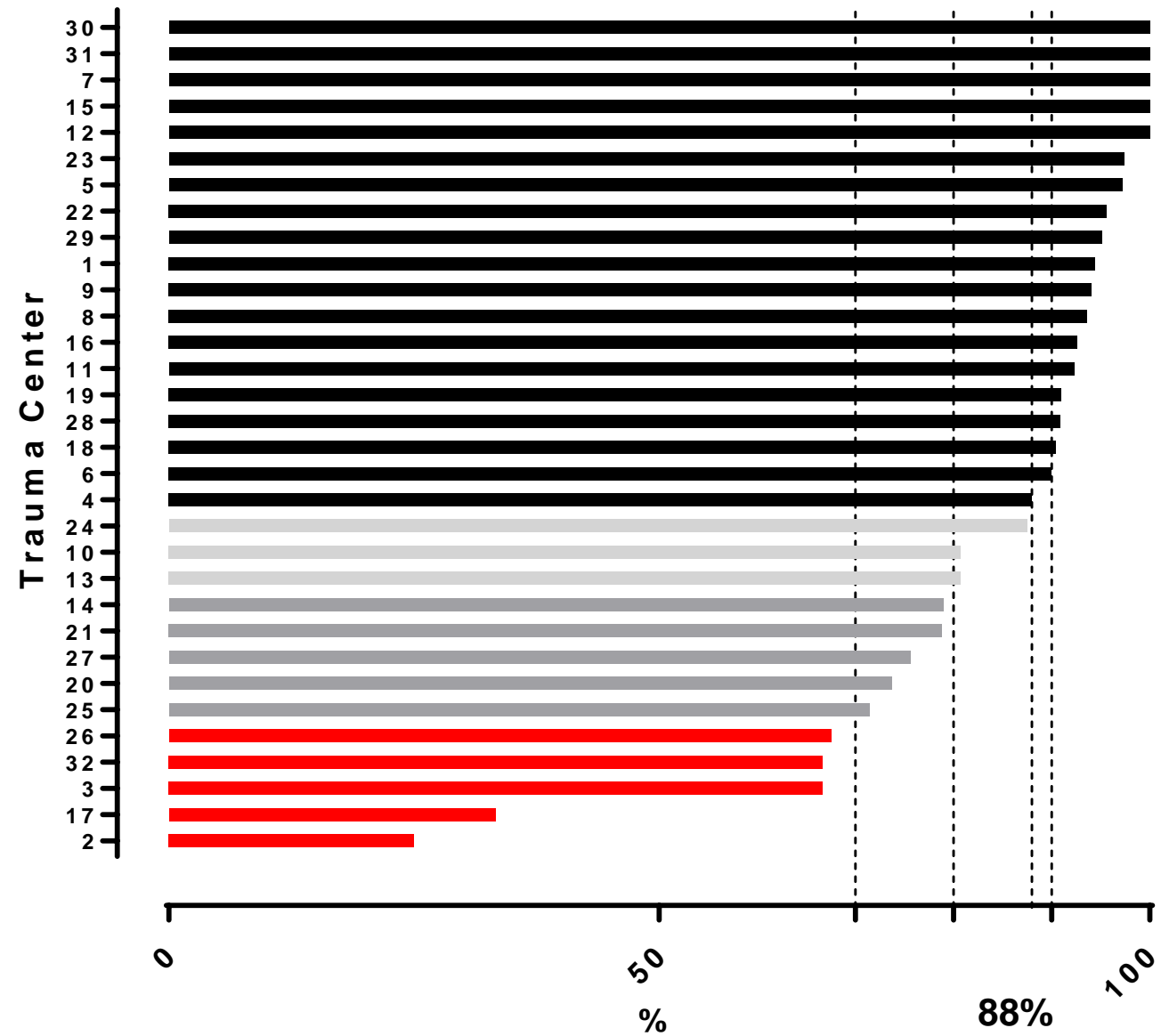
- ◆ Measure = % of patients with Head CT, date, and time
- ◆ Timing
- ◆ Treatment
 - 2018 Data

Trauma C	N	Head CT	Time OK	Time < 4	% OK	% No HCT	% OK CT	% OK Time	% < 4 hrs
31	2	2	2	2	100	0%	100	100	100
8	47	46	46	44	98	2%	98	98	94
3	3	2	2	2	67	33%	67	67	67
9	17	17	16	16	94	0%	100	94	94
5	36	35	35	35	97	3%	97	97	97
1	18	18	18	17	100	0%	100	100	94
12	36	36	36	36	100	0%	100	100	100
11	13	12	12	12	92	8%	92	92	92
23	38	38	38	37	100	0%	100	100	97
18	21	20	19	19	90	5%	95	90	90
10	26	25	25	21	96	4%	96	96	81
29	41	41	40	39	98	0%	100	98	95
13	52	46	46	42	88	12%	88	88	81
2	4	1	1	1	25	75%	25	25	25
26	37	30	30	25	81	19%	81	81	68
32	3	3	3	2	100	0%	100	100	67
24	8	8	7	7	88	0%	100	88	88
16	27	27	27	25	100	0%	100	100	93
20	38	34	33	28	87	11%	89	87	74
22	23	23	23	22	100	0%	100	100	96
14	19	18	18	15	95	5%	95	95	79
6	10	10	9	9	90	0%	100	90	90
15	9	9	9	9	100	0%	100	100	100
21	52	51	44	41	85	2%	98	85	79
7	40	40	40	40	100	0%	100	100	100
17	3	2	1	1	33	33%	67	33	33
25	14	13	10	10	71	7%	93	71	71
19	166	156	156	151	94	6%	94	94	91
30	13	13	13	13	100	0%	100	100	100
27	41	41	34	31	83	0%	100	83	76
28	11	11	10	10	91	0%	100	91	91
4	25	25	25	22	100	0%	100	100	88
	394	372	369	350	94%	6%	94%	94%	89%

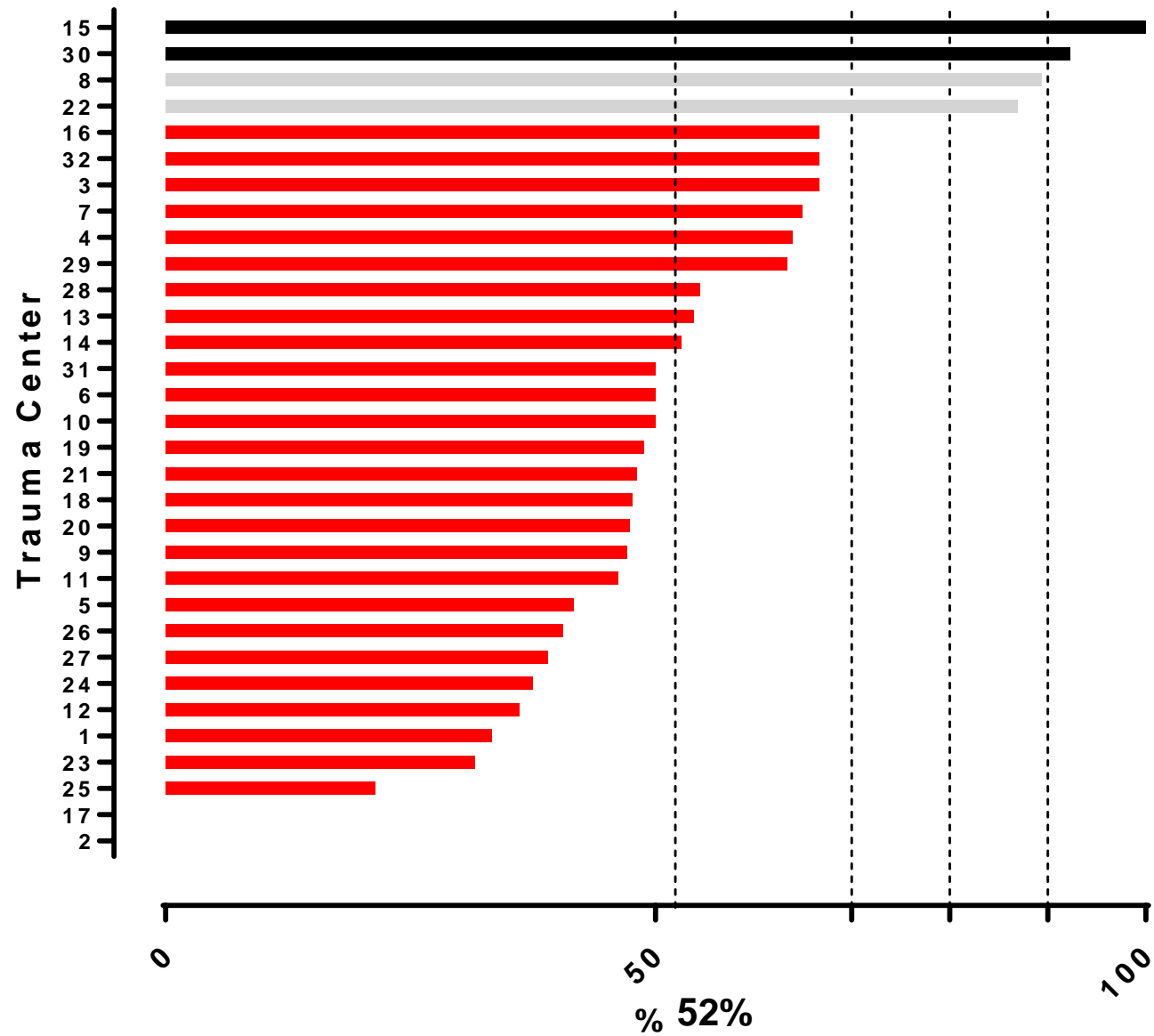
Head Injury and Anticoagulation - Head CT Date/Time 7/1/17 - 1/31/18



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



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



#4 VTE Prophylaxis Initiated \leq 48 hrs

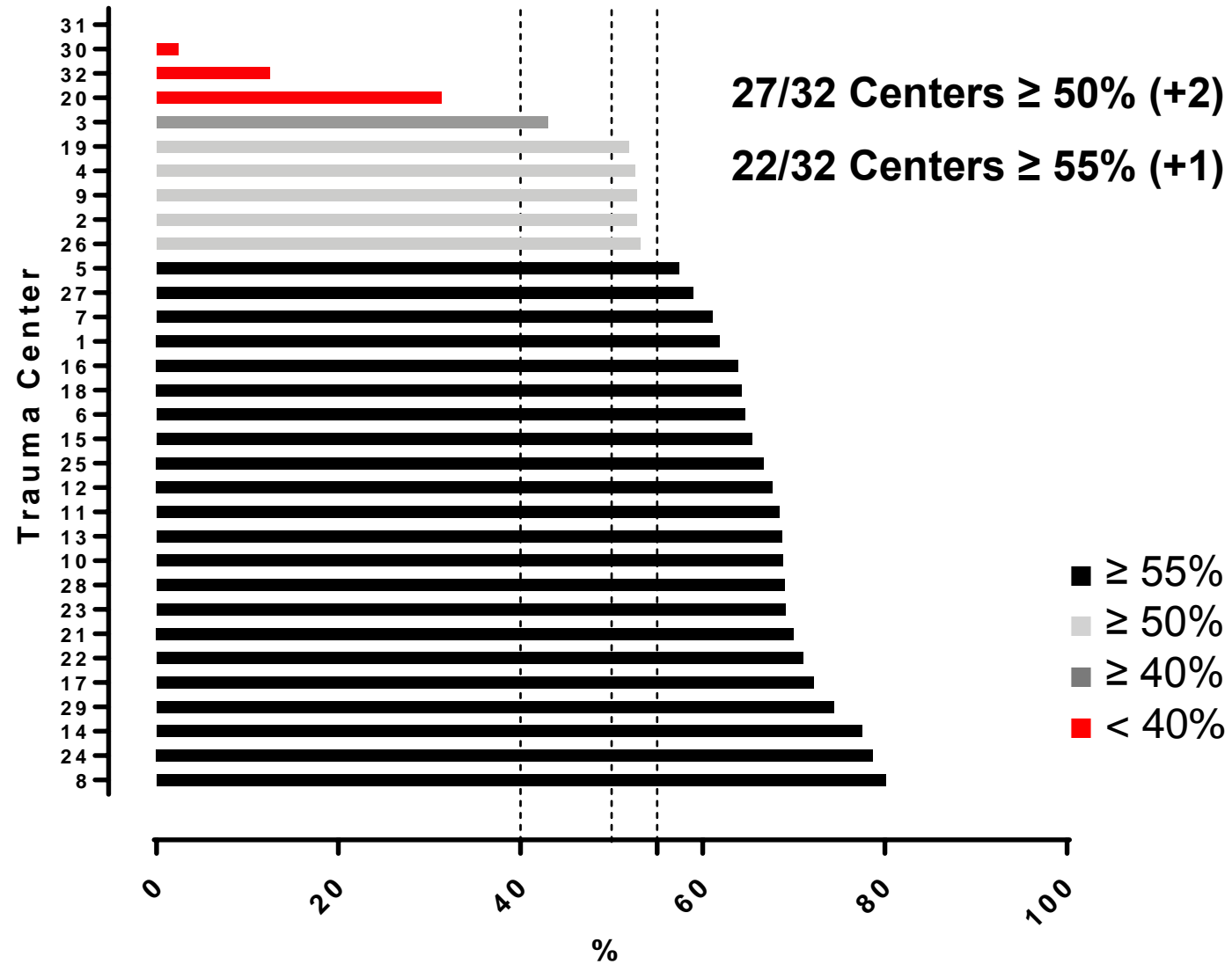
- ◆ Website

- 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

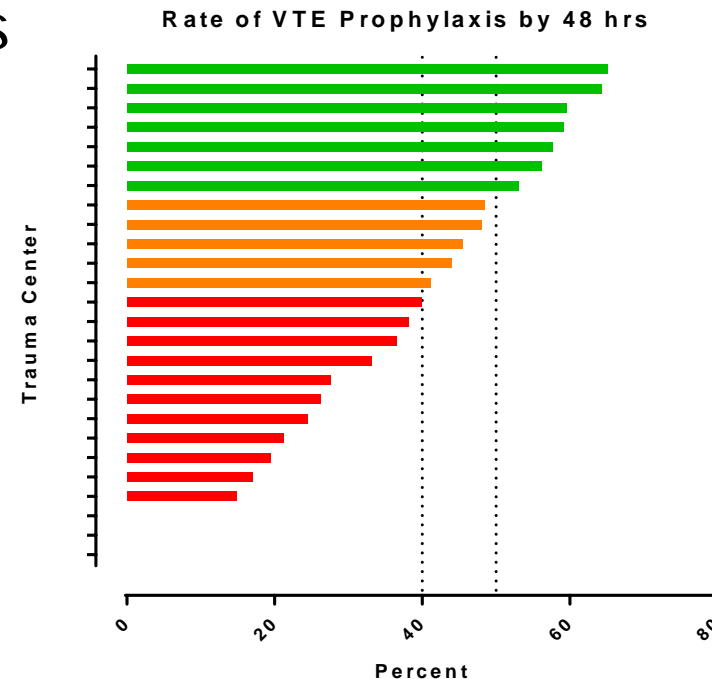
- Hospital - Unadj %

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

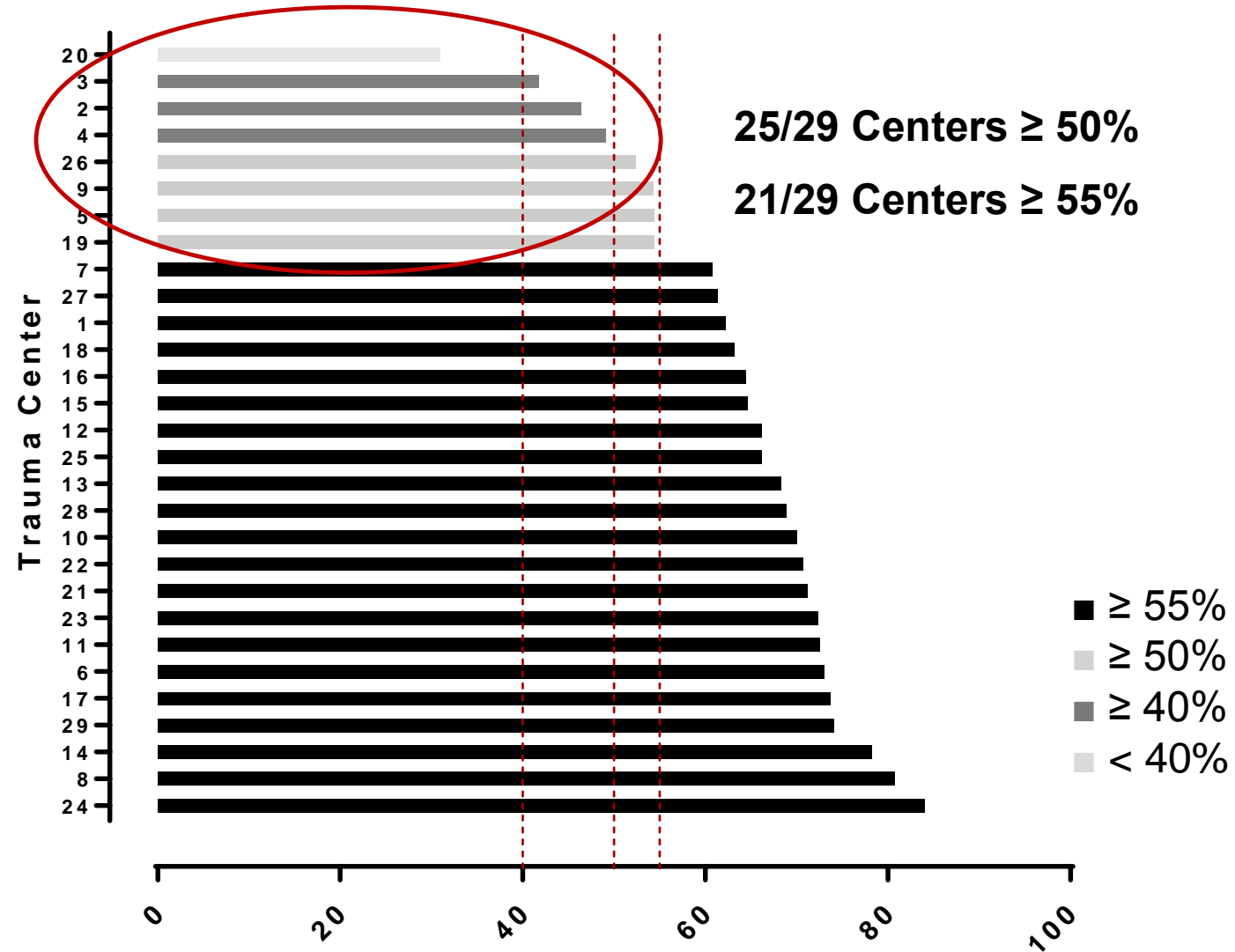


#4 VTE Prophylaxis Initiated \leq 48 hrs

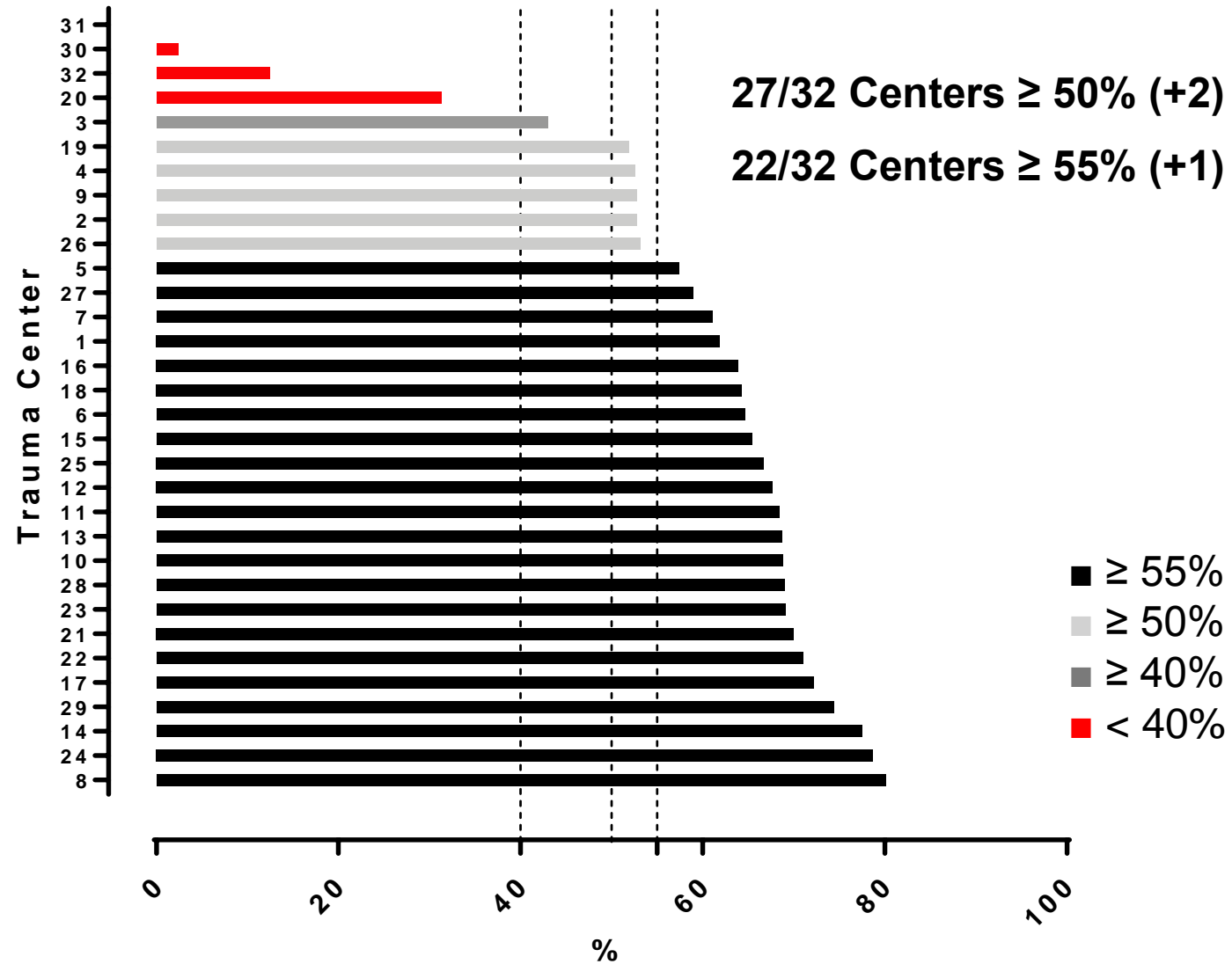
- ◆ Hospital Target $\geq 55\%$ = 10 points
- ◆ CQI Target 75% of hospitals $\geq 55\%$
 - 24/32 hospitals
 - Current is 21→22 hospitals
 - May 2014: 7 > 50%



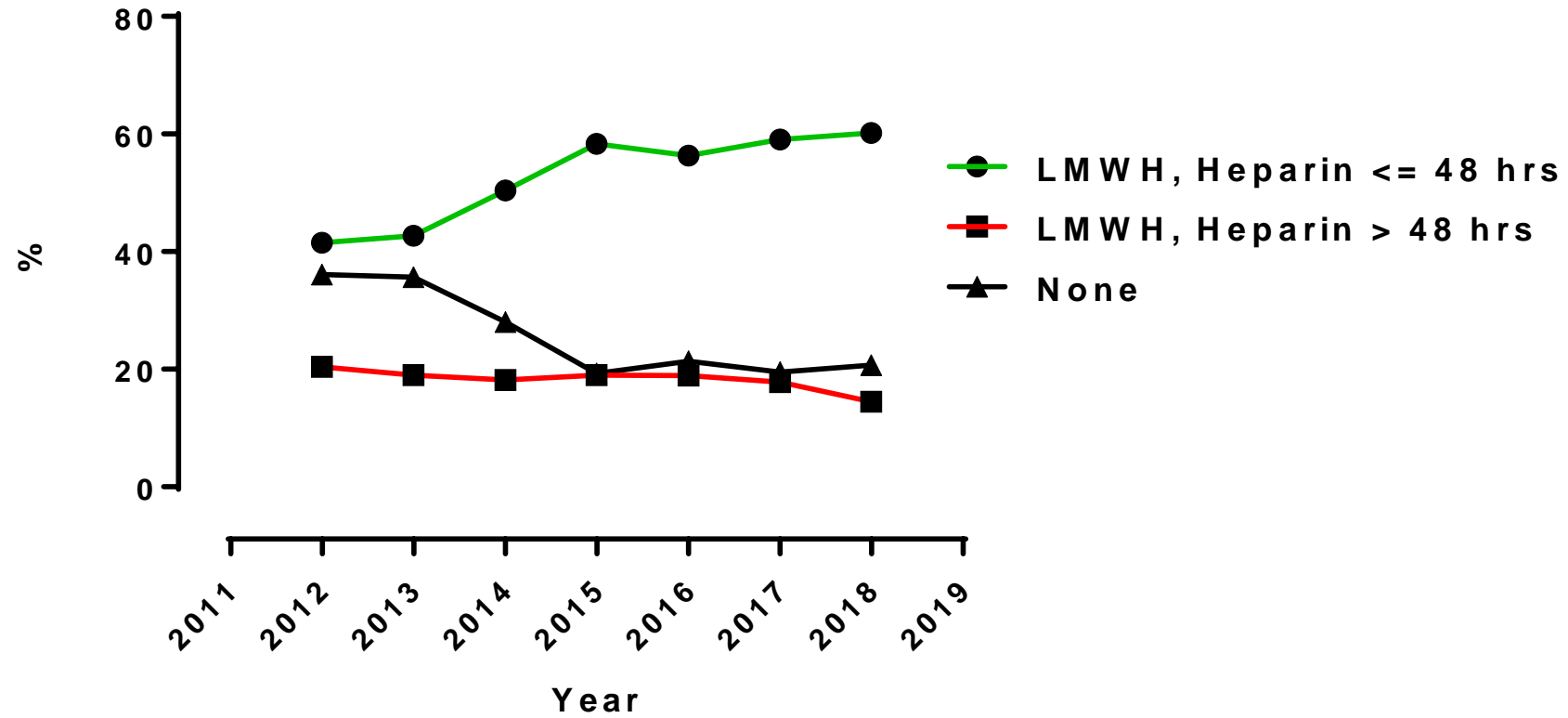
VTE Prophylaxis Timing ≤ 48 hrs
1/1/17 - 9/30/17



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



Timely VTE Prophylaxis



#5 VTE Prophylaxis with LMWH

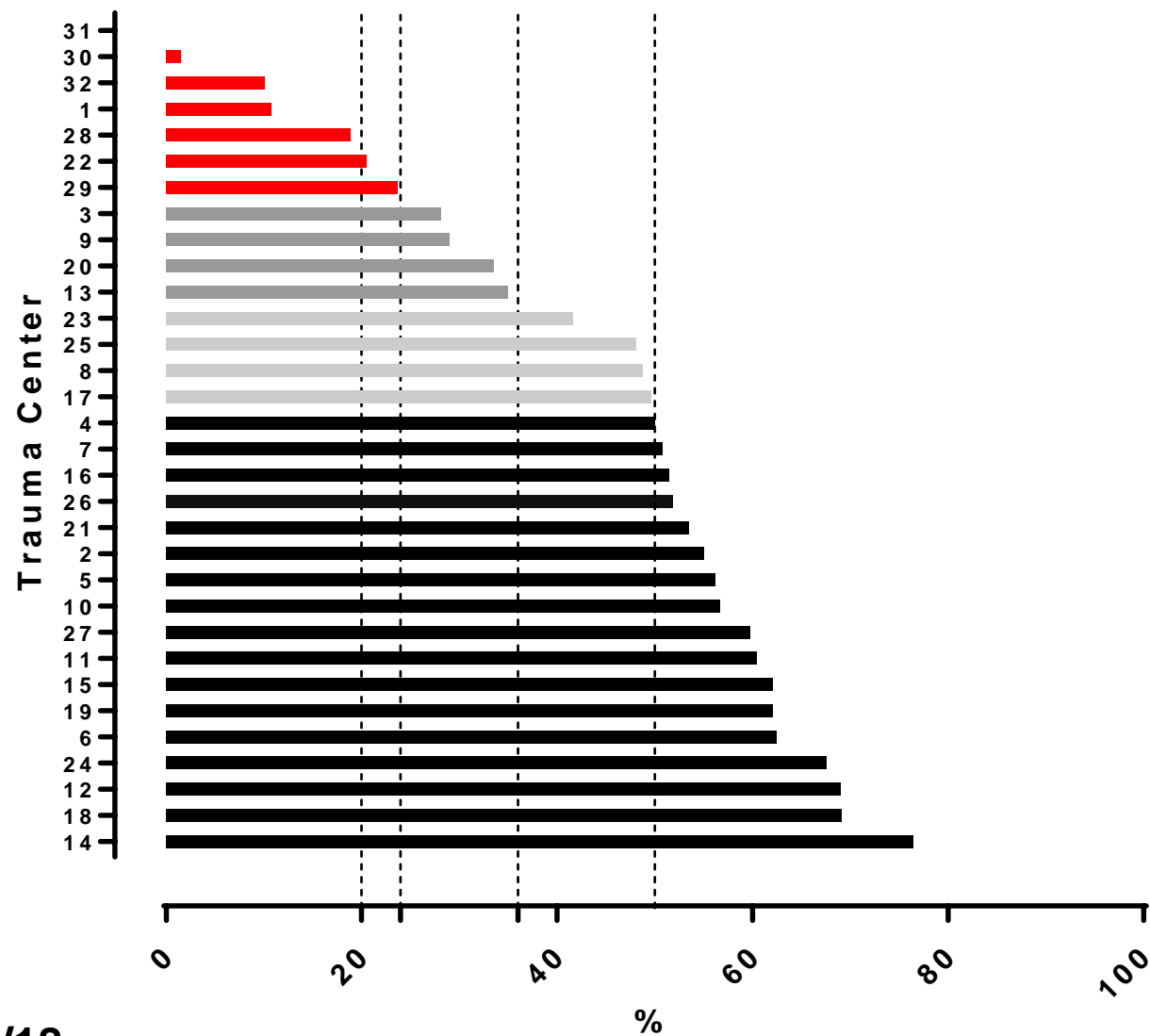
◆ Website

- 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

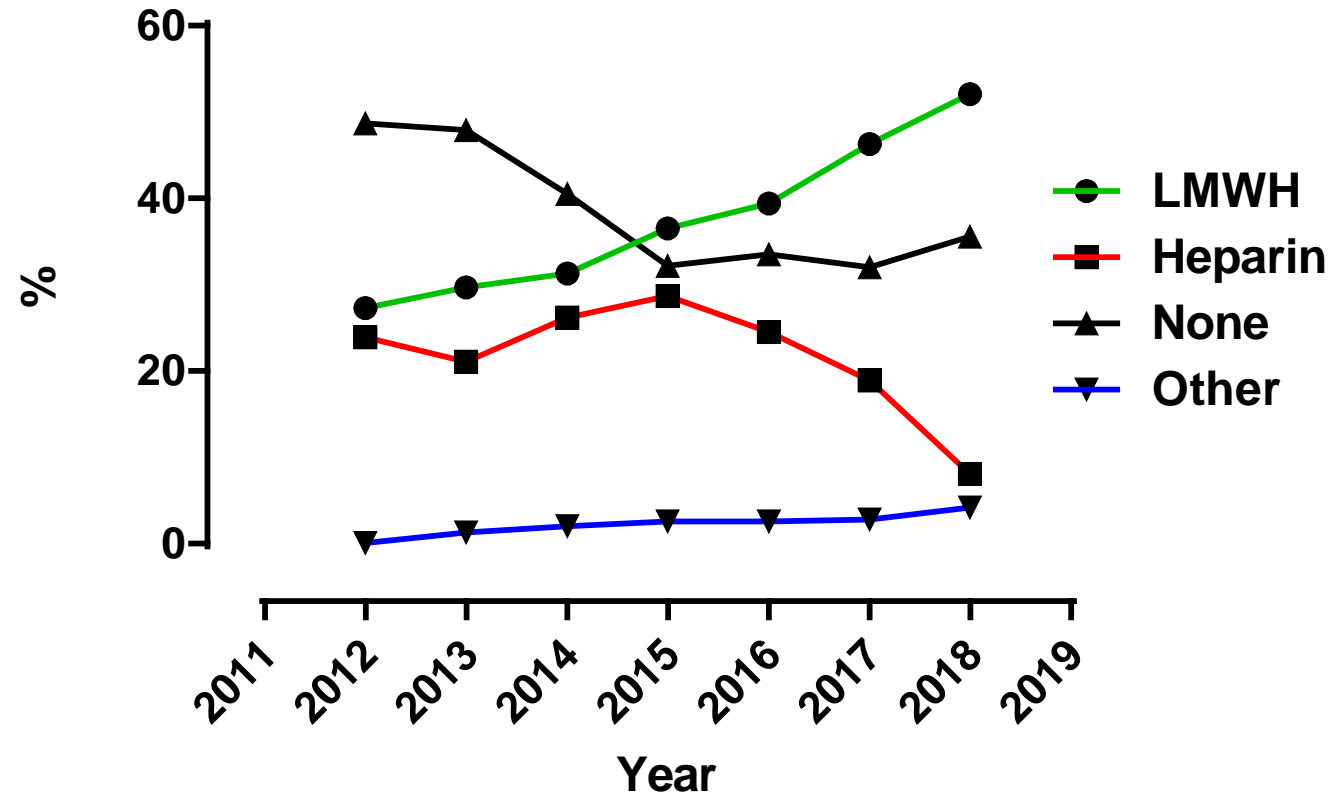
◆ LMWH (Type)

- Hospital - Unadj %

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



Type VTE Prophylaxis



Z-score

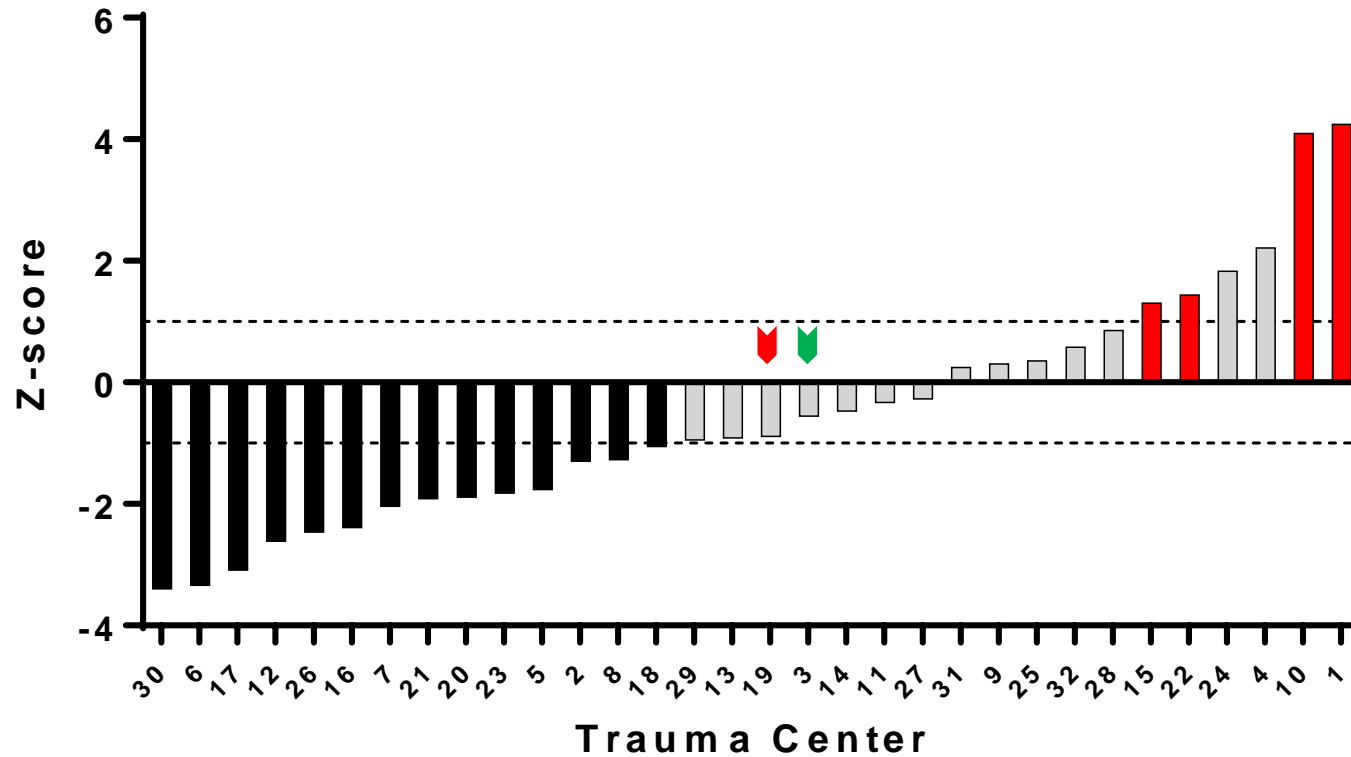
- ◆ Measure of trend in outcome over time
- ◆ Hospital specific
 - Compared to yourself
- ◆ Standard deviation
- ◆ > 1 getting worse
- ◆ 1 to -1 flat
- ◆ < -1 getting better

Z-score

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

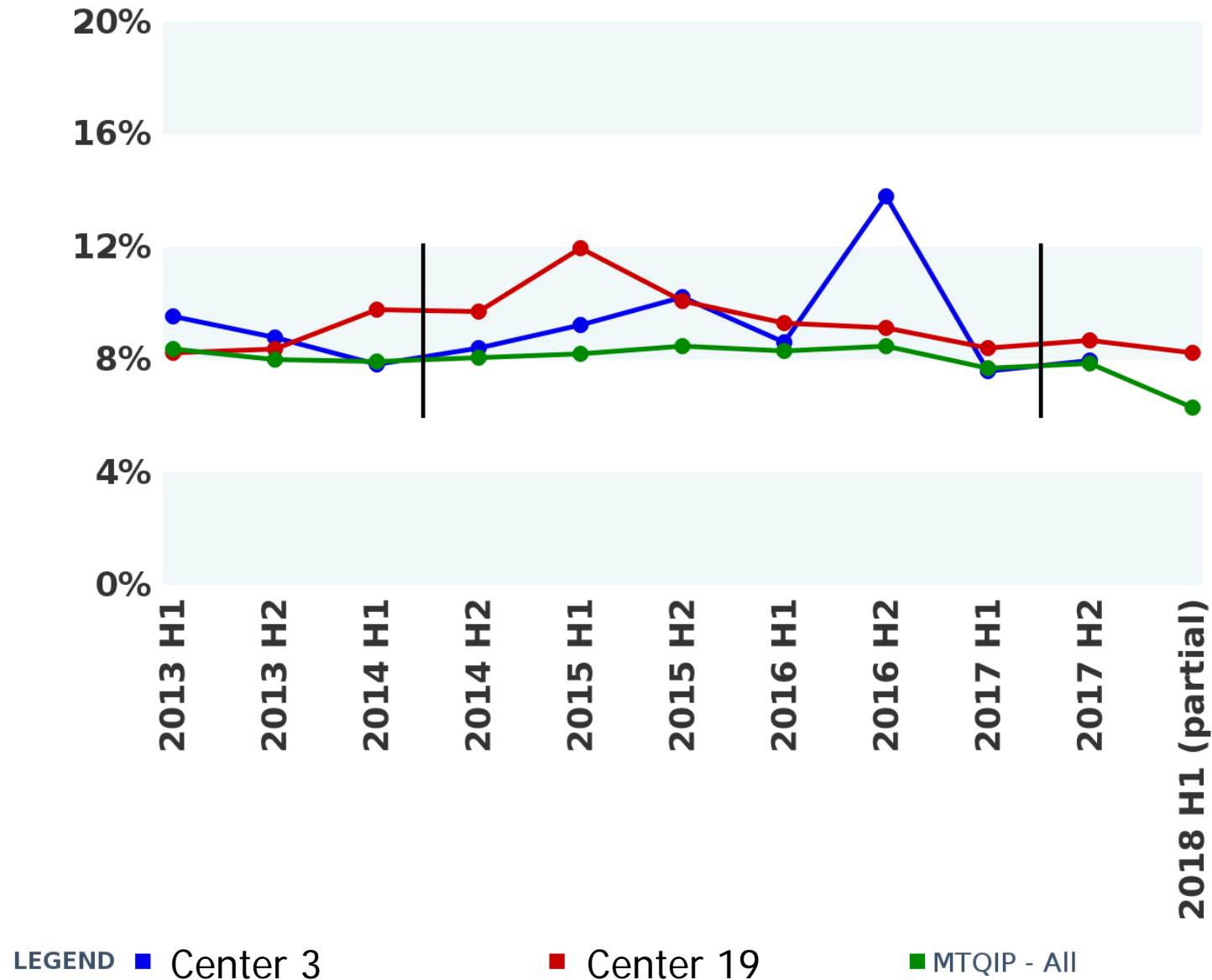
#7 Serious Complication Rate (Z-score)

Z-score - Serious Complication Rate
7/1/15 - 1/31/18



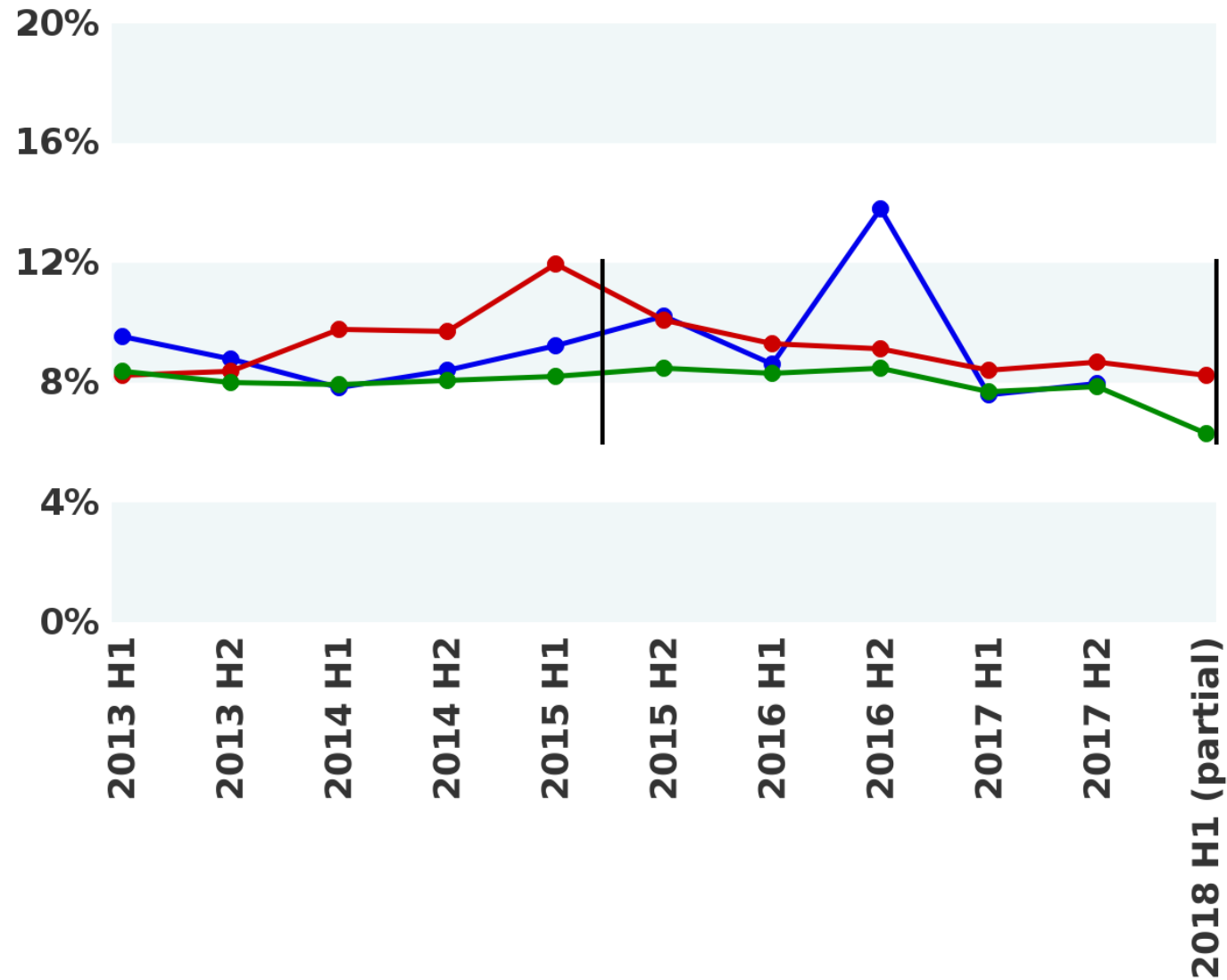
Outcomes Overview - Serious Complications
Cohort 2 (Admit to Trauma Service), Exclude DOAs

- ◆ Center 19
 - Getting better
 - ◆ - Z score
 - Plateau
 - ◆ ave Z score
- ◆ Center 3
 - Getting worse
 - ◆ + Z score
 - Plateau
 - ◆ ave Z score



Outcomes Overview - Serious Complications
Cohort 2 (Admit to Trauma Service), Exclude DOAs

- ◆ Center 19
 - Getting better
 - ◆ - Z score
 - Plateau
 - ◆ ave Z score
- ◆ Center 3
 - Getting worse
 - ◆ + Z score
 - Plateau
 - ◆ ave Z score



LEGEND ◆ Center 3

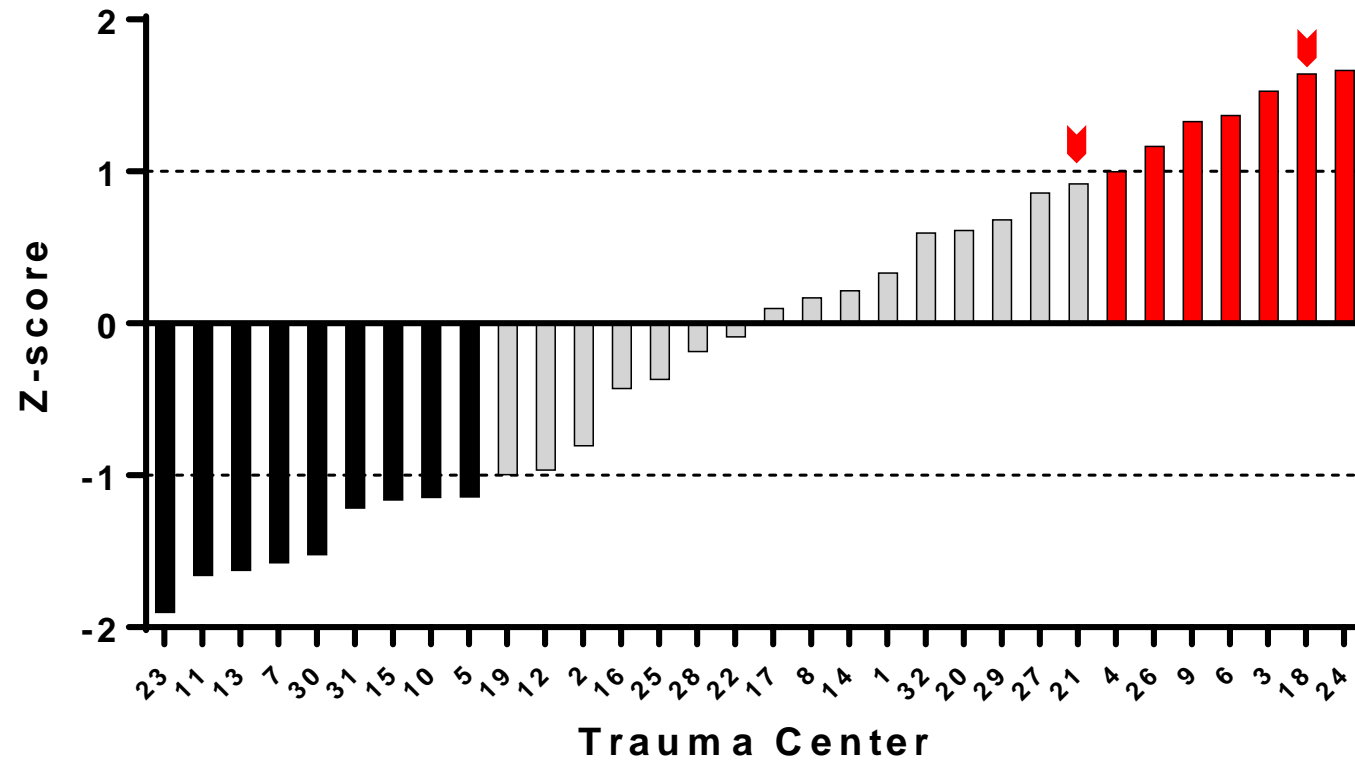
■ Center 19

■ MTQIP - All

8 Mortality Rate (Z-score)

Z-score - Mortality Rate

7/1/15 - 1/31/18



Outcomes Overview - Dead Cohort 2 (Admit to Trauma Service), Exclude DOAs

◆ Center 18

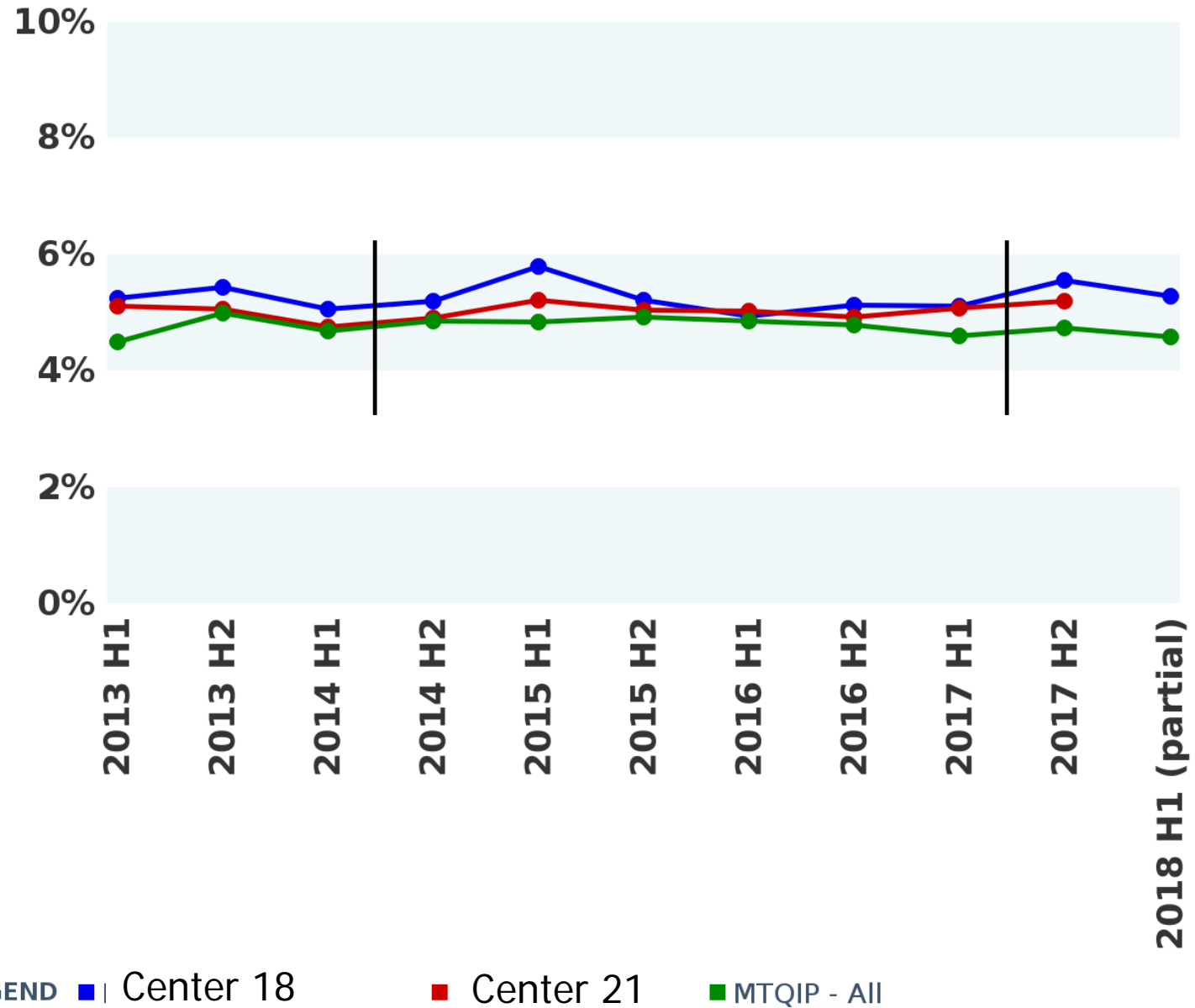
■ Getting better
◆ - Z score

■ Getting worse
◆ + Z score

◆ Center 21

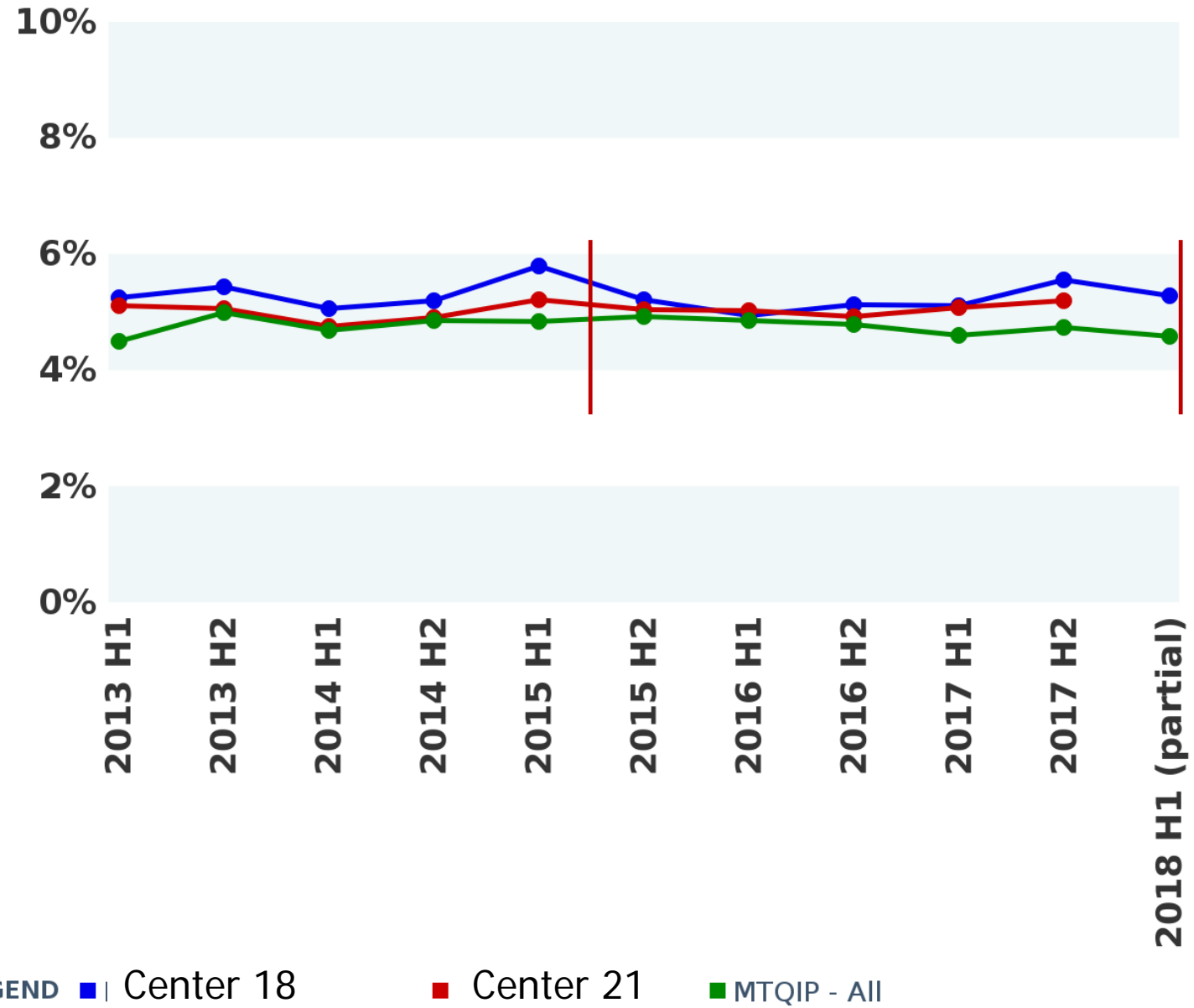
■ Plateau
◆ ave Z score

■ Getting slightly worse
◆ + Z score



Outcomes Overview - Dead Cohort 2 (Admit to Trauma Service), Exclude DOAs

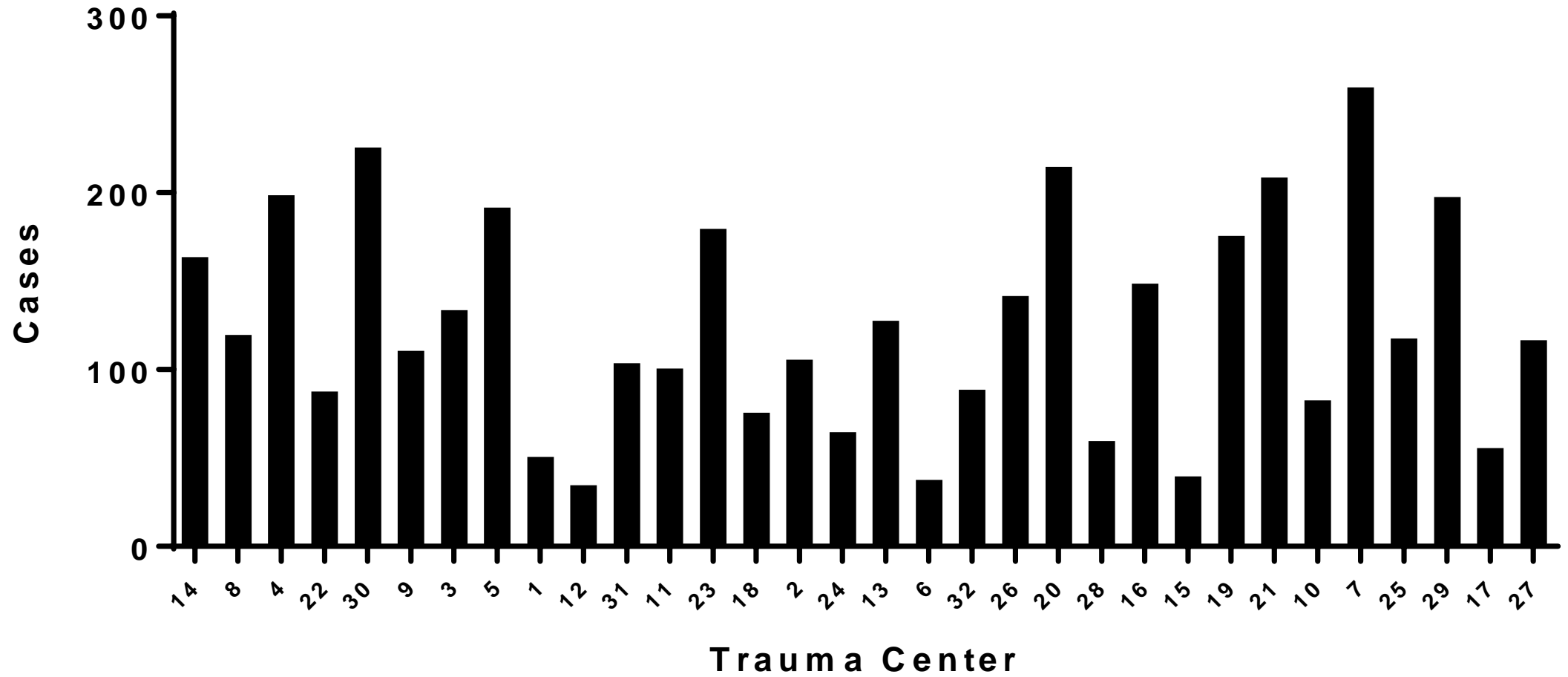
- ◆ Center 18
 - Getting better
 - ◆ - Z score
 - Getting worse
 - ◆ + Z score
- ◆ Center 21
 - Plateau
 - ◆ ave Z score
 - Getting slightly worse
 - ◆ + Z score



Collaborative

- ◆ VTE rate 1.3 → 1.1% (2017, 1.2%)
- ◆ LMWH use > 50% collaborative (2017, 46%)
- ◆ VTE prophylaxis timely
 - $\geq 55\%$ within 48 hrs (hospital)
 - 75% of hospitals (24/32), current 22/32
- ◆ PRBC to plasma ratio ≤ 2.0 in 80% of patients (2017, 79%)
- ◆ Serious complication rate, improvement (2017, 7.8% ↓ from 8.5%)
- ◆ Mortality rate, improvement (2017, 4.4% ↓ from 4.8%)
- ◆ IVC filter rate, maintain $\leq 0.5\%$ (2017, 0.38%)
- ◆ TBI intervention in eligible patients $\geq 75\%$ (2017, 69%)
- ◆ TBI intervention timeliness $\geq 80\%$ (2017, 80.5%)
- ◆ Open Fracture, TBI and anticoagulation baseline

Isolated Hip Fracture Volume (2017)



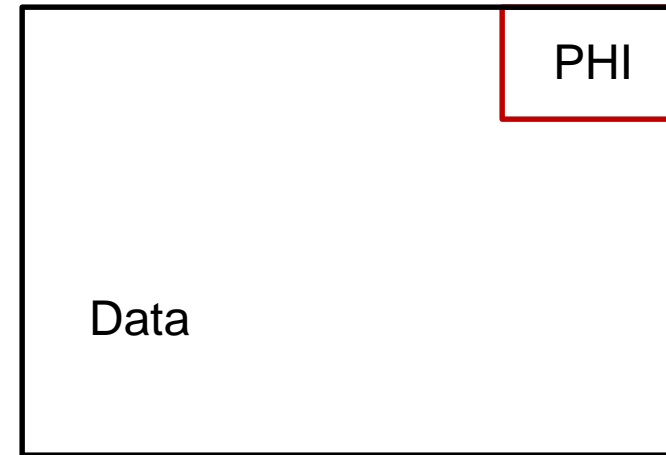
Hip Fracture Patients

- ◆ Volume
- ◆ Pain Relief
 - Pre OR
 - Discharge
- ◆ Anesthetic
- ◆ Long term outcomes
- ◆ ASPIRE

EMS and Trauma Registry



EMS



Trauma Registry

EMS and Trauma Registry



EMS



Trauma Registry

EMS and Trauma Registry



EMS



Trauma Registry

Break



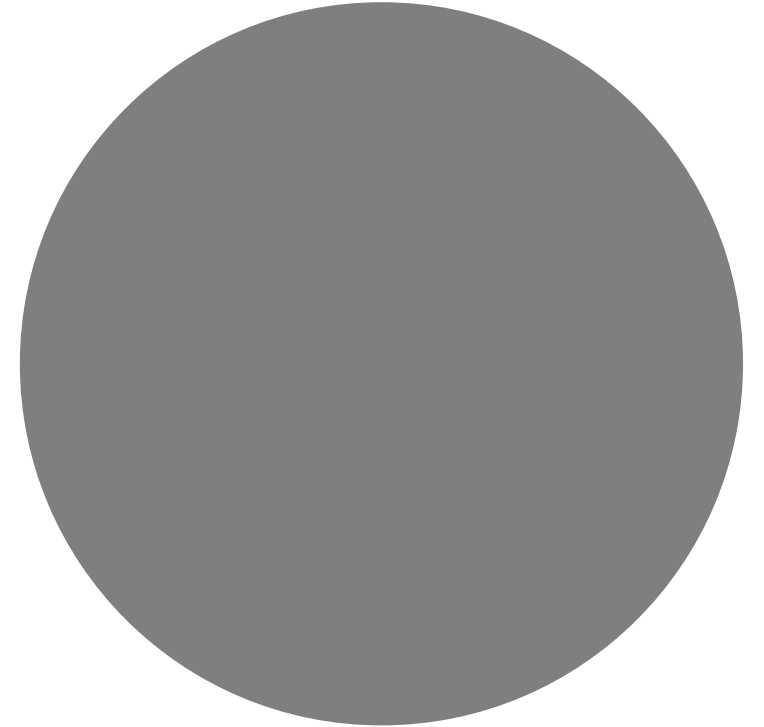
Alcohol Withdrawal Syndrome

Judy Mikhail, PhD



Alcohol Withdrawal Syndrome (AWS)

Judy Mikhail, PhD, MBA, RN
Program Manager
MTQIP



Alcohol Withdrawal Syndrome

Literature Review

2010-2018

#	Journal Type n=65
15	Pharmacology
13	Critical Care
9	Toxicology/Substance Abuse
8	Internal Med
8	Surgery/Trauma
6	ED
3	Cochrane Library
2	Psychiatry
2	Professional Organizations

Status of AWS Research

- Mostly small retrospective studies < 2010
- Markedly Heterogeneous: Settings, Populations, Assessments
- Few recent trials.....No money in it...
- Unethical to do placebo studies?
- No universally agreed upon Guideline
- Consensus driven care by setting & population

Alcohol Spectrum in General Population

Alcohol
Use
Disorder (AUD)
Comorbidity

Alcohol
Withdrawal
Syndrome
(AWS)
Complication

Delirium
Tremens
(DT)

AUD
10-20%

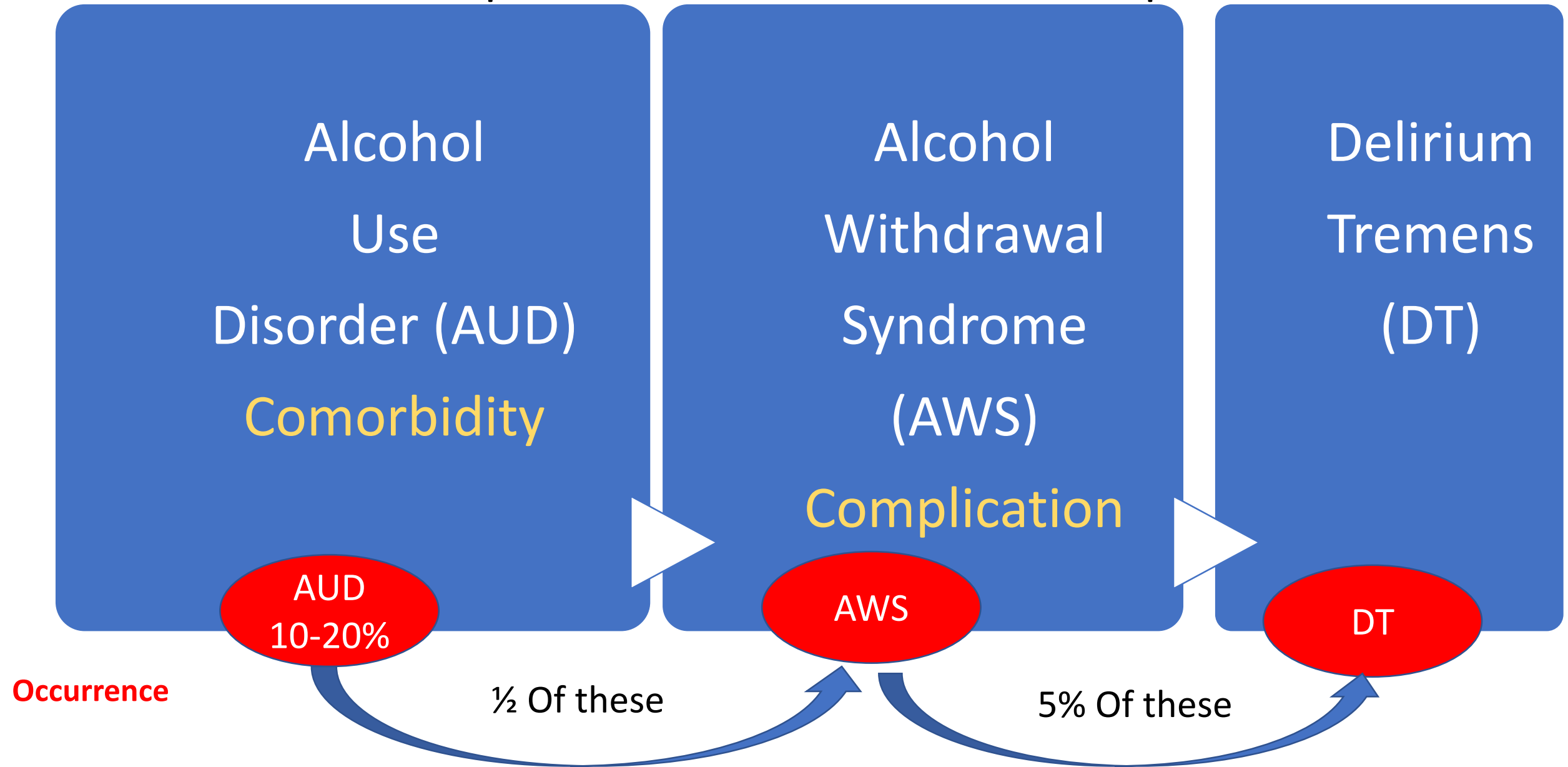
AWS

DT

Occurrence

½ Of these

5% Of these



MTQIP Data Collection

Alcohol use disorder				
Center ID	0	1	3	total
35	0	0		35
36	1	0		37
41	3	1		45
26	0	2		28
37	0	1		38
53	0	2		55
53	1	1		55
32	0	0		21
	0	0		48
	0	0		39
	0	1		7
	0	2		28
	0	3		46
	0	1		21
	0	2		21
	0	0		28
	0	1		45
	0	1		28
32	0	2		34
40	1	0		41
51	2	2		55
34	2	0		36
48	0	0		48
20	0	1		21
21	0	0		21
42	2	0		44
56	0	2		58
5	0	2		7
48	1	2		51
Total	988	24	29	1,041

Reg
Under

Reg
Over

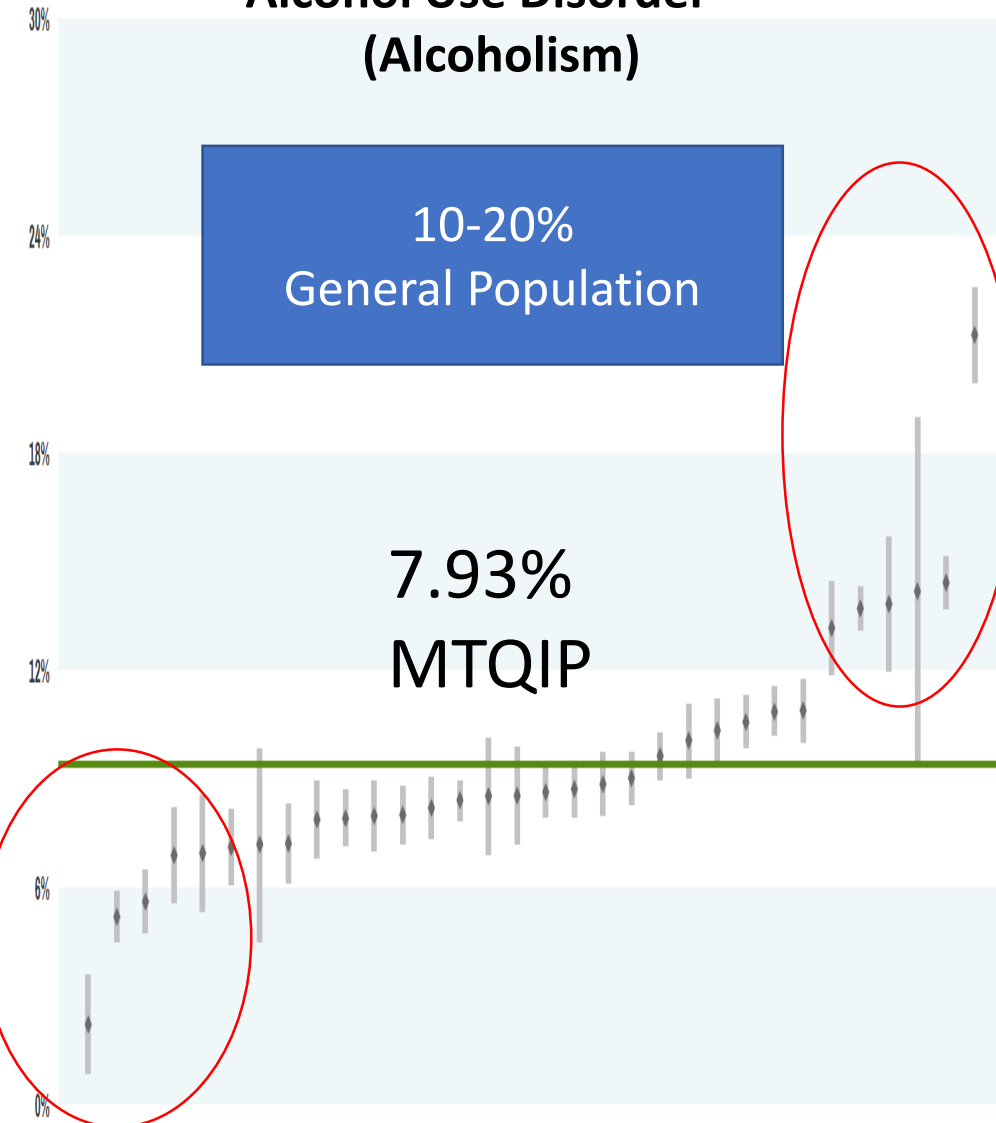
Alcohol Use Disorder

- Evidence of chronic use such as withdrawal episodes **or**
- In the 2 wks prior to admission:
 - >2 oz hard liquor/daily
 - >2 (12 oz) beers/daily
 - >2 (6 oz) wine/daily
- Binge Drinker
 - Total Drinks during binge/7dys
 - Then apply definition

Comorbidity Drill-Down - Alcoholism

Cohort 2 (Admit to Trauma Service)

Alcohol Use Disorder (Alcoholism)



MTQIP Data Collection

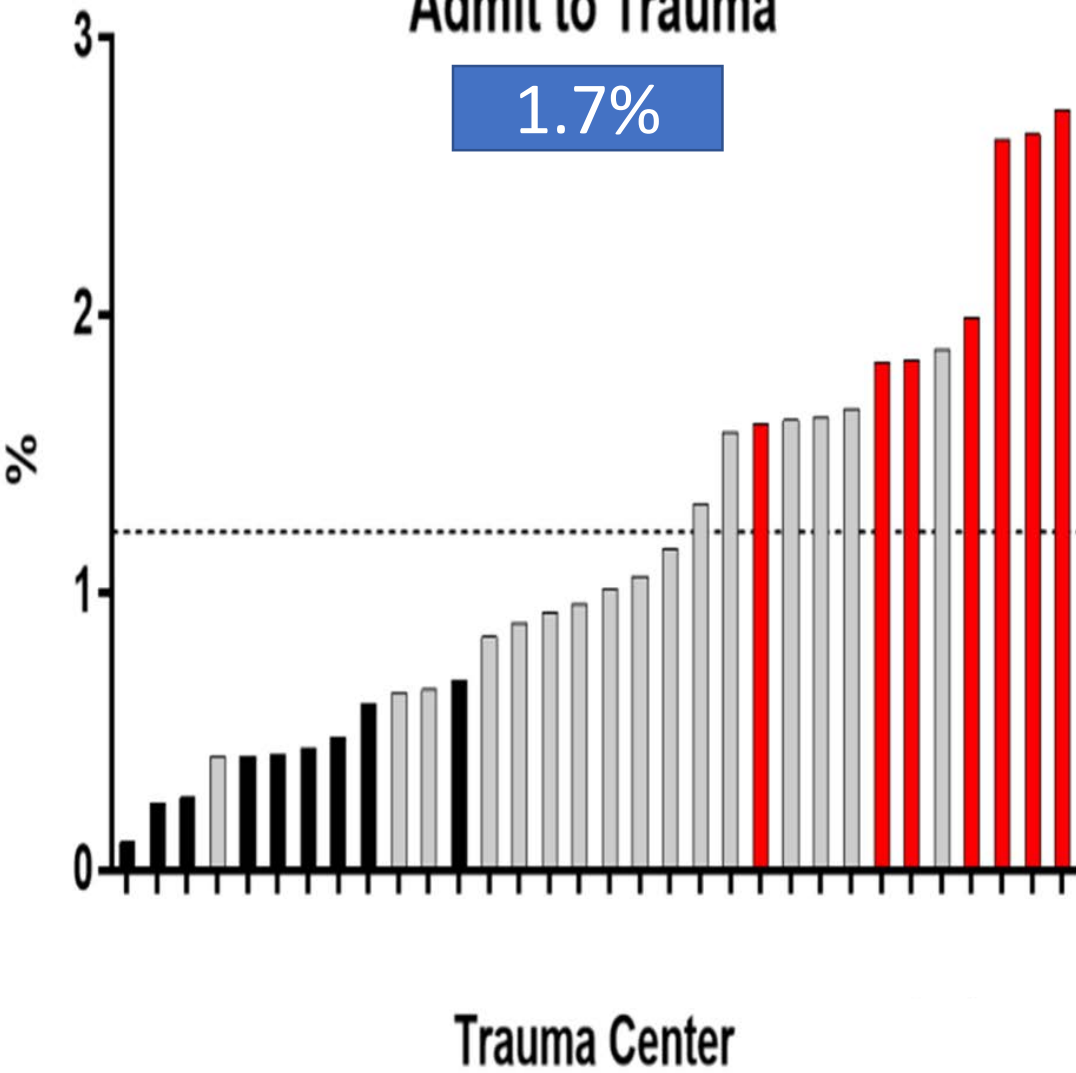
Center ID	Alcohol withdrawal syndrome		Total
	0	1	
	35	0	35
	27	0	27
	34	1	35
	28	0	28
	27	1	28
	35	0	35
	27	1	28
	19	2	21
	28	0	28
	39	0	39
	6	1	7
	27	1	28
	36	0	36
	20	1	21
	21	0	21
	27	1	28
	35	0	35
	27	1	28
	34	0	34
	21	0	21
	33	2	35
	35	1	36
	28	0	28
	21	0	21
	21	0	21
	34	0	34
	28	0	28
	7	0	7
	30	0	30
Total	790	13	803

AWS

- Characterized by:
 1. Tremor
 2. Sweating
 3. Anxiety
 4. Agitation
 5. Depression
 6. Nausea
 7. Malaise
 8. Seizures
 9. Delirium

← Under capture →

Drug or Alcohol Withdrawal - Cohort 2
Admit to Trauma



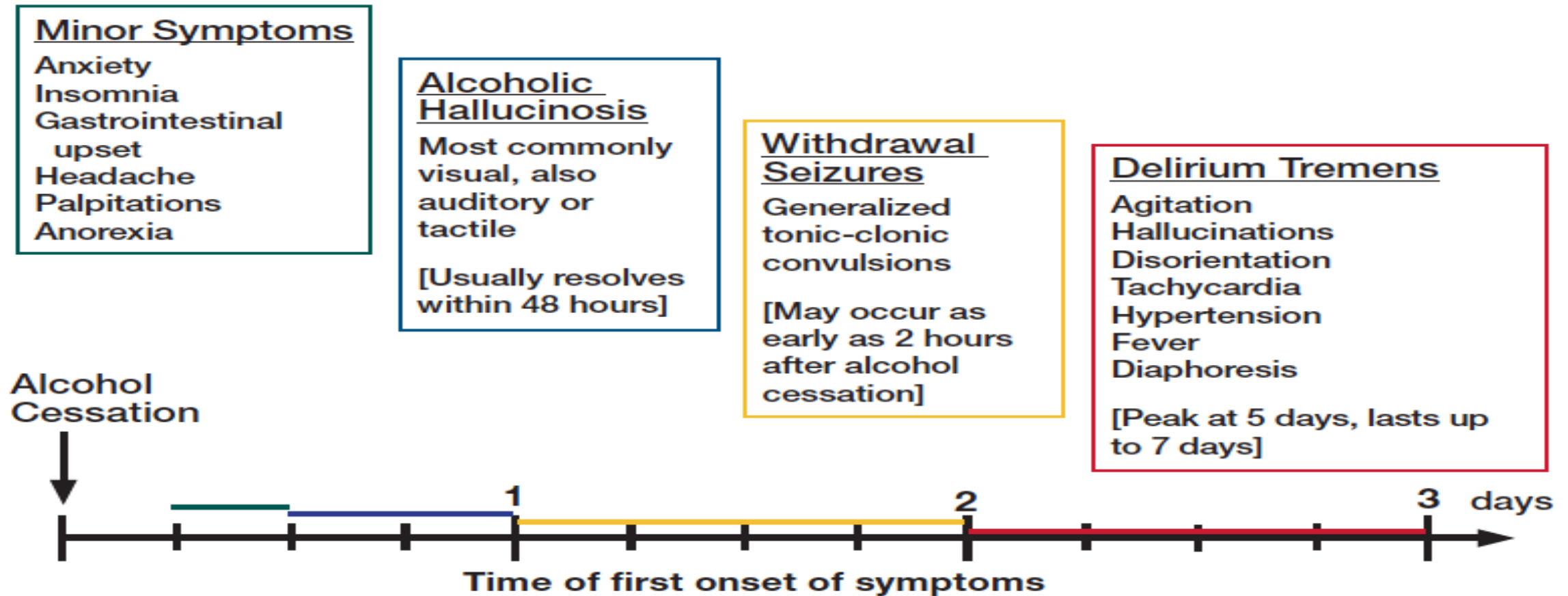
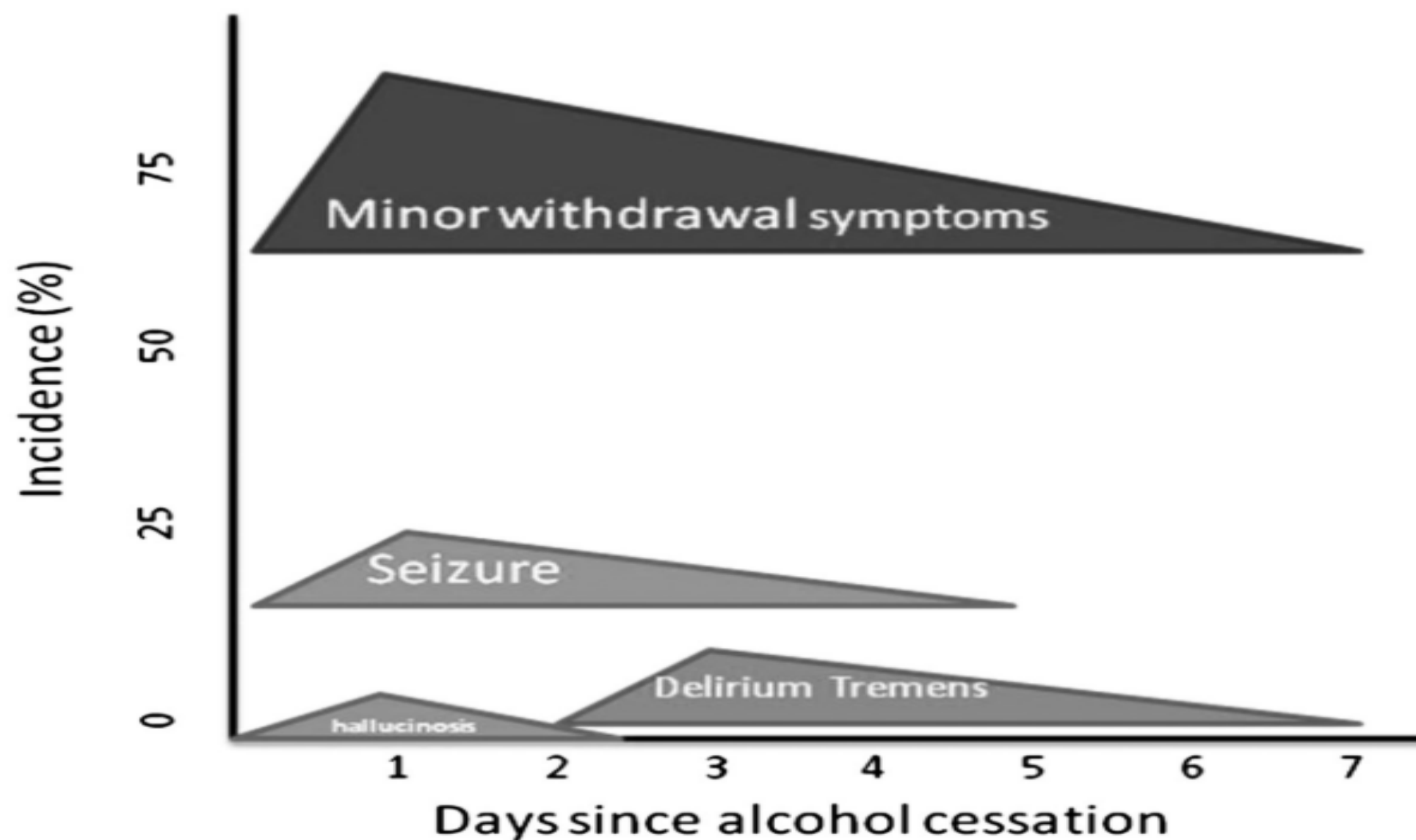


Figure. The four distinct conditions of alcohol withdrawal syndrome shown on a spectrum of severity and timeline scale. This figure was adapted with permission from Alcohol Withdrawal Syndrome.¹⁹ *American Family Physician*, ©American Academy of Family Physicians. All Rights Reserved.

- Progression variable non-linear
- Stages may overlap, skip
- Seizures do not predict DTs

Onset & Frequency of Alcohol Withdrawal Symptoms



Delirium Tremens

- Result of no treatment/undertreatment (*failure to rescue*)
- Hallmark is delirium: rapid fluctuation of consciousness → Disorientation
- Autonomic symptoms (↑HR, ↑BP, ↑T, sweating, N&V, tremor, anxiety)
- Seizures & Coma
- **Mortality**
 - Historically (w/o treatment 15%)
 - Currently (w treatment <2%)
 - Most due: arrhythmias or MI

Mirijello 2015 Drugs
Schuckit 2014 NEJM
Mirijello 2015 Drugs

Delirium Tremens Incidence in Trauma



Excerpta Medica

The American Journal of Surgery 187 (2004) 332-337
Scientific paper

The American
Journal of Surgery

Admission characteristics of trauma patients in whom delirium develops 2004

Richard D. Blondell, M.D.^{a,d,*}, Glen E. Powell, M.S.P.H.^a, Heather N. Dodds^a,
Stephen W. Looney, Ph.D.^b, James K. Lukan, M.D.^c

Single Trauma Center
2001-2002
2-yr REG review
Chart review
n=11,140

Abstract

Background: Delirium is a common complication of trauma, but its development and outcomes are poorly understood.
Methods: In a retrospective review of 11,140 trauma patients admitted to a single trauma center from 2001 to 2002, we identified patients who developed delirium during their hospital stay.
Results: Delirium developed in 1,354 (12%) of the 11,140 patients. The incidence of delirium was higher in patients who were older, had a history of alcoholism, and who were admitted to the hospital from a nursing home or long-term care facility.
Conclusions: Delirium is a common complication of trauma, and its incidence is higher in certain patient populations. Further research is needed to better understand the development and outcomes of delirium in trauma patients.

care and decrease lengths of stay. © 2004 Excerpta Medica, Inc. All rights reserved.

Keywords: Delirium; Age; Alcoholism; Surgery; Trauma; Wounds; Injuries

Delirium is a disturbance of attention, awareness, and cognition that is not better accounted for by a preexisting or evolving dementia [1]. It is a common complication of trauma, and its incidence is higher in certain patient populations [2], and tends to occur in patients who are older, have a history of alcoholism, and who are admitted to the hospital from a nursing home or long-term care facility. Several characteristics have been identified as risk factors for delirium among the elderly, including low social interactions or "polypharmacy" [3]; dementia [4,5]; infection, especially of the urinary tract [6,7]; low serum albumin

DTs
12%

problems, cognitive impairment or sensory deficits, such as visual or hearing impairment [9]; hypoxia prior to admission [10]; fracture on admission [6]; psychoactive drug use, severe hypothermia or hypothermia [11]; electrolyte abnormalities; and an "unstable" condition on admission. A meta-analysis of 26 surgical studies involving 1,140 patients, the overall prevalence of postoperative delirium was noted to be 11.4% in a study of 500 consecutive patients undergoing "major elective surgery" [13]. Risk factors for postoperative delirium include: biochemical

Risk Factors for Delirium in Trauma Patients: The Impact of Ethanol Use and Lack of Insurance

BERNARDINO C. BRANCO, M.D.,* KENJI INABA, M.D.,* MARKO BUKUR, M.D.,† PEEP TALVING, M.D., Ph.D.,*
MATTHEW OLIVER, M.D.,* JEAN-STEPHANE DAVID, M.D.,‡ LYDIA LAM, M.D.,*
DEMETRIOS DEMETRIADES, M.D., Ph.D.*

2011

From the *Division of Trauma and Surgical Critical Care, University of Southern California, Los Angeles, California; †Division of Trauma and Critical Care, Cedars-Sinai Medical Center, Los Angeles, California; and the ‡Department of Anesthesiology & Critical Care, Lyon-Sud Hospital, Hospital Civilis de Lyon and Claude Bernard University, Lyon, France

NTDB Study
2002-2006
5-yr REG review
ETOH Level Drawn
n=504,839

The alcohol use history of patients was determined by reviewing the medical records of patients who were admitted to the hospital from 2002 to 2006. The incidence of delirium was higher in patients who were older, had a history of alcoholism, and who were admitted to the hospital from a nursing home or long-term care facility.

helpful in designing interventions to prevent delirium.

THE DEVELOPMENT OF DELIRIUM during hospital admission is associated with a variety of risk factors, including age, alcoholism, and the lack of logistic support [1]. Previous reports have documented that delirium is associated with higher rates of mortality, prolonged length of stay (LOS) and hospital charges, and increased costs [2-4]. More recent studies have shown that delirium is associated with a higher risk of mortality and increased costs [5-7]. The purpose of this study was to examine the prevalence of delirium in an acutely injured patient cohort and to identify independent risk factors for its development.

DTs
0.6%

Occurrence, Predictors, and Prognosis of Alcohol Withdrawal Syndrome and Delirium Tremens Following Traumatic Injury 2017

Kristin Salottolo, MPH¹⁻⁴; Emmett McGuire, MD¹; Charles W. Mains, MD²;
Erika C. van Doorn, MD³; David Bar-Or, MD¹⁻⁵

3 Trauma Centers
2010-2014
5-yr REG review
n=28,101

Objectives: We sought to determine the occurrence, predictors, and prognosis of alcohol withdrawal syndrome and delirium tremens in patients with traumatic injury.
Design: Retrospective cohort study.
Setting: Three Level I trauma centers.
Patients: Twenty-eight thousand one hundred and one patients admitted from 2010 to 2014.
Interventions: None.
Measurements: The incidence of alcohol withdrawal syndrome and delirium tremens was determined by reviewing the medical records of patients who were admitted to the hospital from 2010 to 2014.

Characteristics, risk factors for alcohol withdrawal syndrome, clinical outcomes, pharmacologic treatment for alcohol withdrawal syndrome, and Clinical Institute Withdrawal Assessment for Alcohol, Revised (CIWA-Ar) scores. Alcohol withdrawal syndrome severity was defined by CIWA-Ar score as mild (5-10), moderate (10-20), and severe (> 20). Alcohol withdrawal syndrome developed in 0.88% (n = 246), including 10% mild, 53% moderate, and 37% severe. Alcohol withdrawal syndrome severity was associated with delirium tremens in 11%. Before multivariate analysis, the following predictors of delirium tremens were associated with delirium tremens: baseline CIWA-Ar score, age, and severe head injury. The purpose of this study was to examine the prevalence of delirium in an acutely injured patient cohort and to identify independent risk factors for its development.

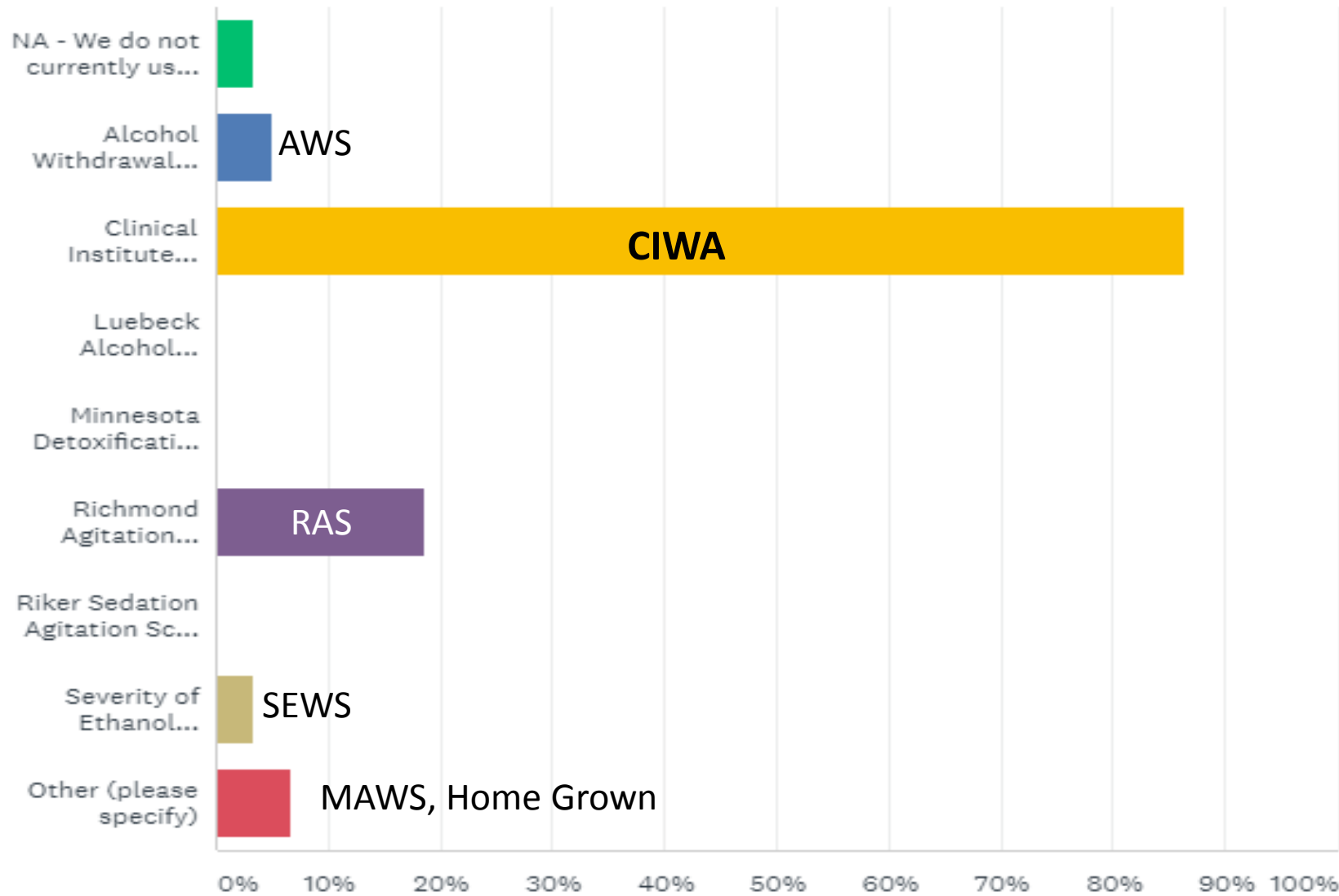
delirium tremens was defined by CIWA-Ar score as mild (5-10), moderate (10-20), and severe (> 20). Alcohol withdrawal syndrome developed in 0.88% (n = 246), including 10% mild, 53% moderate, and 37% severe. Alcohol withdrawal syndrome severity was associated with delirium tremens in 11%. Before multivariate analysis, the following predictors of delirium tremens were associated with delirium tremens: baseline CIWA-Ar score, age, and severe head injury. The purpose of this study was to examine the prevalence of delirium in an acutely injured patient cohort and to identify independent risk factors for its development.

Key Words: alcohol withdrawal syndrome; Clinical Institute Withdrawal Assessment for alcohol; delirium tremens; mortality

DTs
11%

Which of the following ICU scoring tools are used to assess and manage alcohol withdrawal?

Answered: 59 Skipped: 0



Clinical Institute for Withdrawal Assessment for Alcohol (CIWA-Ar) *revised*

Lists 10 Signs & Symptoms

1. Agitation
 2. Anxiety
 3. Headache
 4. N&V
 5. Auditory disturbances
 6. Tactile disturbances
 7. Visual disturbances
 8. Paroxysmal sweats
 9. Tremor
 10. Orientation (0-4)
- (0-7)

Score	Withdrawal
<8	Absent
9-14	Mild
15-20	Moderate
>20	Severe

Scores range from 0-67

- **>8-10 trigger for intervention**
- Cons:
 - Requires patient cooperation
 - Subjective
 - ≈ 5-15 minutes to complete?
 - Confounded by trauma – critical illness

APPENDIX 1. (Continued). Revised Clinical Institute Withdrawal Assessment for Alcohol Scale

Assessment Protocol a. Vitals, assessment now. b. If initial score ≥ 8 repeat q1h \times 8 hr, then if stable q2h \times 8 hr, then if stable q4h. c. If initial score < 8 , assess q4h \times 72 hr. If score < 8 for 72 hr, d/c assessment. If score ≥ 8 at any time, go to (b) above. d. If indicated (see indications below) Administer PRN medications as ordered and record on MAR and below.	Date																
	Time																
	Pulse																
	RR																
	O ₂ sat																
Blood pressure																	
Assess and rate each of the following (CIWA-Ar):		Refer to reverse for detailed instructions in use of the CIWA-Ar															
Nausea/vomiting (0–7) 0: none; 1: mild nausea, no vomiting; 4: intermittent nausea; 7: constant nausea, frequent dry heaves and vomiting																	
Tremors (0–7) 0: no tremor; 1: not visible but can be felt; 4: moderate with arms extended; 7: severe, even with arms not extended																	
Anxiety (0–7) 0: none, at ease; 1: mildly anxious; 4: moderately anxious or guarded; 7: equivalent to acute panic state																	
Agitation (0–7) 0: normal activity; 1: somewhat normal activity; 4: moderately fidgety/restless; 7: paces or constantly thrashes about																	
Paroxysmal sweats (0–7) 0: no sweats; 1: barely perceptible sweating, palms moist; 4: beads of sweat obvious on forehead; 7: drenching sweat																	
Orientation (0–4) 0: oriented; 1: uncertain about date; 2: disoriented to date by ≤ 2 d; 3: disoriented to date by > 2 d; 4: disoriented to place and/or person																	
Tactile disturbances (0–7) 0: none; 1: very mild itch, pins and needle sensation, numbness; 2: mild itch, pins and needle sensation, burning, numbness; 3: moderate itch, pins and needle sensation, burning, numbness; 4: moderate hallucinations; 5: severe hallucinations; 6: extremely severe hallucinations; 7: continuous hallucinations																	
Auditory disturbances (0–7) 0: not present; 1: very mild harshness/ability to startle; 2: mild harshness, ability to startle; 3: moderate harshness, ability to startle; 4: moderate hallucinations; 5: severe hallucinations; 6: extremely severe hallucinations; 7: continuous hallucinations																	
Visual disturbances (0–7) 0: not present; 1: very mild sensitivity; 2: mild sensitivity; 3: moderate sensitivity; 4: moderate hallucinations; 5: severe hallucinations; 6: extremely severe hallucinations; 7: continuous hallucinations																	
Headache (0–7) 0: not present; 1: very mild; 2: mild; 3: moderate; 4: moderately severe; 5: severe; 6: very severe; 7: extremely severe																	
Total CIWA-Ar score																	
	Dose given (mg):																
	Route:																
Time of PRN medication administration:																	
Assessment of response (CIWA-Ar score 30–60 min after medication administered)																	
RN initials																	

Scale for scoring:
Total score =
0–9: absent or minimal withdrawal
10–19: mild to moderate withdrawal
> 20: severe withdrawal

Indications for PRN medication:
a. Total CIWA-Ar score 8 or higher if ordered PRN only (symptom-triggered method)
b. Total CIWA-Ar score 15 or higher if on scheduled medication (scheduled + PRN method)
Consider transfer to ICU for any of the following: Total score above 35, q1h assess. \times > 8 hr required, > 4 mg/hr lorazepam \times 3 hr or 20 mg/hr diazepam \times 3 hr required, or resp. distress.

Patient identification (Addressograph)	
--	--

Signature/Title	Initials	Signature/ Title	Initials
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Efficacy and safety of pharmacological interventions for the treatment of the Alcohol Withdrawal Syndrome (Review)

Amato L, Minozzi S, Davoli M

2011 Systematic Review

Amato L, Minozzi S, Davoli M.
Efficacy and safety of pharmacological interventions for the treatment of the Alcohol Withdrawal Syndrome.
Cochrane Database of Systematic Reviews 2011, Issue 6. Art. No.: CD008537.
DOI: 10.1002/14651858.CD008537.pub2.

www.cochranelibrary.com

Early recognition & treatment of AWS with benzodiazepines:

- ↓ duration & severity of AWS symptoms
- Protective benefit against seizures
- ↓ mortality associated with DTs

Quality of Evidence:

- High 3%
- Mod 28%
- Low 48%
- Very Low 20%

Benzodiazepines (BZD)

Generic	Brand	Onset	Safe for Liver Dysf	Half-life (hrs)	Anti-Seizure Effects
Diazepam	Valium	1-5 min IV		100	15-30 min
Midazolam	Versed	2-5 min IV		2	
Lorazepam	Ativan	5-20 min IV	Yes	14	12-24 hrs
Oxazepam	Serax	2-3 h PO	Yes	8	
Chlordiazepoxide	Librium	2-3 h PO		100	15-30 min

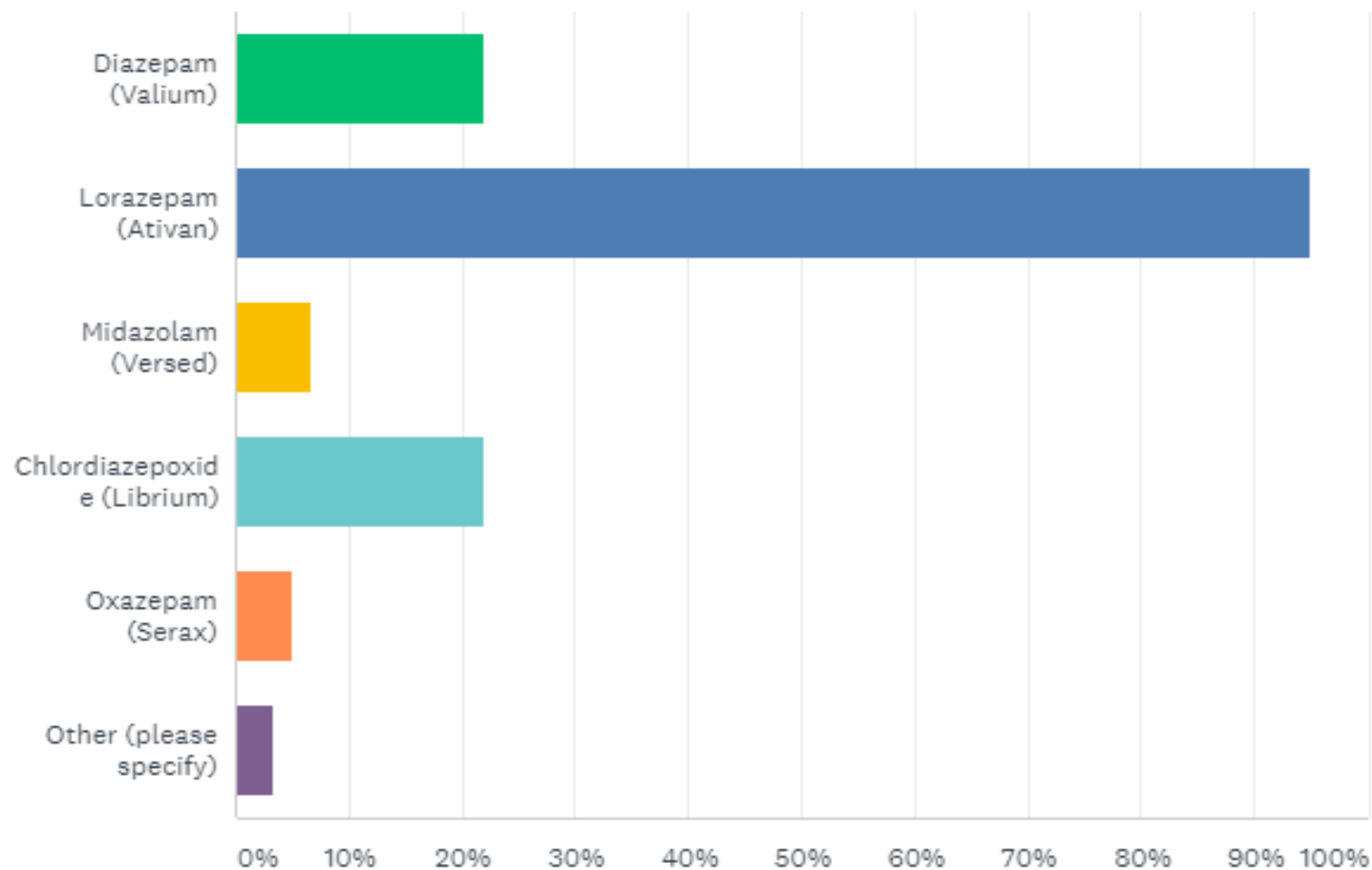
Repeated escalating doses as needed

No max dose

Diazepam as high as 2,000 mg/day

For moderate to severe alcohol withdrawal in the ICU, which Benzodiazepines do you primarily use (Check all that apply)

Answered: 59 Skipped: 1



Treatment Strategies - Timing

Fixed Tapered Regimen

- Historically BZDs administered in scheduled fashion
- Gradually tapered over 4-7 days

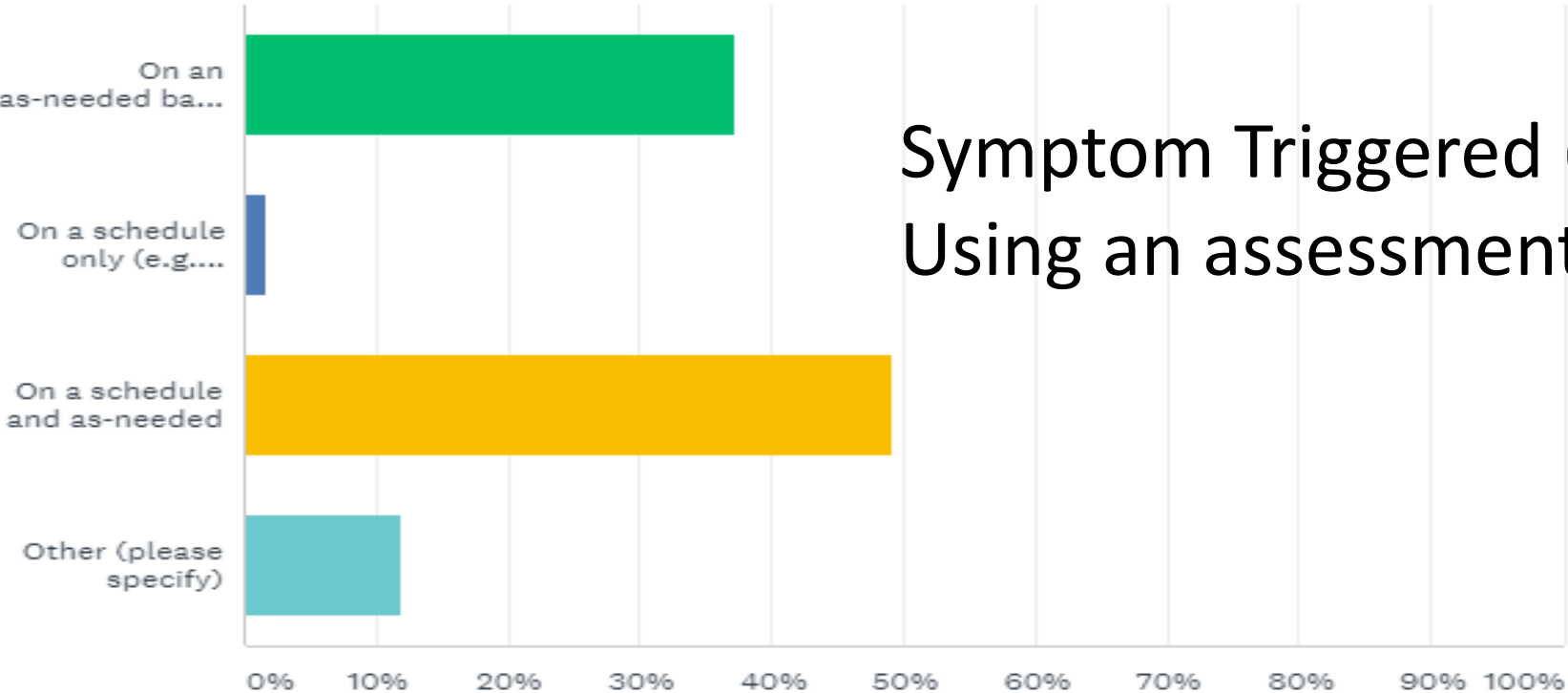


Symptom Triggered Regimen

- Use of validated assessment tool
- Early aggressive tx:
 - ↓ severity & duration AWS
 - ↓ benzo drug dosage
 - ↓ vent & ICU days

How would the Benzodiazepines be given?

Answered: 59 Skipped: 1

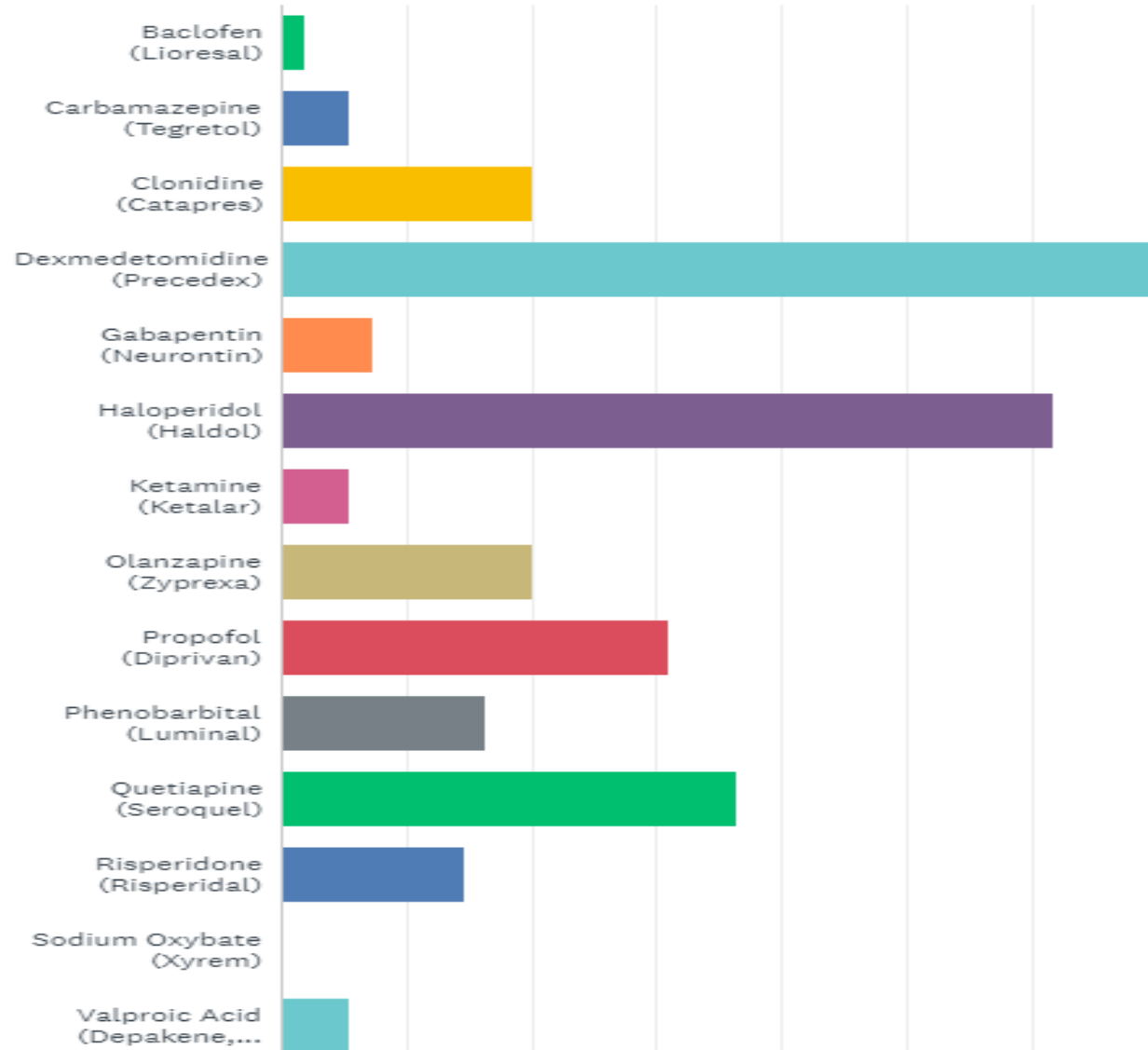


Symptom Triggered (PRN)
Using an assessment scale

ANSWER CHOICES	RESPONSES	
On an as-needed basis (PRN) only	37.29%	22
On a schedule only (e.g. every 6 hours)	1.69%	1
On a schedule and as-needed	49.15%	29
Other (please specify)	11.86%	7
TOTAL		59

What other agents do you use as Benzodiazepine adjuncts? (check all that apply)

Answered: 55 Skipped: 4



Rank Order:

1. Dexmedetomidine
2. Haloperidol
3. Quetiapine
4. Propofol
5. Clonidine or Olanzapine
6. Phenobarb

Phenobarbital

- Binds to GABA receptors → prolongs Cl⁻ channel opening
- Outcomes similar to benzodiazepines
- **Most useful in severe AWS**
- Onset 5 minutes, peaks 30 min, half life 3-4 days
- Dose: 260mg IV followed by 130mg IV q 30 min to sedation
- Caution:
 - Narrow therapeutic index, long half life, making titration difficult
 - Higher likelihood of respiratory depression and coma → intubation


Phenobarbital

Syst Review Results:

Similar or improved outcomes compared to BZDs alone:

- AWS severity
- ↓ BZD
- ICU adm
- MV
- ICU/H LOS

Patient Outcomes Associated With Phenobarbital Use With or Without Benzodiazepines for Alcohol Withdrawal Syndrome: A Systematic Review

Hospital Pharmacy
2017, Vol. 52(9) 607–616
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DOI: 10.1177/0018578717720310
journals.sagepub.com/home/hpx


2017

Drayton A. Hammond¹, Jordan M. Rowe², Adrian Wong³,
Tessa L. Wiley⁴, Kristen C. Lee⁵, and Sandra L. Kane-Gill⁶

Abstract

Purpose: Benzodiazepines are the drug of choice for alcohol withdrawal syndrome (AWS); however, phenobarbital is an alternative agent used with or without concomitant benzodiazepine therapy. In this systematic review, we evaluate patient outcomes with phenobarbital for AWS. **Methods:** Medline, Cochrane Library, and Scopus were searched from 1950 through February 2017 for controlled trials and observational studies using ["phenobarbital" or "barbiturate"] and ["alcohol withdrawal" or "delirium tremens."] Risk of bias was assessed using tools recommended by National Heart, Lung, and Blood Institute. **Results:** From 294 nonduplicative articles, 4 controlled trials and 5 observational studies (n = 720) for AWS of any severity were included. Studies were of good quality (n = 2), fair (n = 4), and poor (n = 3). In 6 studies describing phenobarbital without concomitant benzodiazepine therapy, phenobarbital decreased AWS symptoms ($P < .00001$) and displayed similar rates of treatment failure versus comparator therapies (38% vs 29%). A study with 2 cohorts showed similar rates of intensive care unit (ICU) admission (phenobarbital: 16% and 9% vs benzodiazepine: 14%) and hospital length of stay (phenobarbital: 5.85 and 5.30 days vs benzodiazepine: 6.64 days). In 4 studies describing phenobarbital with concomitant benzodiazepine therapy, phenobarbital groups had similar ICU admission rates (8% vs 25%), decreased mechanical ventilation (21.9% vs 47.3%), decreased benzodiazepine requirements by 50% to 90%, and similar ICU and hospital lengths of stay and AWS symptom resolution versus comparator groups. Adverse effects with phenobarbital, including dizziness and drowsiness, rarely occurred. **Conclusion:** Phenobarbital, with or without concomitant benzodiazepines, may provide similar or improved outcomes when compared with alternative therapies, including benzodiazepines alone.

Dexmedetomidine (Precedex)

alpha₂ agonist

- alpha₂ adrenergic agonist- ↓ sympathetic outflow – ↓ norepinephrine
- Reduces autonomic symptoms with less sedation than Clonidine
- Rapid onset (≈15 min), short half life (2 hr), titratable
- Continuous Infusion: 0.2 to 0.7 ug/kg/h titrated to effect
- Produces calm wakefulness without respiratory depression
- Adverse effects: bradycardia (titratable)
- Consistently reported to lower BZD requirements

2015 Systematic Review:

- Dexmedetomidine + BZD superior to BZD alone in ICU patients with DTs:
 - ↓ delirium ↓ CIWA & RASS scores

Haloperidol (Haldol)

Antipsychotics

- Neuroleptic antipsychotic with dopaminergic blocking activity
- Used to control **severe agitation/hallucinations**
- 0.5-5.0 mg IV or IM q30-60 min (not to exceed 20mg) *OR*
- 0.5-5.0 mg PO q4hr up to 30mg

Caution

- lowers seizure threshold
 - **prolongs QT interval**
- Associated with higher mortality, longer delirium, ↑ risk of seizures
- **Reserve for pts in AWS with underlying psychiatric disorders**
- Others antipsychotics: risperidone, quetiapine, olanzapine

Anticonvulsants - Mild to Mod AWS only

Currently no role in withdrawal seizures

- “Antikindling effect” blocks progressive neuronal sensitization with repeat AWS
- **Phenytoin** (Dilantin) – ineffective → avoid
- **Carbamazepine** (Tegretol)
 - 600-800mg po daily tapered over 5 days to 200mg
 - Superior to placebo & noninferior to BZDs
 - Side Effects: N&V, Stevens Johnson, agranulocytosis
 - Multiple drug interactions
- **Valproic Acid** (Depakote)
 - 400-500 mg po TID
 - Superior to placebo ↓ AWS symptoms & seizures
 - Caution in liver impairment (↑LFT's)
- **Under study**: gabapentin, pregabalin, tiagabine, vigabatrin, lamotrigine, topiramate, zonisamide, levetiracetam, oxcarbazepine

2014 Systematic Review

Most studies methodologically flawed

Lack of validated scale use

Underpowered to examine seizures/DTs as outcomes

Routine use NOT currently recommended

Propofol (Diprivan)

Anesthetic

- Anesthetic- GABA agonist, inhibits NMDA receptors
- Used as “**Rescue**” med for severe AWS → ICU on vent
- Used when high dose benzodiazepine and phenobarbital fail
- Rapid onset, short half-life, easy to titrate
- 0.5–1.25 mg/kg, up to 4mg/kg/hr, for up to 48 hrs
- Side Effect: bradycardia & hypotension
- Higher incidence of cardiovascular effects, mechanical ventilation, pneumonia

Ketamine

- Antagonizes NMDA receptor
- Few small retrospective studies for severe AWS
- Reduce BZDs, ↓ intubation, ↓ ICU LOS
- Continuous Infusion: 0.15-0.3 mg/kg/hr until delirium resolved

Beta Blockers

- B-adrenergic antagonists -reduce AWS autonomic symptoms
- Primarily reserved for AWS patients with coronary artery disease
- Atenolol (Tenormin) most commonly used
- Avoid Propranolol → worsens delirium

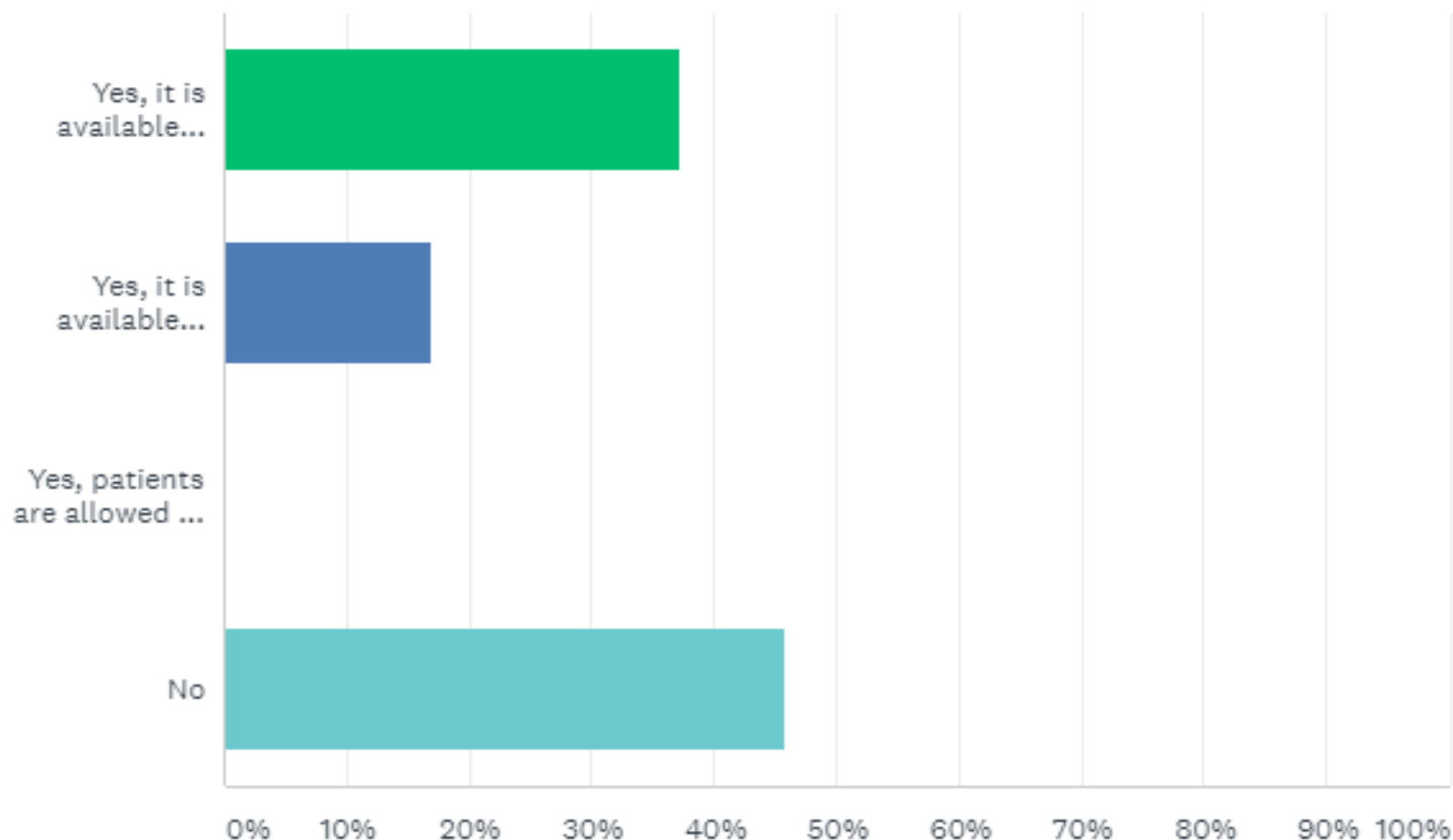
Alcohol

As Treatment



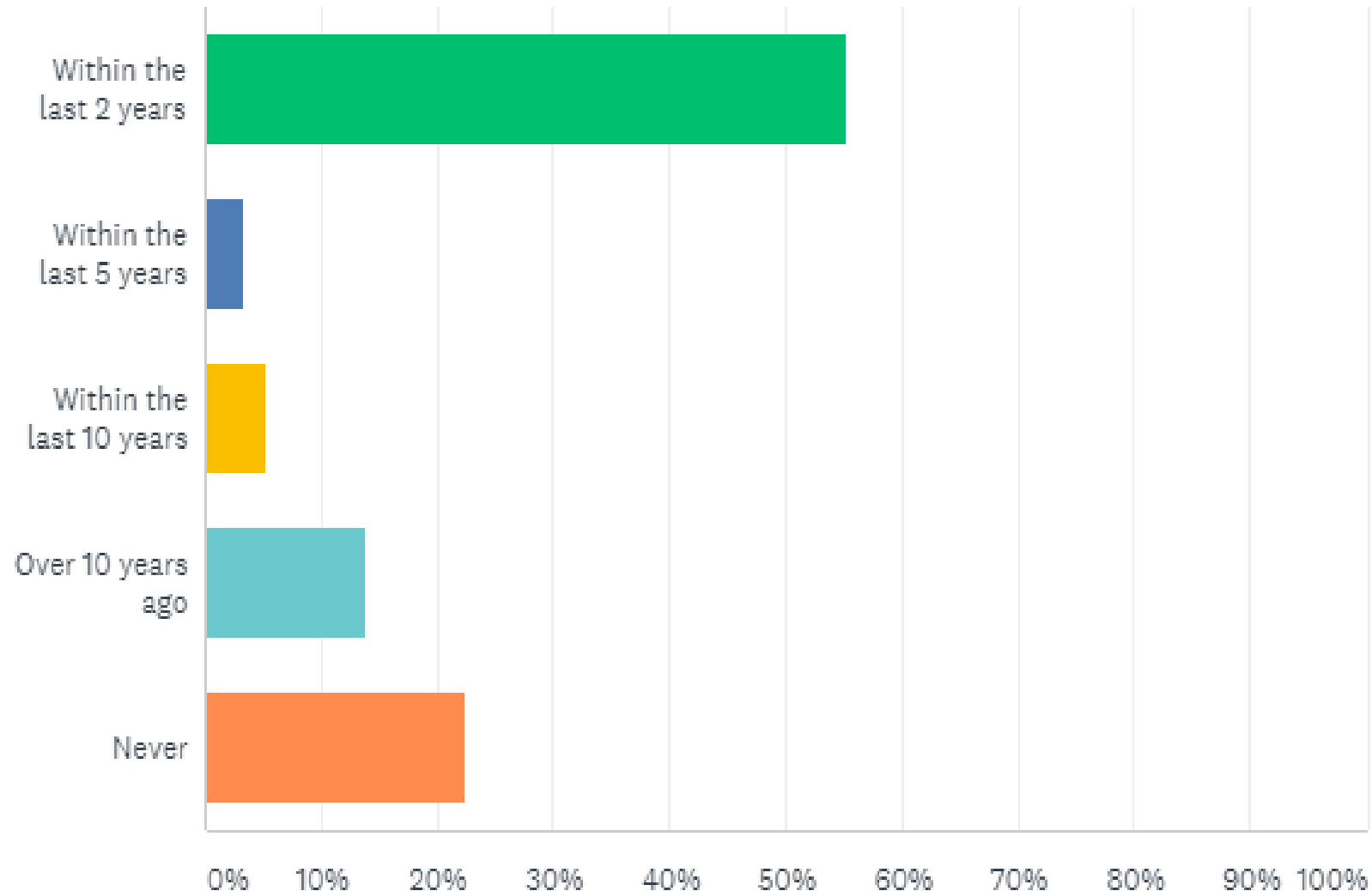
Does your institution currently allow alcohol for the management of alcohol withdrawal?

Answered: 59 Skipped: 0



When was the last time you gave alcohol for alcohol withdrawal syndrome?

Answered: 58 Skipped: 1



Published in final edited form as:

Am J Crit Care. 2013 September ; 22(5): 398–4

Cardiac Care

Alcohol Withdrawal Prevention: A Randomized Evaluation of Lorazepam and Ethanol (AWARE) Pilot Study

Coronary Care Unit: n=59

CAGE→Beer/vodka PO/NG q4 hr vs Lorazepam
Equivalent efficacy = viable option

The Journal of TRAUMA® Injury, Infection, and Critical Care

2008 Journal of Trauma

Comparison of Intravenous Ethanol for Alcohol Withdrawal Prophylaxis: Results of a Randomized Trial

Jordan A. Weinberg, MD, Louis J. Magnotti, MD, Peter L. ...
Thomas Schroepel, MD, Timothy C. Fabian, MD, and Martin A. Croce, MD

Trauma ICU: n=50

IV ETOH vs Diazepam
ETOH No advantage

Background: Although benzodiazepines are the recommended first-line treatment for alcohol withdrawal, a history of chronic daily alcohol consumption greater than or equal to five standard drinks per day is associated with a higher risk of mortality in a cohort of patients who deviated from a score of 4 during the course of treatment ($p =$

2006 JACS

An Ethanol Protocol To Prevent Alcohol Withdrawal Syndrome

Sharmila Dissanaiké, MD, Ari Halldorsson, MD, FACS, ...

Surgical ICU: n=76

Pre-protocol IV ETOH vs Post-Protocol IV ETOH
Reduced duration of treatment = viable option

BACKGROUND: Alcohol withdrawal syndrome (AWS) is a common complication of sudden onset abstinence. It is usually characterized by tremor, anxiety, agitation, and tachycardia, but, if untreated, can progress to seizures, delirium, and death.

2000 Addiction Specialist:

To my consternation.... surgical textbooks have advocated giving ethanol IV for alcohol withdrawal. It is more toxic than benzodiazepines, harder to administer and requires monitoring of blood levels not to mention the fact that it condones the use of alcohol”

Alcohol

- Difficult to titration
 - short duration
 - narrow therapeutic window
 - can lower seizure threshold
- Adverse events
- Lack of efficacy compared to BZDs
- Minimal to weak research support
- Not recommended

Ethanol for alcohol withdrawal: The end of an era

J Trauma Acute Care Surg 2013

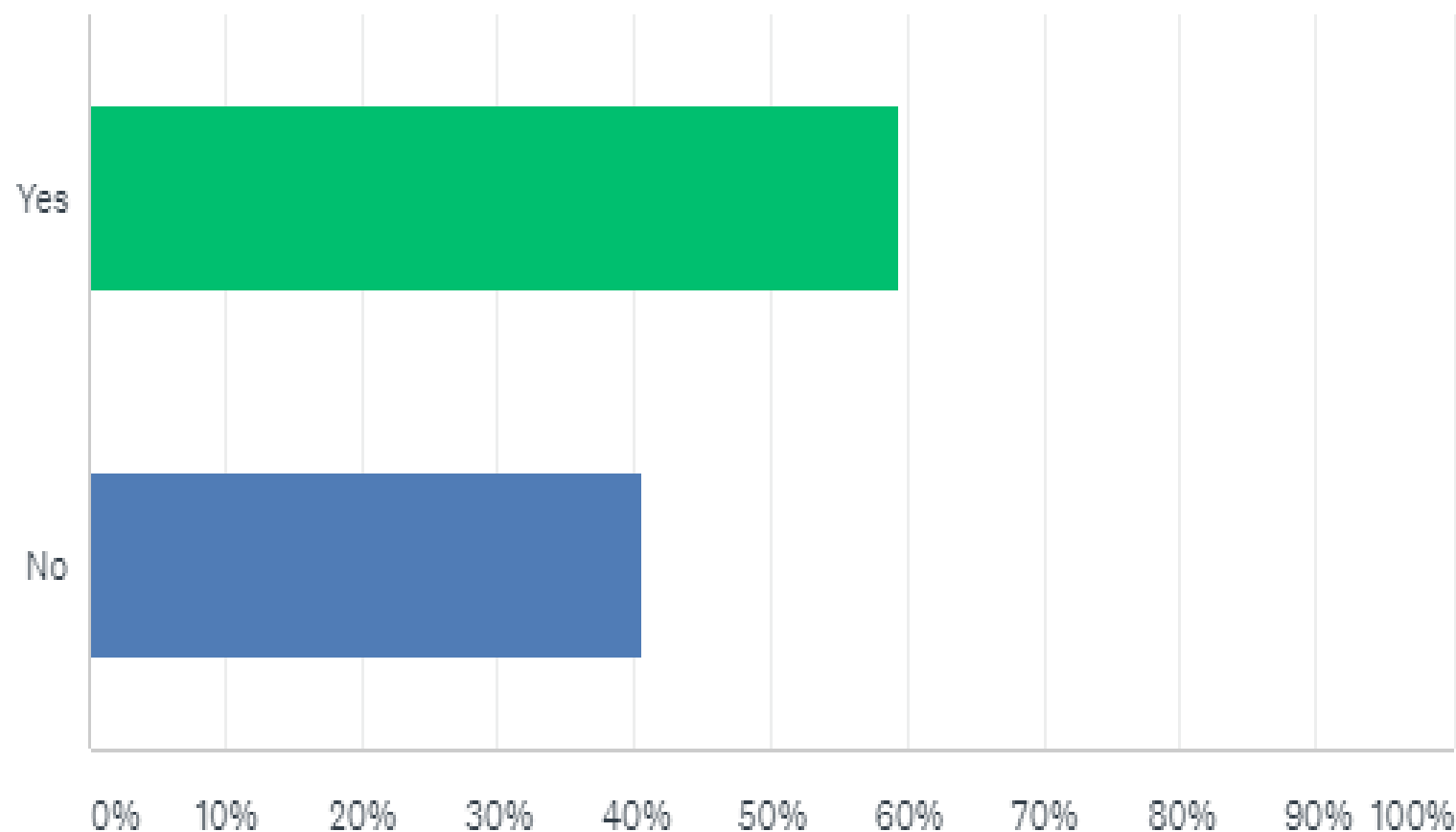
Blair Walker, MD, Mary Anderson, MD, FAPM, Lawrence Hauser, MD, FAPM,
and Isela Werchan, MD, Austin, Texas

A substantial number of patients presenting with severe trauma, other surgical emergencies, and elective surgery effectively is imperative as the risk of going into withdrawal and developing withdrawal seizures or delirium tremens (DT)



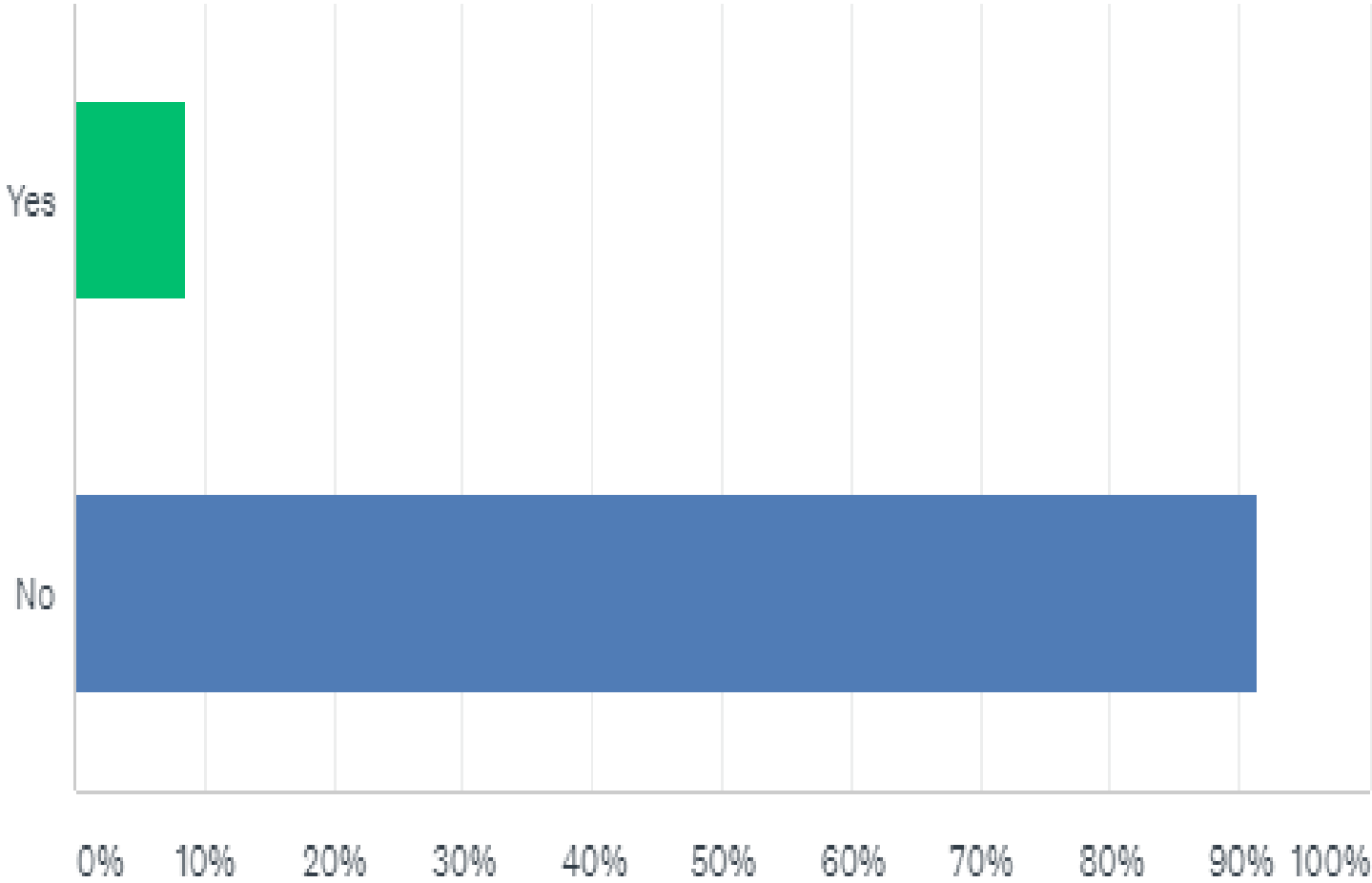
Do you have access to a substance abuse service or specialist for AWS consults?

Answered: 59 Skipped: 0



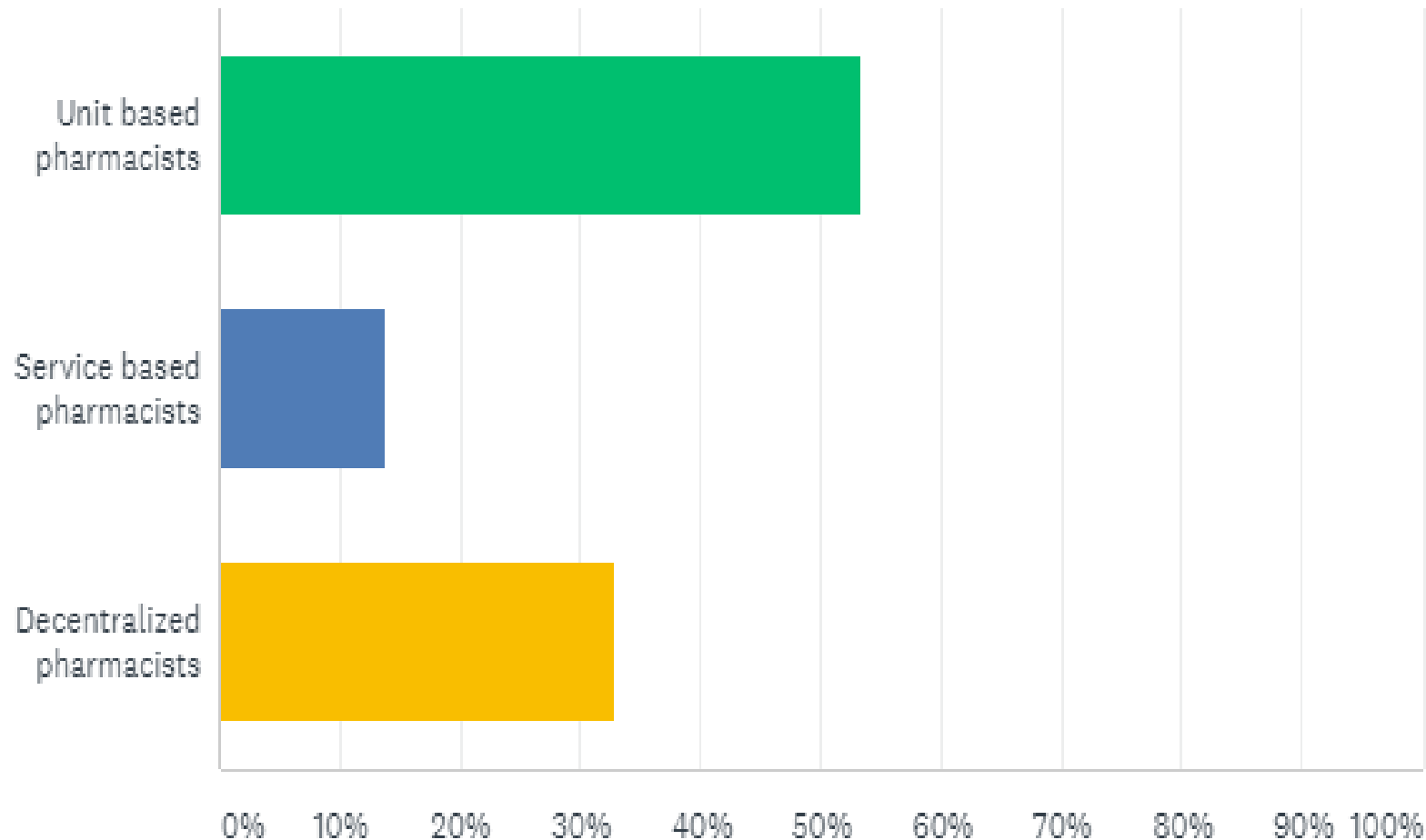
Does your institution have a dedicated drug and alcohol withdrawal unit?

Answered: 59 Skipped: 0



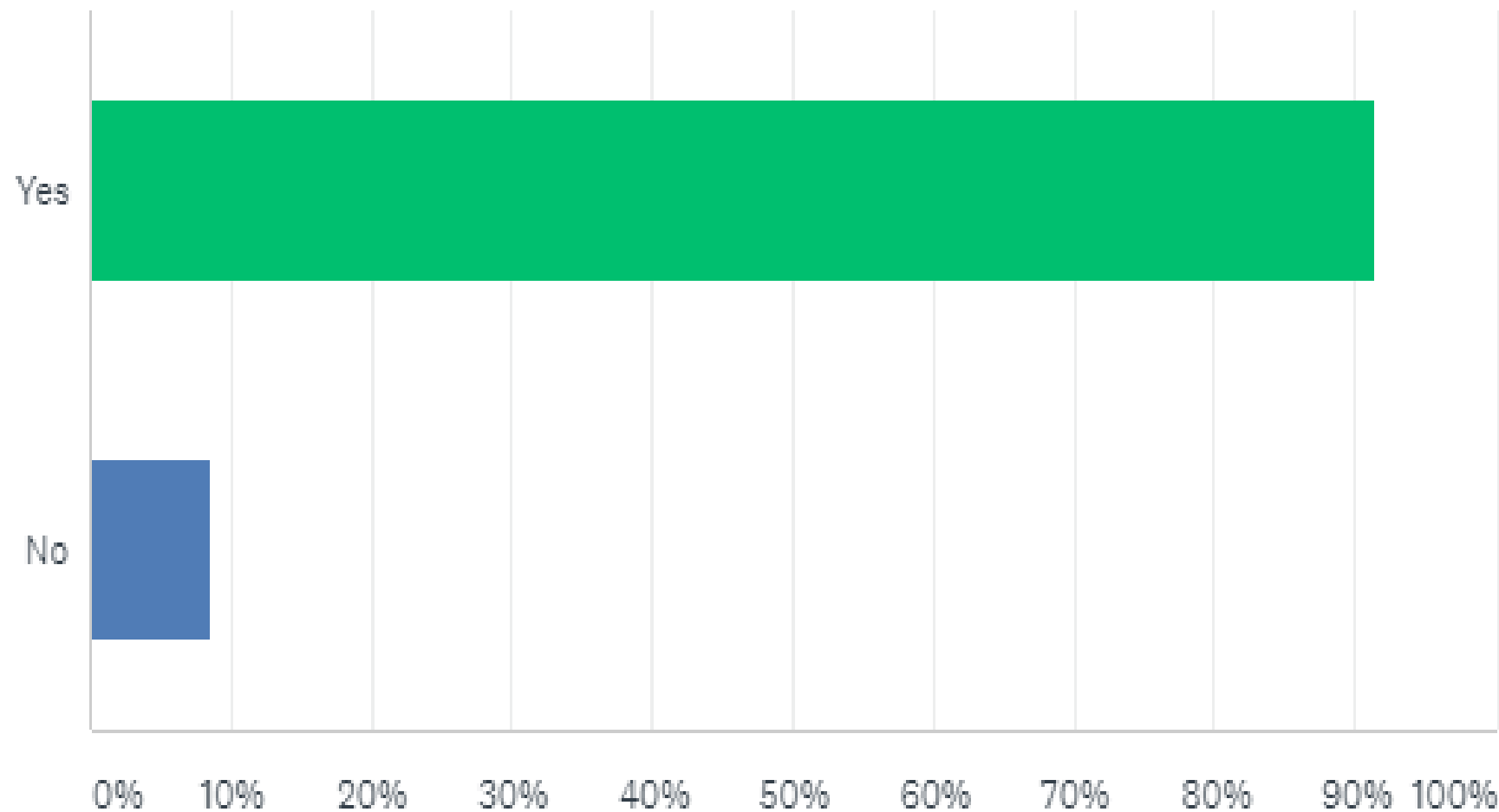
Which of the following describes your access to clinical pharmacists to assist with AWS?

Answered: 58 Skipped: 1



Does your ICU have an AWS protocol/guideline in place?

Answered: 58 Skipped: 1



University of Michigan

SICU Alcohol Withdrawal Protocol

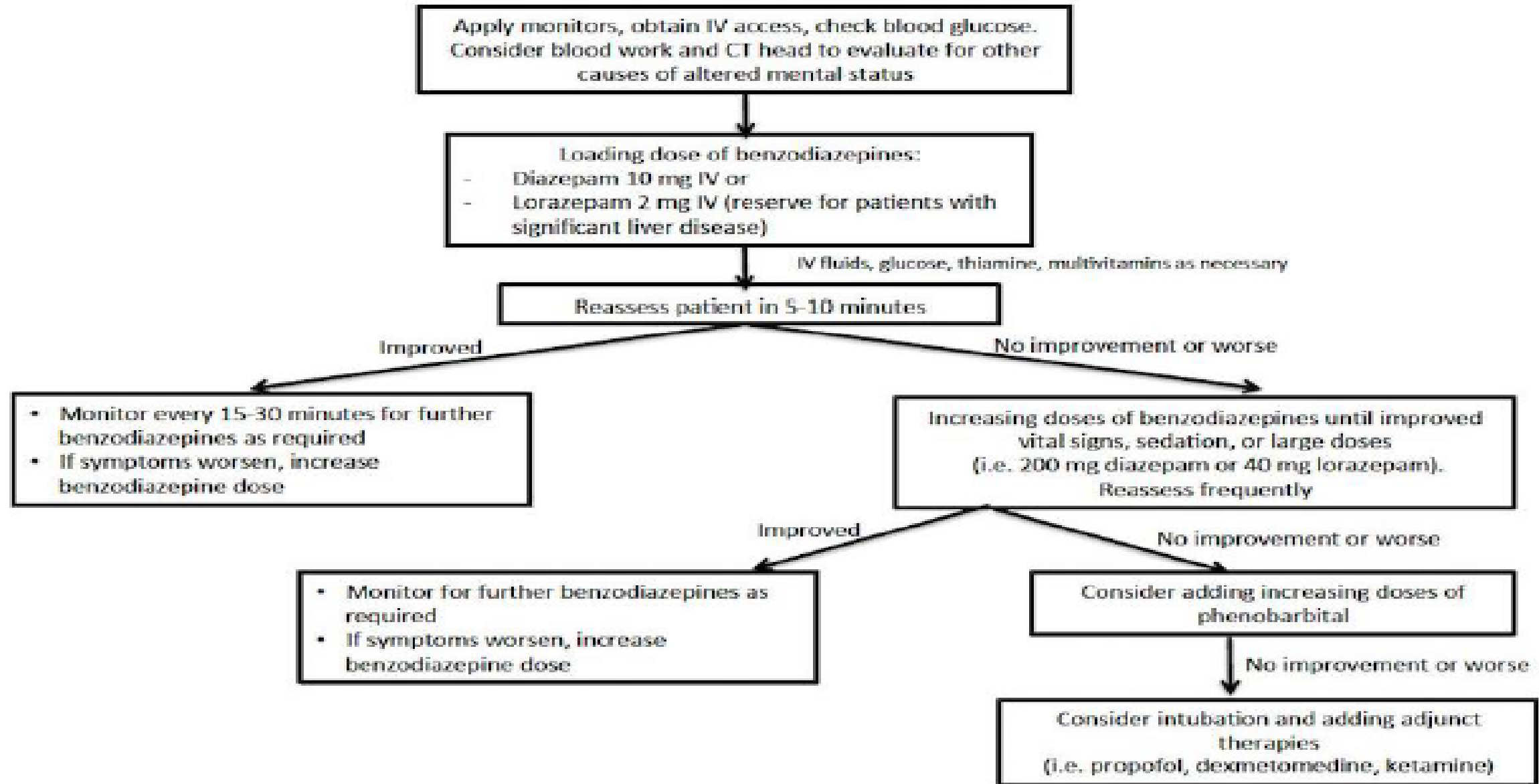
Patients admitted to SICU with alcohol history at high risk for withdrawal (no detox prior to surgery):

1. Foundation enteral ativan dosing: Enteral ativan 1 mg q 4 hours RTC – hold only if too sedated
2. Initiate MAWS protocol on SICU arrival, calculate next 24 hr Ativan dose given, and increase enteral Ativan dosing, continue on a daily basis. Enteral Ativan will be weaned after SICU d/c.
3. For severe alcohol withdrawal unresponsive to MAWS protocol, initiate Severe Alcohol Withdrawal protocol below:

Algorithm for Management of Severe Alcohol Withdrawal

Algorithm for Management of Severe Alcohol Withdrawal

Approach to the Patient with Severe Alcohol Withdrawal



U of M Adjuncts

Drug	Dose	Mechanism of Action	Monitoring
Phenobarbital	130 – 260 mg IV q 20 min OR 10 mg/kg IV over 1 hr	GABA Agonist	Hypotension Respiratory depression Bradycardia Thrombophlebitis
Propofol	5-80 mcg/kg/min IV (intubated)	GABA Agonist & NMDA Receptor Antagonist	Hypotension Respiratory depression Bradycardia
Dexmedetomidine	0.2 – 1.4 mcg/kg/hr IV	Alpha2 Agonist with sedative properties	Hypotension Bradycardia Respiratory depression
Ketamine	0.2 mg/kg/hr IV	NMDA Antagonist	Hypertension Tachycardia Sialorrhea Emergency reactions Laryngospasm

<https://emergencymedicinecases.com/alcohol-withdrawal-delirium-tremens/>

Yanta JH et al. Alcohol withdrawal syndrome: improving outcomes through early identification and aggressive treatment strategies. Emergency Medicine Practice June 2015;17(6): 1-20. www.ebmedicine.net

AWS Guidelines

- American Society of Addiction Medicine 2004 (2019)
- Royal College of Physicians 2010
- US Department of Defense 2015

AWS Performance Improvement

- AWS Complications: (Failure to Rescue?)
 - Delirium tremens
 - Hallucinosiis
 - Seizure
- AWS-related ICU admissions
- Intubations
- Vent days
- Total number of AWS meds used
- Total BZD dose
- Nosocomial pneumonia
- ICU & Hospital LOS

In Conclusion

- Best practice
 - Sedation assessment scoring tool
 - Symptom-triggered BZD escalation protocol
 - Select use of adjuncts
 - Reconsider role of Alcohol
 - Early aggressive symptom control → prevent progression

Conclusion

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