The Michigan Trauma Quality Improvement Program

Ypsilanti, MI

February 10, 2015

M·TQIP

Disclosures

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

Welcome/Introductions

- New Participants
  - Jonathan Saxe MD, TPD Sinai-Grace

Welcome/Introductions

- Guests
  - BCBS-Michigan
  - Virginia Commonwealth University
  - Wake Forest University
  - Digital Innovation

Welcome/Introductions

- BCBS-Michigan
  - David Share, MD, Senior Vice President, Health Care Value
  - Rozanne Darland, CQI Program Manager
  - Marc Cohen, CQI Program Manager

Welcome/Introductions

- Wake Forest University
  - Dr. Michael Chang, MD Associate Medical Director, Executive Director Trauma and Acute Care Surgery
  - Cynthia Mastropieri, Trauma Program Manager
- Virginia Commonwealth University
  - Dr. Guilherme Campos, MD PhD
  - Mary Beth Camacho, Associate Administrator
  - Luke Wolfe, MS

Welcome/Introductions

- Digital Innovation
  - John Kutcher, Chief Executive Officer
- Speakers
  - Pauline Park, MD
  - James Montie, MD
  - Susan Linsell, MHSA

ACS-TQIP

- Michigan Report
  - Executing contract for 2015 and 2016
  - Frequency
    - Two outcome reports per year
    - One custom report agreed on by TQIP and MTQIP
- No Invoices
  - 2015
  - 2016

Data Submission

- DI
  - XML written
  - Server configuration and software install
  - Test data
  - V5 Report Writer Files, MTQIP tab Installs
- February Submission
  - 7/1/2013 to 10/31/2014 (minimum)
- ArborMetrix Website
  - Aim for 1 month turnaround
  - Data submitted 10/3 available mid-November

Survey Results

- Surgeons n=14, TPM n=19
- Regional Reports
  - 94% Yes
- MTQIP RN Data abstractor
  - 94% Yes
- Retain individual PI project (MTQIP data)
  - 70% Yes
- Collaborative wide PI project (Aggregate)
  - 88% Yes

Future Meetings

- Spring (MCOT)
  - Wednesday May 13, 2015
  - Grand Rapids, Amway Grand Plaza Hotel
- Spring (Registrars)
  - Wednesday June 2, 2015
  - Ann Arbor, NCRC
- Fall
  - Tuesday October 13, 2015
  - Ypsilanti, EMU Marriott Conference Center
- Neurosurgery?

IVC Filters

Mark Hemmila, MD

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IVC Filters

- MTQIP Data
  - 1/1/2010 to 9/30/2014
  - ICD9 Procedure Code 38.7
- Exclusions
  - No signs of life
  - ISS < 9
  - Hospital days < 3

	N	%
None	38,315	97.4
IVC Filter	1,013	2.6
No VTE	38,424	97.7
VTE	904	2.3
No PE	39,057	99.3
PE	271	0.7
No DVT	38,626	98.2
DVT	702	1.8
Alive	37,912	96.4
Dead	1,416	3.6

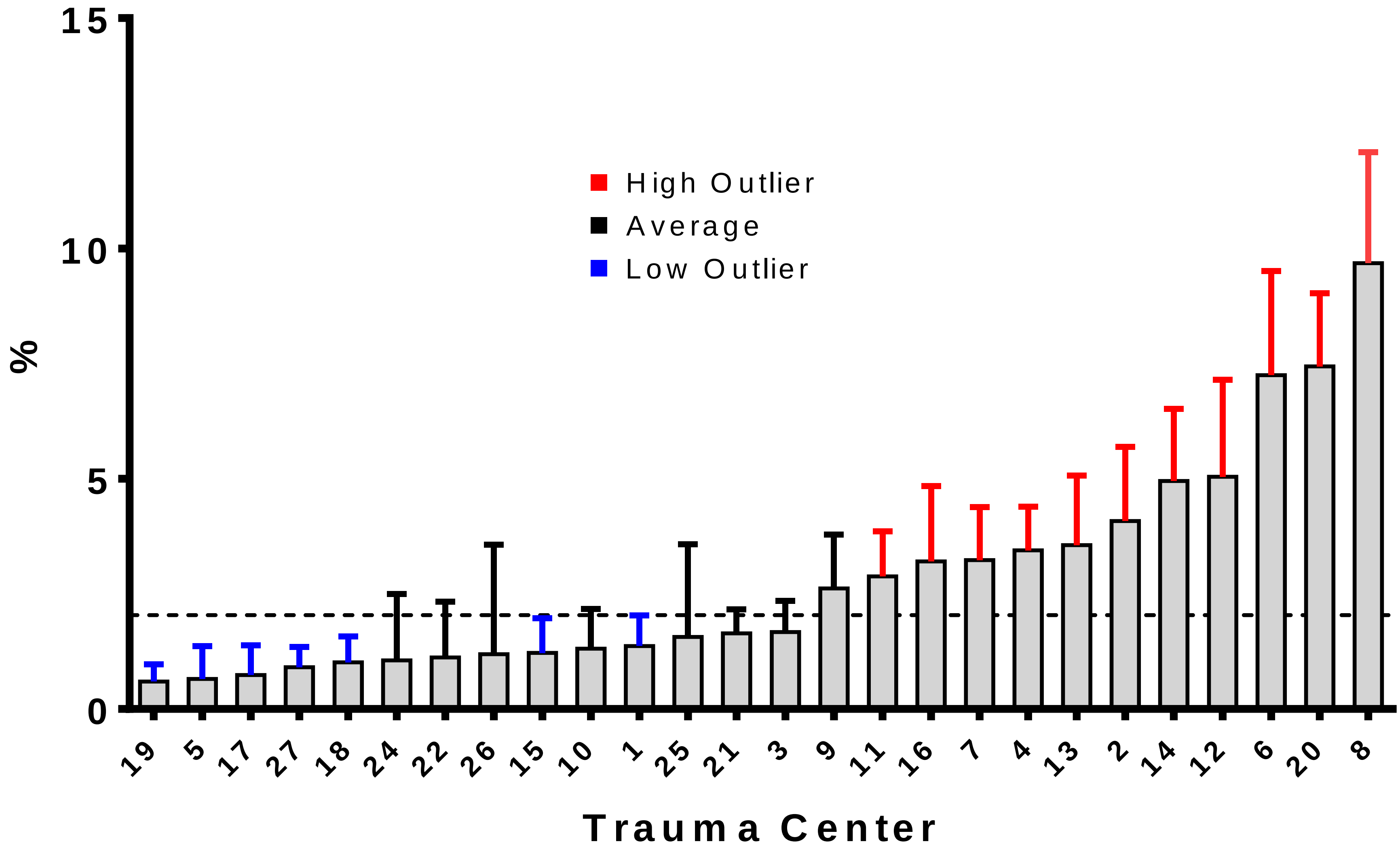
IVC Filters

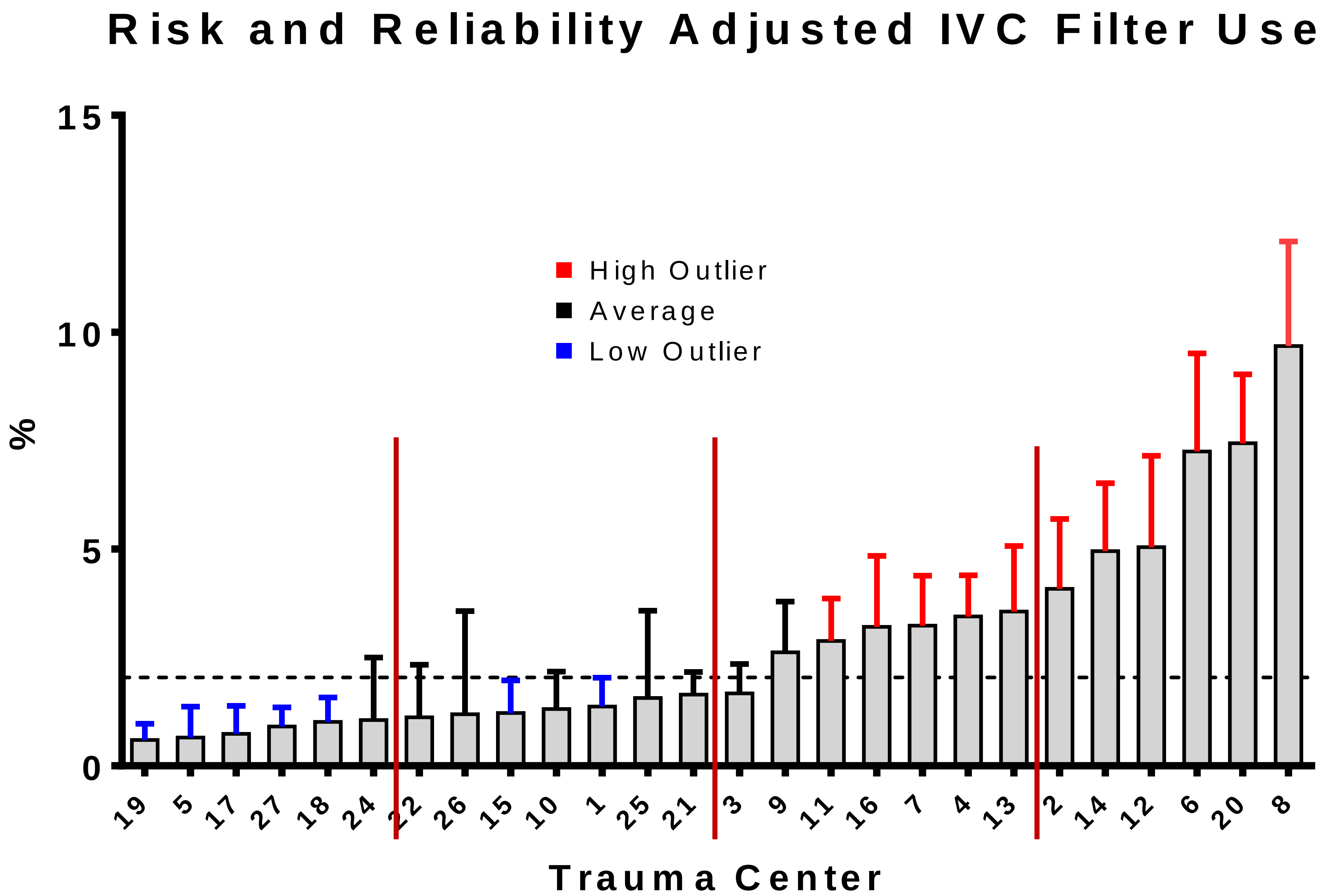
- Exclude if
  - IVC Filter Placement Date > VTE Event Date
    - 161 patients
  - IVC Filter Placed and VTE, but IVC Filter or VTE Event Date unknown
    - 53 patients

	N	%
None	38,315	98.0
IVC Filter	799	2.0
No VTE	38,424	98.2
VTE	690	1.8
Alive	37,708	96.4
Dead	1,406	3.6

	IVC Filter N	IVC Filter Y
No VTE	37,683	741
VTE	632 (1.6%)	58 (7.4%)

Risk and Reliability Adjusted IVC Filter Use

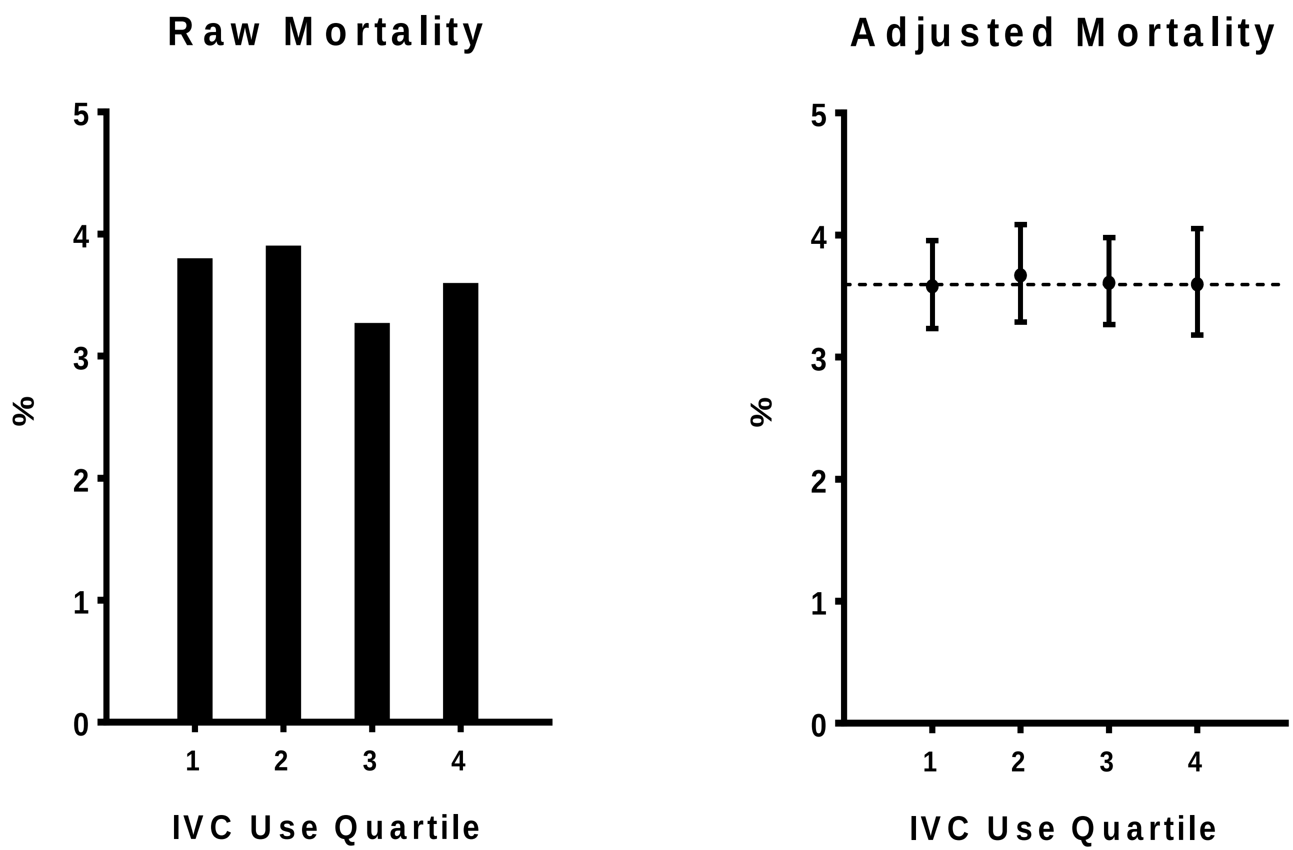


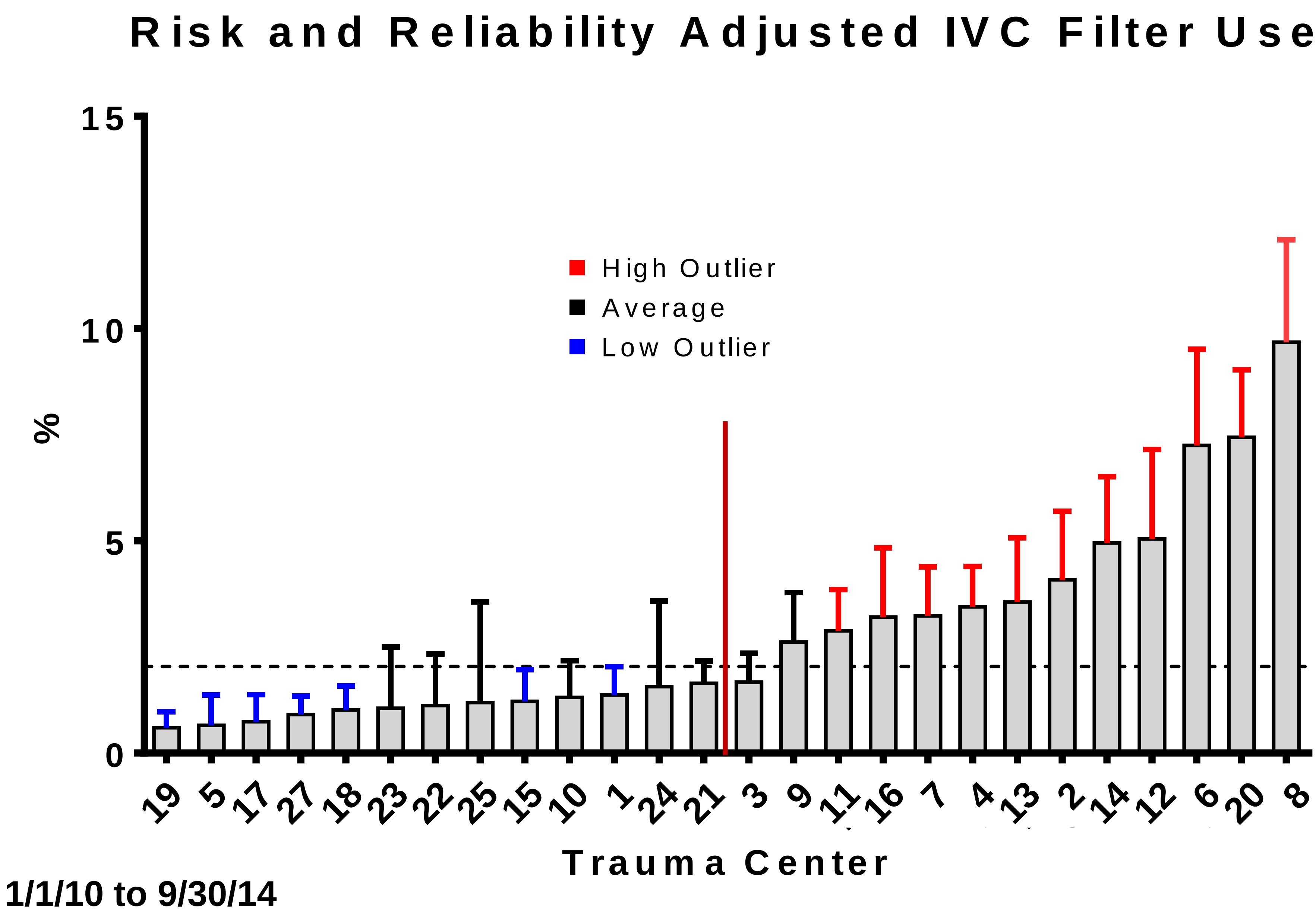

Risk and Reliability Adjusted IVC Filter Use
High Outlier
Average
Low Outlier
%
15
10
5
0
19
5
17
27
18
24
22
26
15
10
1
25
21
3
9
11
16
7
4
13
2
14
12
6
20
8
Trauma Center

Quartiles

	Quartile			
	1	2	3	4
No IVC Filter	10,302	8,512	12,251	7,250
IVC Filter	68	112	266	353
	0.7%	1.3%	2.1%	4.6%

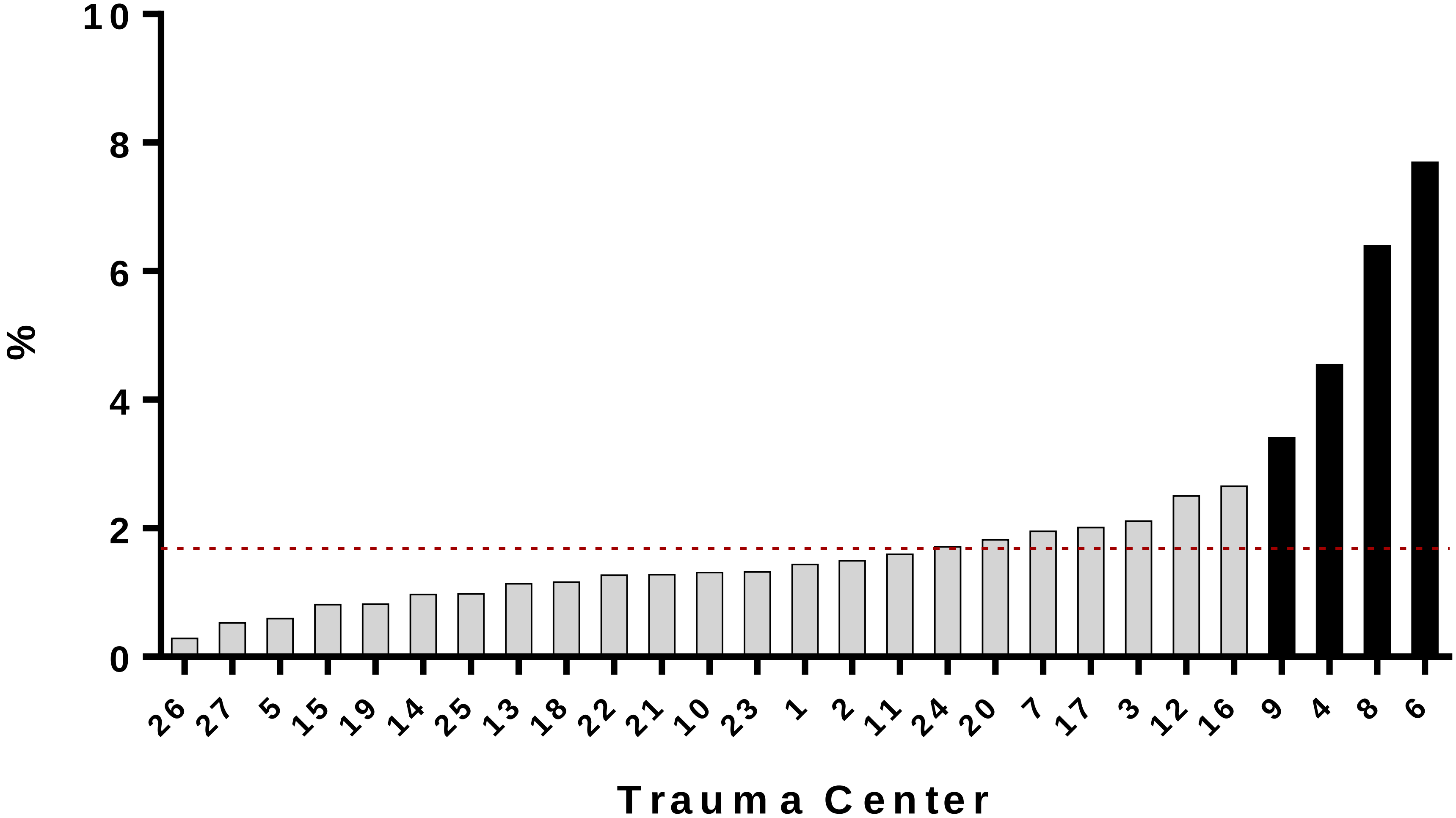
Mortality


Raw Mortality
Adjusted Mortality
%
5
4
3
2
1
0
1
2
3
4
IVC Use Quartile



Risk and Reliability Adjusted IVC Filter Use
High Outlier
Average
Low Outlier
%
15
10
5
0
19
5
17
27
18
23
22
25
15
10
1
24
21
3
9
11
16
7
4
13
2
14
12
6
20
8
Trauma Center
1/1/10 to 9/30/14

Risk and Reliability Adjusted IVC Filter Use



3/1/13 to 9/30/14

Next Steps

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

MTQIP Reports

Mark Hemmila, MD

M·TQIP

Confidentiality Agreement

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

Confidentiality Agreement

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

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

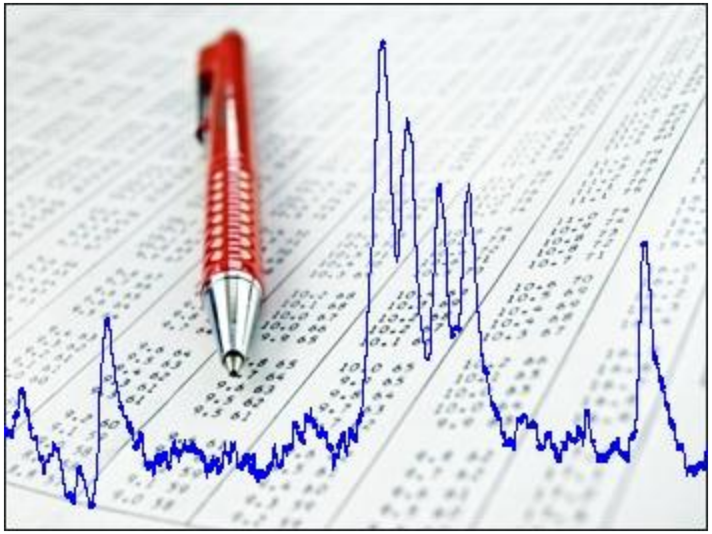
Confidentiality Agreement

By signing this document, I agree to protect the confidentiality of all information discussed at this meeting and take steps to safeguard against any disclosure of privileged information that may have been discussed. I understand that any violation of confidentiality may result in my personal removal from participation in the project as well as the removal of the hospital site I represent.

Hospitals Submitting Extra Data

- Minimum Range 3/13 to 4/14
- Centers submitting extra data (≥5/1/14)

Hospital Metrics



MTQIP 2014 Hospital Metrics

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

2014 MTQIP Hospital Metrics

Measure	Weight	Measure Description	Points (Existing Participants)	Points (New Participants)
		PARTICIPATION (70%)		
#1	10	**Data Submission**		
		On time 3 of 3 times	10	10
		On time 2 of 3 times	5	5
		On time 1 of 3 times	0	0
#2	20	**Meeting Participation – Surgeon Lead**		
		Participated in 3 of 3 meetings	20	20
		Participated in 2 of 3 meetings	10	10
		Participated in 1 of 3 meetings	5	5
		No participation	0	0
#3	20	**Meeting Participation – Trauma Manager/Registrar (Avg)**		
		Participated in 3 of 3 meetings	20	20
		Participated in 2 of 3 meetings	10	10
		Participated in 1 of 3 meetings	5	5
		No participation	0	0
#4	10	**Site Specific Quality Improvement Project Implementation**		
		Project data submitted	10	10
		Project data not submitted	0	0
#5	10	**Surgeon Lead Presents MTQIP Reports at Hospital Meetings**		
		Presented at 3 meetings	10	10
		Presented at 2 meetings	8	8
		Presented at 1 meeting	5	5
		Did not present	0	0
		*Signed attestation required		

#1 Data Submission

10 Points	5 Points

#2 Meeting Participation – Surgeon Lead

20 Points	10 Points	5 Points

#3 Meeting Participation – Program Manager/Registrar

20 Points	10 Points

#4 Site Specific Quality Improvement Project

10 Points

#5 Presentation of MTQIP Reports at Hospital Meetings

10 Points	0 Points

Performance

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

#6 Accuracy of Data

10 Points	8 Points	5 Points

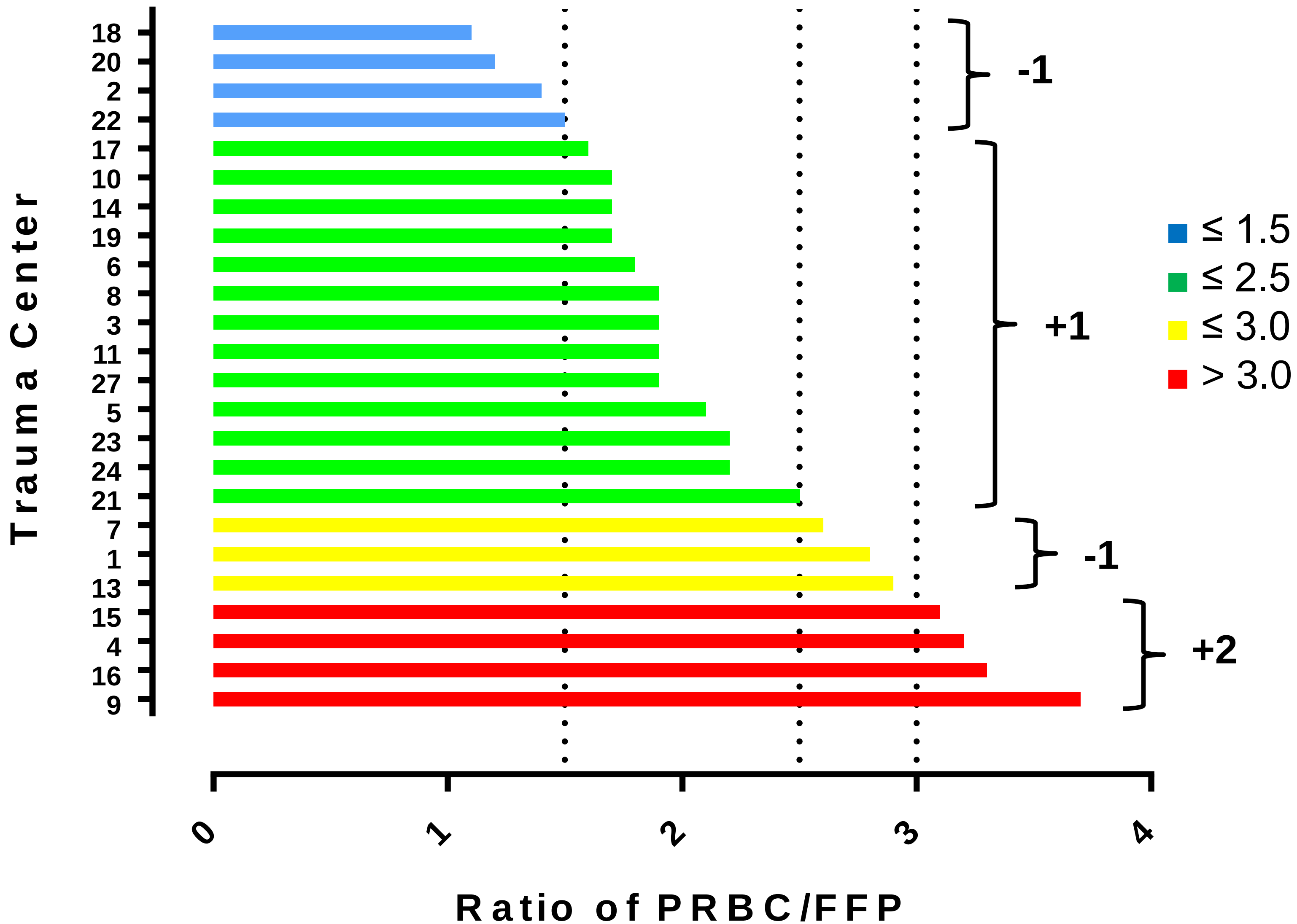
3 Points	0 Points

Blood Products (2/1/13 to 9/30/14)

Inclusion:
PRBC 4hrs ≥ 4 units

Trauma Center	N Patients	Ratio PRBC/FFP 4 hrs	N Ratio PRBC/FFP 4 hrs ≤ 3	N Ratio PRBC/FFP 4 hrs ≤ 2.5	N Ratio PRBC/FFP 4 hrs ≤ 1.5	Ratio PRBC/FFP 24 hrs	N Ratio PRBC/FFP 24 hrs ≤ 2.0	N Ratio PRBC/FFP 24 hrs ≤ 1.5	Dead
18	26	1.1	25	25	22	1.2	25	20	9
20	7	1.2	5	5	4	0.8	2	2	2
2	8	1.4	5	5	4	1.4	6	4	2
22	4	1.5	4	4	2	2.0	2	2	2
17	18	1.6	13	11	9	1.6	12	10	7
10	24	1.7	19	18	16	1.5	20	19	8
14	18	1.7	12	12	7	1.7	12	8	10
19	12	1.7	7	6	3	1.7	8	3	4
6	4	1.8	2	2	1	3.0	2	1	2
8	14	1.9	11	9	5	2.3	8	6	6
3	18	1.9	11	10	8	1.9	11	7	8
11	21	1.9	15	15	8	1.9	12	8	8
27	24	1.9	17	15	10	2.0	14	11	12
5	14	2.1	11	9	3	2.3	6	3	8
23	6	2.2	3	2	0	2.3	2	0	3
24	1	2.2	1	1	0	0.9	1	1	0
21	35	2.5	19	14	7	2.6	15	7	15
7	20	2.6	12	12	4	2.3	10	5	7
1	9	2.8	3	3	0	2.7	2	0	4
13	16	2.9	10	9	4	2.1	6	3	2
15	42	3.1	21	16	4	2.7	17	9	14
4	16	3.2	9	6	3	3.2	6	3	8
16	8	3.3	5	4	2	3.3	3	2	4
9	2	3.7	0	0	0	3.3	0	0	1
Total	367	1.8	240	213	126	1.7	202	134	146

Blood Product Ratio in first 4 hrs if ≥ 4 uPRBCs



2/1/13 to 9/30/14

MTQIP 2014 Hospital Metrics

- Massive Transfusion
  - ≥ 4 units PRBC's in first 4 hrs
  - Average of ratio for each patient
  - 7/1/13 to 9/30/14

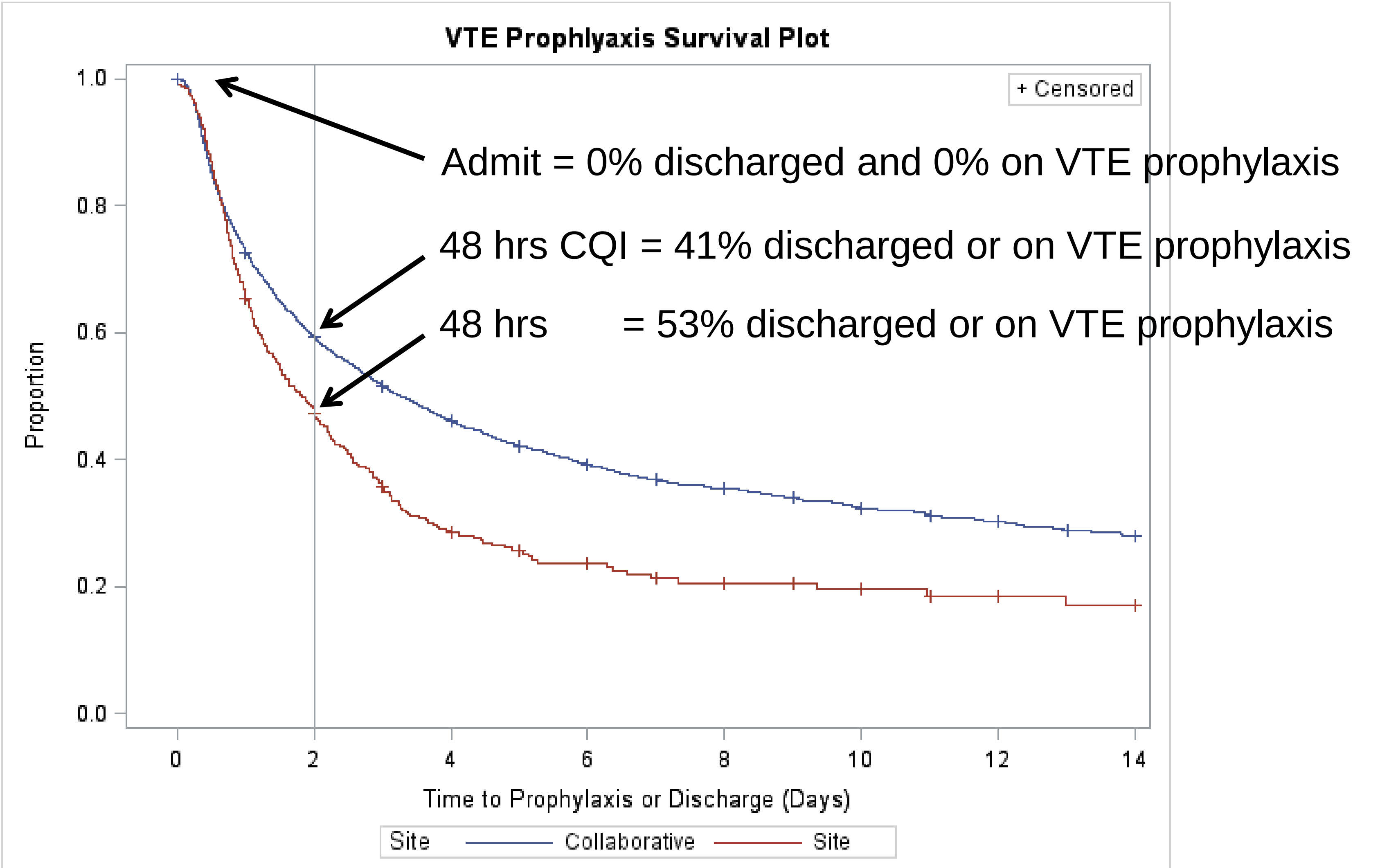
Ratio PRBC/FFP	Points
< 1.5	10
1.6 – 2.5	7.5
2.6 – 3.0	5
> 3.0	0

#7 MTP – Mean PRBC to Plasma ratio first 4 hrs

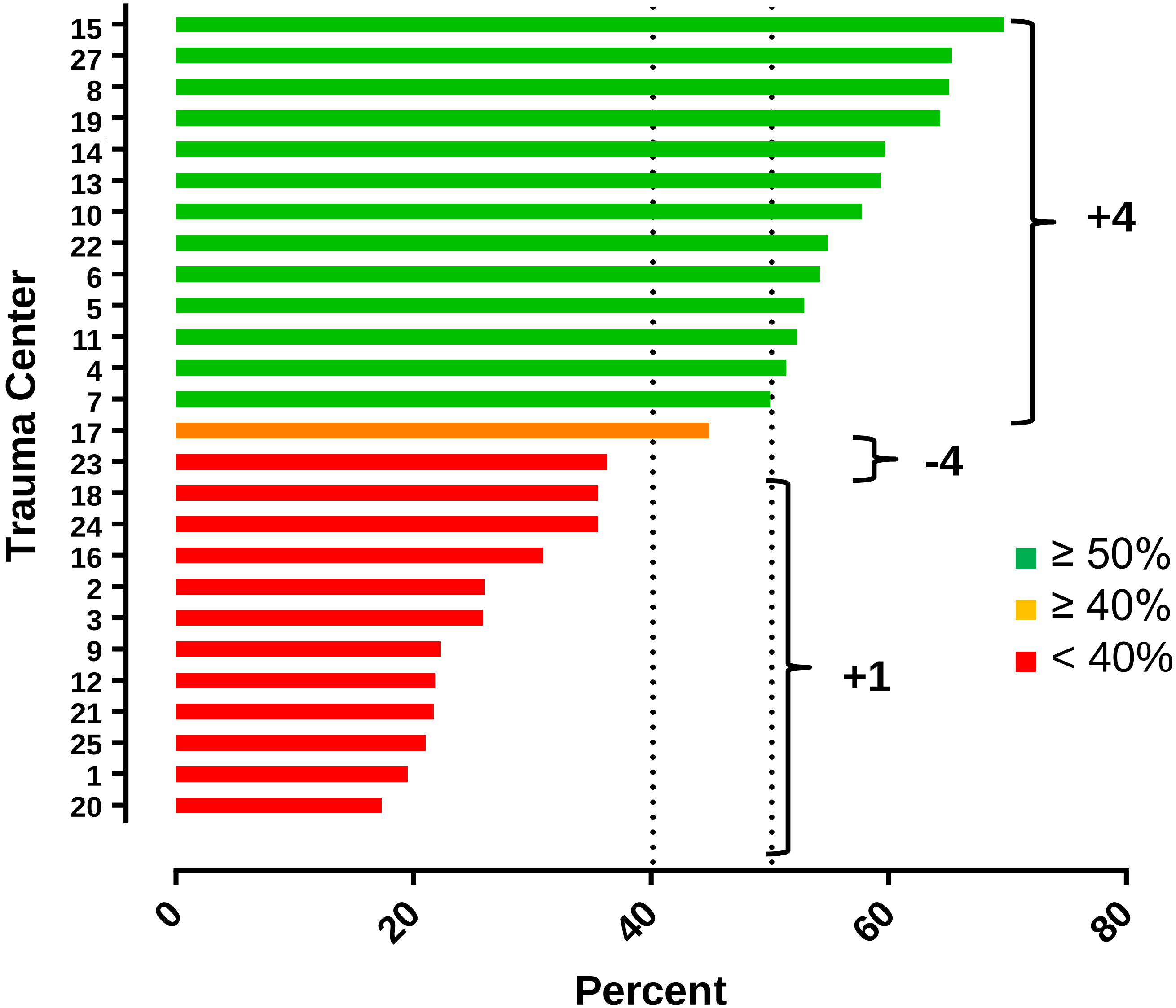
10 Points	7.5 Points

5 Points	0 Points

VTE Prophylaxis



Rate of VTE Prophylaxis by 48 hrs



3/1/13 to 9/30/14

VTE Prophylaxis

- Admit Trauma Service
  - In hospital with no VTE pro = non-Event
  - Discharge Home in 48 hrs = Event
  - VTE Prophylaxis in 48 hrs = Event
  - 3/1/13 to 9/30/14 or 7/1/13 to 9/30/14
- Rate
  - ≥ 50% (10 points)
  - ≥ 40% (5 points)
  - 0 – 39% (0 points)

#8 Timely VTE Prophylaxis

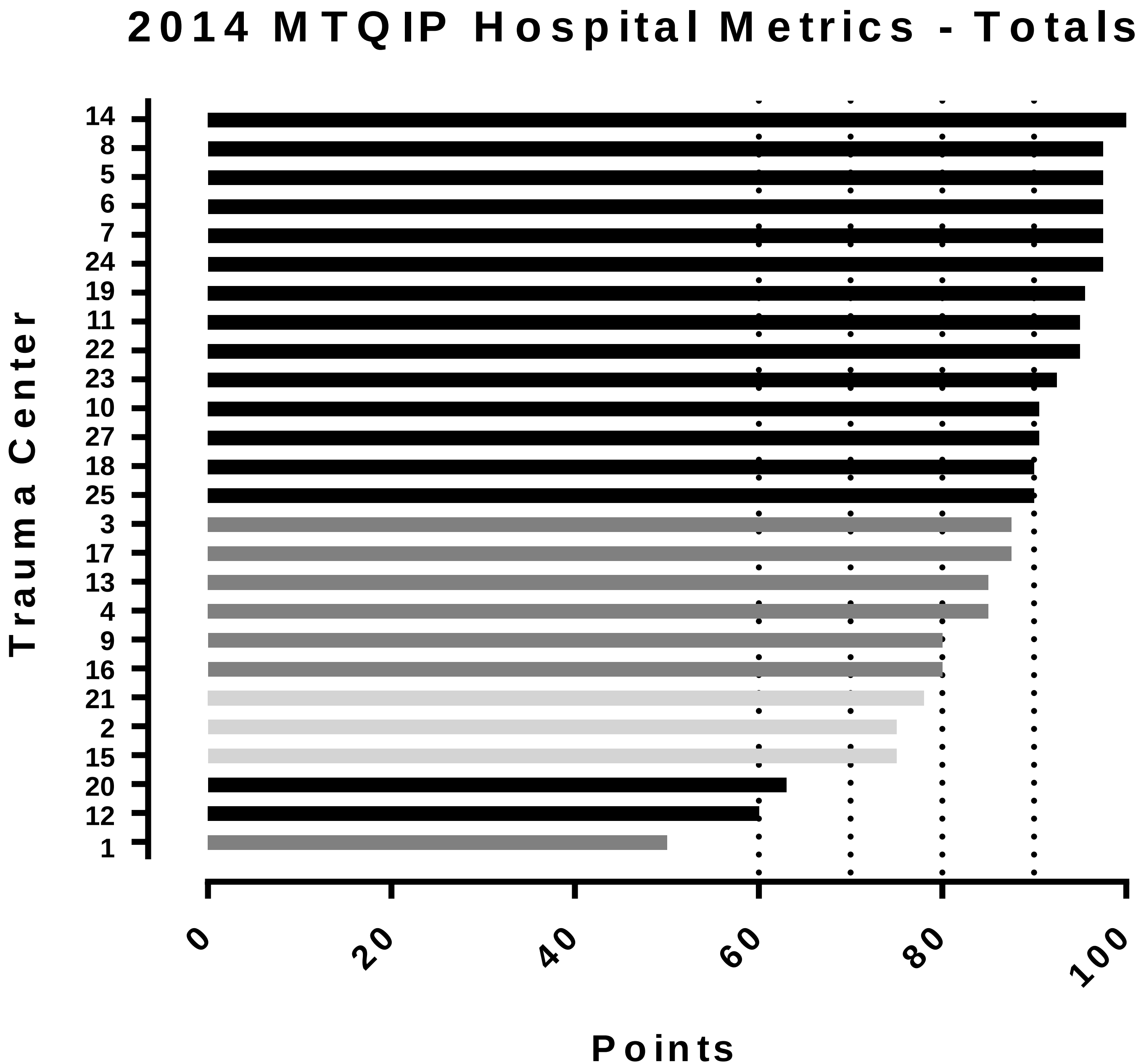
10 Points

0 Points

5 Points

2014 Hospital Metrics - Totals

Hospital	Points (100 Max)



2014 MTQIP Hospital Metrics - Totals
Trauma Center
14
8
5
6
7
24
19
11
22
23
10
27
18
25
3
17
13
4
9
16
21
2
15
20
12
1
0
20
40
60
80
100
Points

It's not perfect – What I learned

- Attention grabber
- Getting points is achievable by all
- Data problems
  - Scoring due 1st Quarter
  - Data submission in Oct and Feb
  - Cardiac goes back one year from Sept/Oct
- ~~Reactionary~~ / Thoughtful
- Perceptions vs. Reality e.g. Blood

Resources for Optimal Care of the Injured Patient

Chapter 15 – Trauma Registry

Outcomes Measurement

Outcomes measurements describe the results of intervention and management. Positive patient outcomes result from effective and efficient systems of care. Outcomes measurement focuses on a wide variety of clinical results, including the quality of life and the level of function achieved by patients who survive trauma. The most effective use of outcomes measurement is through a rigorous process based on standardized data and risk adjustment. Such risk-adjusted benchmarking processes may occur at the regional, state, or national level. The ACS TQIP provides the opportunity for such outcomes measurement. **All trauma centers must use a risk-adjusted benchmarking system to measure performance and outcomes (CD 15–5).**

Resources for Optimal Care of the Injured Patient

Chapter 16 – PIPS

Clinical Practice Guidelines, Protocols, and Algorithms

Trauma programs should seek to reduce unnecessary variation in the care they provide. To achieve this goal, a trauma program must use **clinical practice guidelines, protocols, and algorithms** derived from evidenced-based validated resources (CD 16–4). In areas where there is an absence of such resources, consensus-based institutional guidelines should be established according to the most current available peer-reviewed literature and clinical experience and acumen. Once implemented, trauma programs should **track compliance** with their clinical practice guidelines, protocols, and/or algorithms and ultimately monitor them for effects on outcome.

Resources for Optimal Care of the Injured Patient

Chapter 16 – PIPS

Clinical Practice Guidelines, Protocols, and Algorithms

Examples of such activities include the following:

- The use of **massive transfusion protocols** in patients with exsanguinating hemorrhage.
- Assessment and clearance of the cervical spine.
- The management of **severe traumatic brain injury**.
- The reversal of oral anticoagulants, the timing of antibiotic administration, and time to the operating room for open fracture management.
- The use of **venous thromboembolism prophylaxis**.
- **Deep vein thrombosis or pulmonary embolism events**.

Original Investigation

Association of Hospital Participation in a Surgical Outcomes Monitoring Program With Inpatient Complications and Mortality

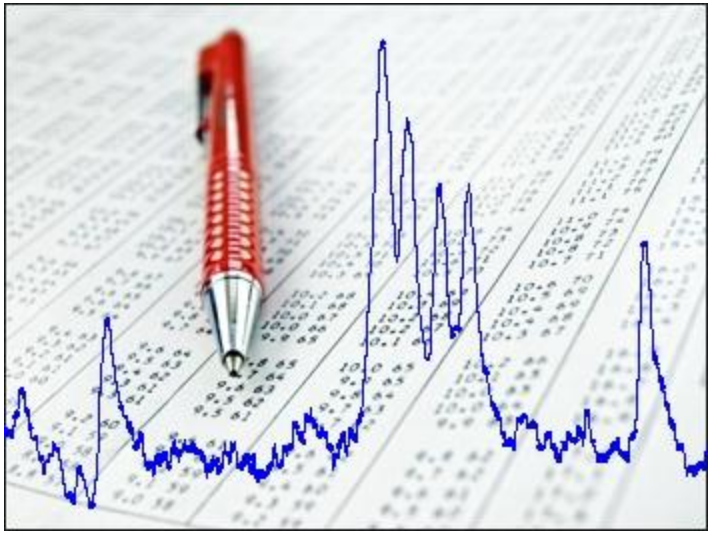
David A. Etzioni, MD, MSHS; Nabil Wasif, MD, MPH; Amylou C. Dueck, PhD; Robert R. Cima, MD; Samuel F. Hohmann, PhD; James M. Naessens, ScD; Amit K. Mathur, MD, MS; Elizabeth B. Habermann, PhD, MPH

Measuring Surgical Outcomes for Improvement
Was Codman Wrong?

Donald M. Berwick, MD, MPP

"…Measurement alone is not enough for improvement. Weighing a pig does not make the pig fatter."

Collaborative Metrics



MTQIP 2014 Collaborative Metrics

- Hemorrhage (≥ 4 u PRBC's first 4 hrs)
  - % of patients with 4hr PRBC/FFP ratio < 2.5
    - Begin = 34 %
    - Previous = 56 %
    - Current = **59 %**
    - Target = 80 %

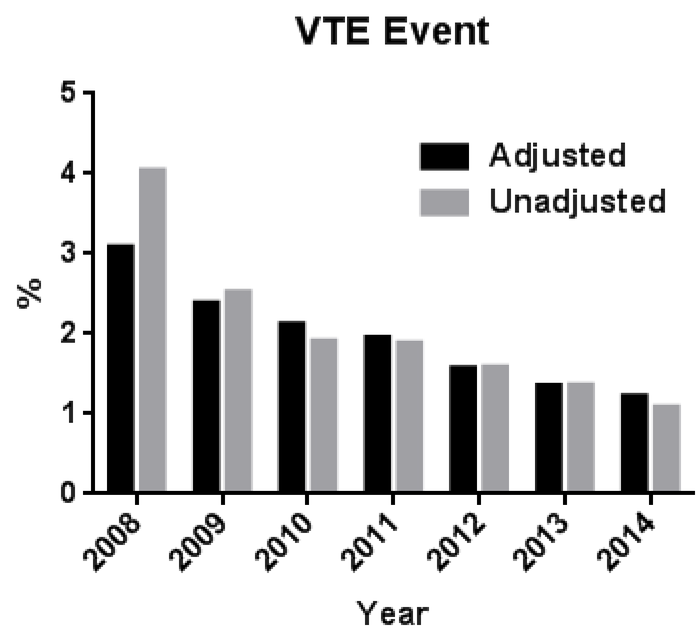
Patient List - Blood

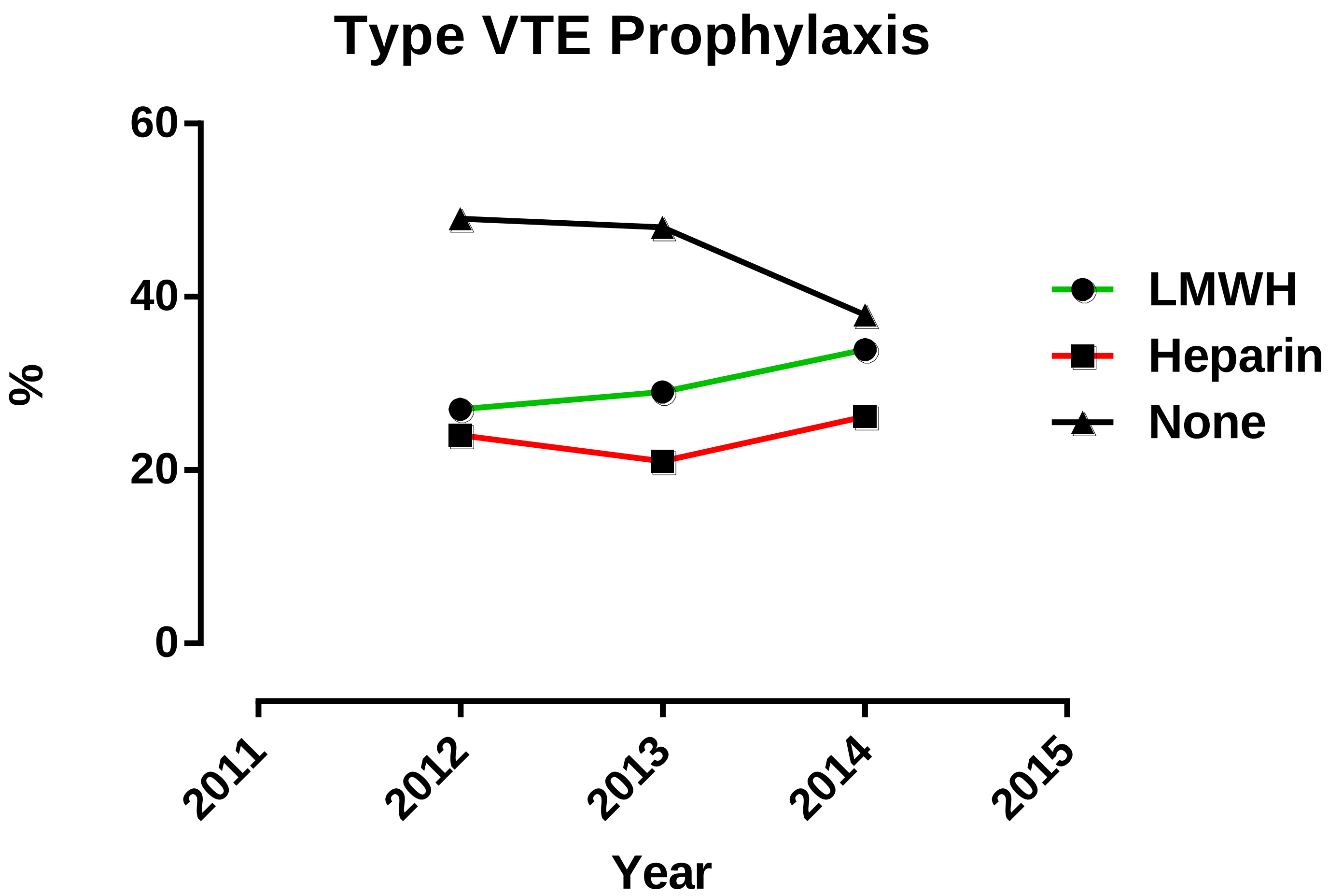
recordno	traumactr	age	blunt	ed_arrdate	ed_arrtime	ed_bp	ed_pulse	ed_mtr	usrais_iss	prbc4	ffp4	plt4	cryo4	ratio4
						64	151	6	10	6	2	5	0	3
						110	81	1	38	10	10	10	0	1
						99	84	1	34	4	4	0	0	1
						137	100	1	22	4	0	0	0	
						107	106	6	16	7	8	15	0	0.875
						0	0	1	9	11	0	0	0	
						65	73	6	59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

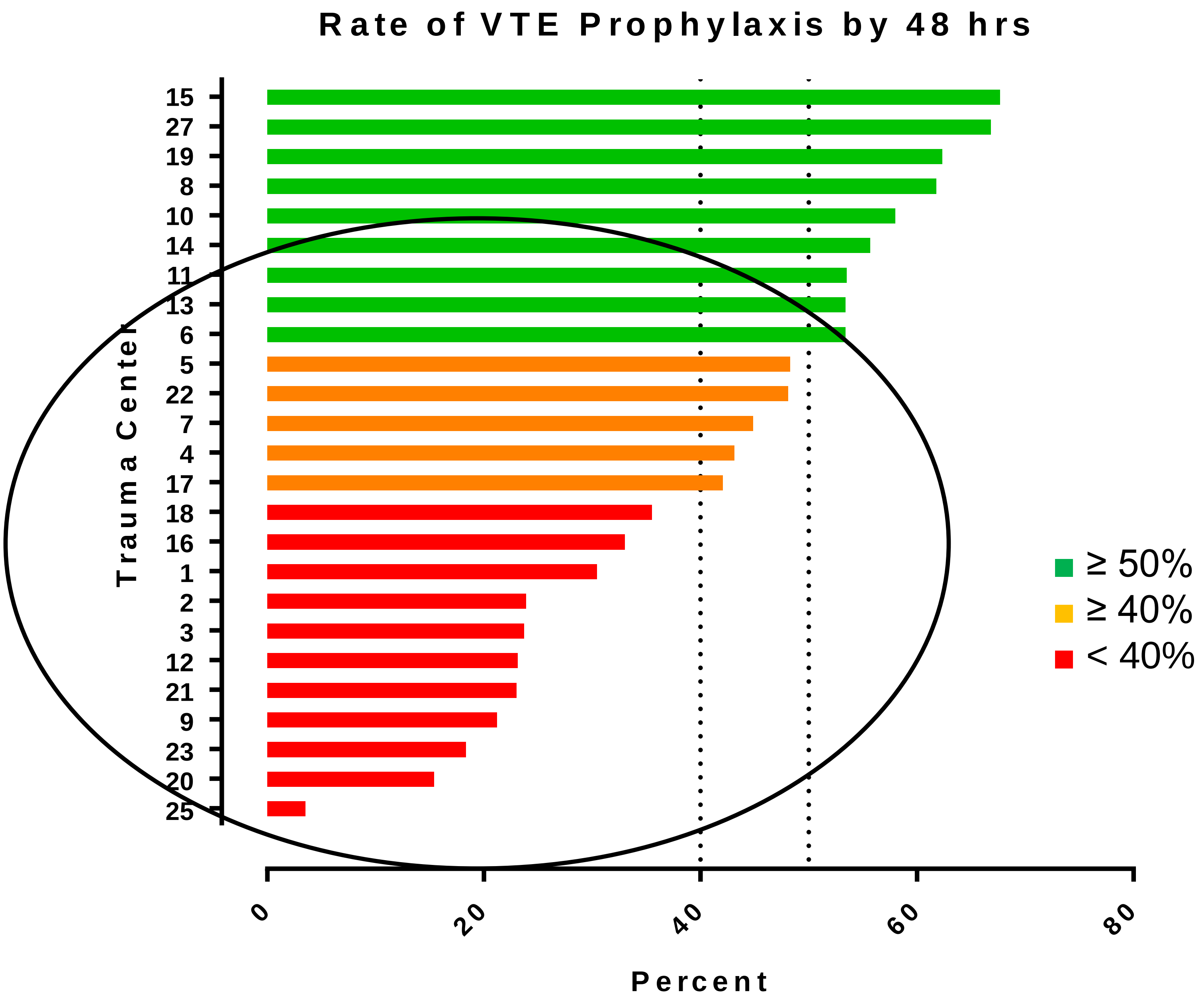
- Your list of patients
- 0 = No
- 1 = Yes
- Injury, Blood products, TXA, Operation, Angio
- MTQIP Report Site (Hemorrhage)

MTQIP 2014 Collaborative Metrics

- VTE
  - VTE Rate
    - Begin = 2.5 %
    - Previous = 1.4 %
    - Current = **1.4 %**
    - Target = 1.5 %
  - 48 hr VTE Prophylaxis Rate
    - Begin = 38 %
    - Previous = 40 %
    - Current = **46 %**
    - Target = 50 %

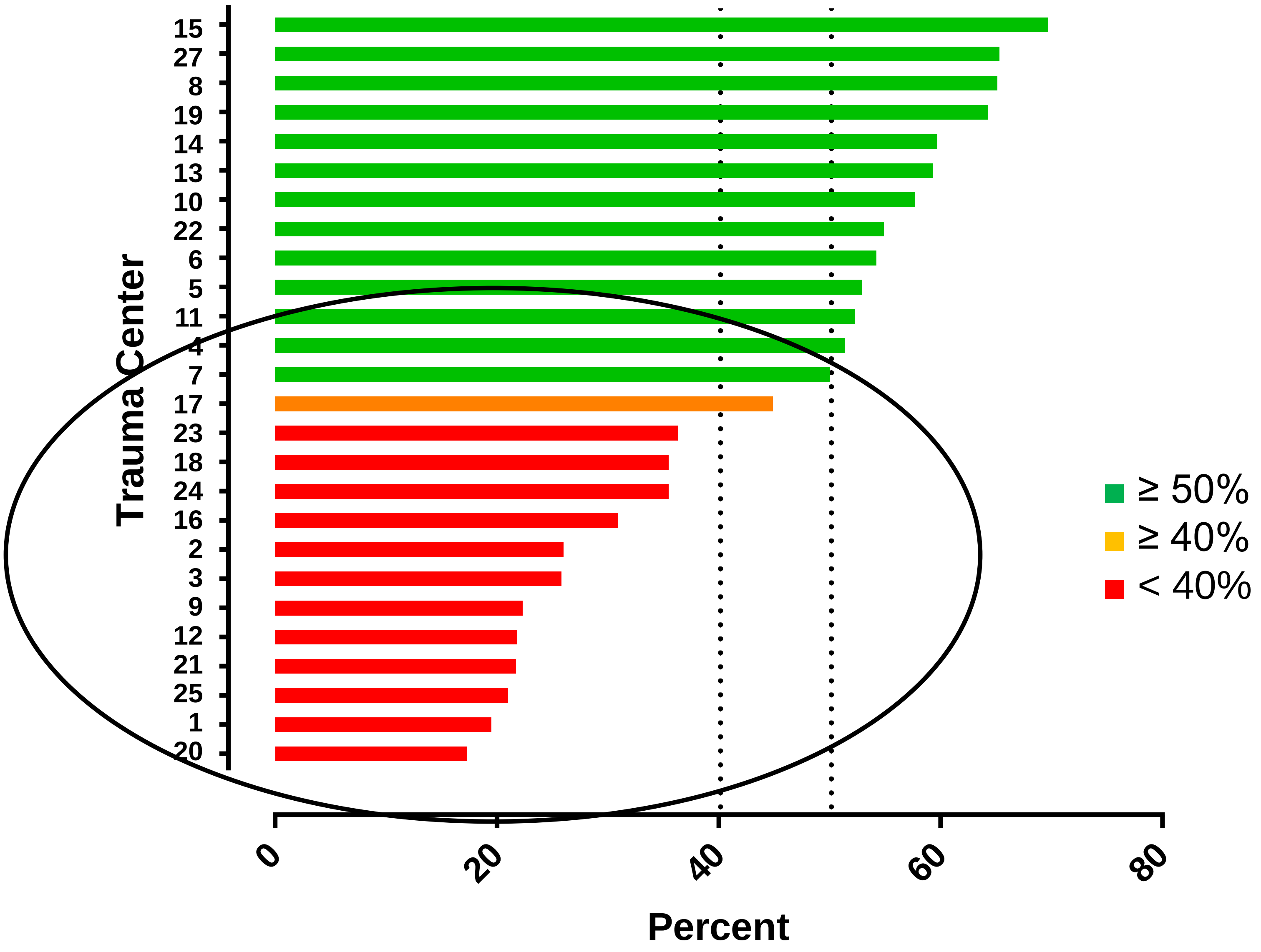



Type VTE Prophylaxis
60
40
20
0
%
2011
2012
2013
2014
2015
Year
LMWH
Heparin
None



Rate of VTE Prophylaxis by 48 hrs
Trauma Center
15
27
19
8
10
14
11
13
6
5
22
7
4
17
18
16
1
2
3
12
21
9
23
20
25
0
20
40
60
80
Percent
≥ 50%
≥ 40%
< 40%

Rate of VTE Prophylaxis by 48 hrs

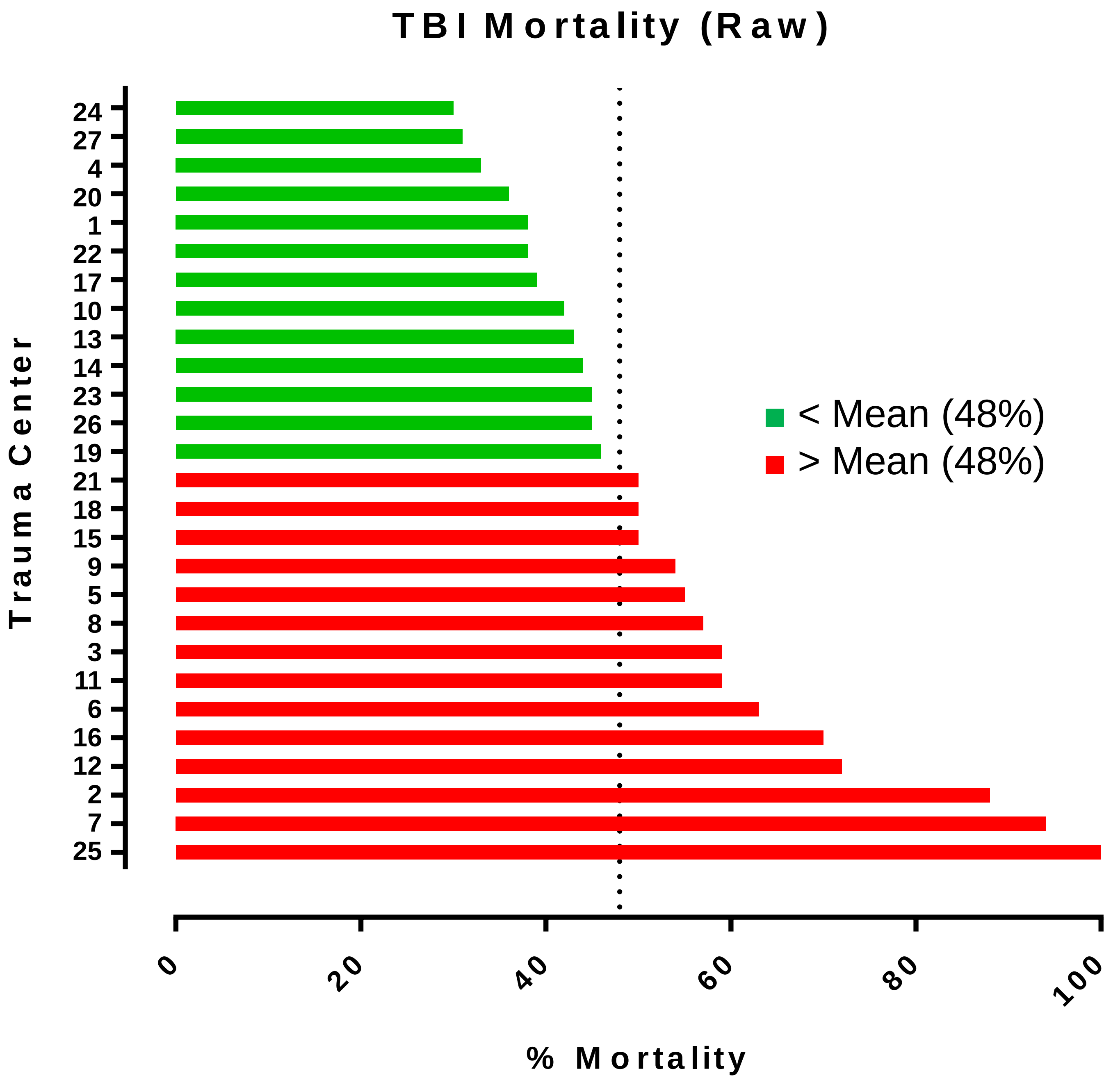


MTQIP 2014 Collaborative Metrics

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

MTQIP 2014 Collaborative Metrics

- Brain Injury
  - % of eligible patients with TBI intervention (Monitor or Operation)
    - Begin = 57 %
    - Previous = 70 %
    - Current = **72 %**
    - Target = 70 %

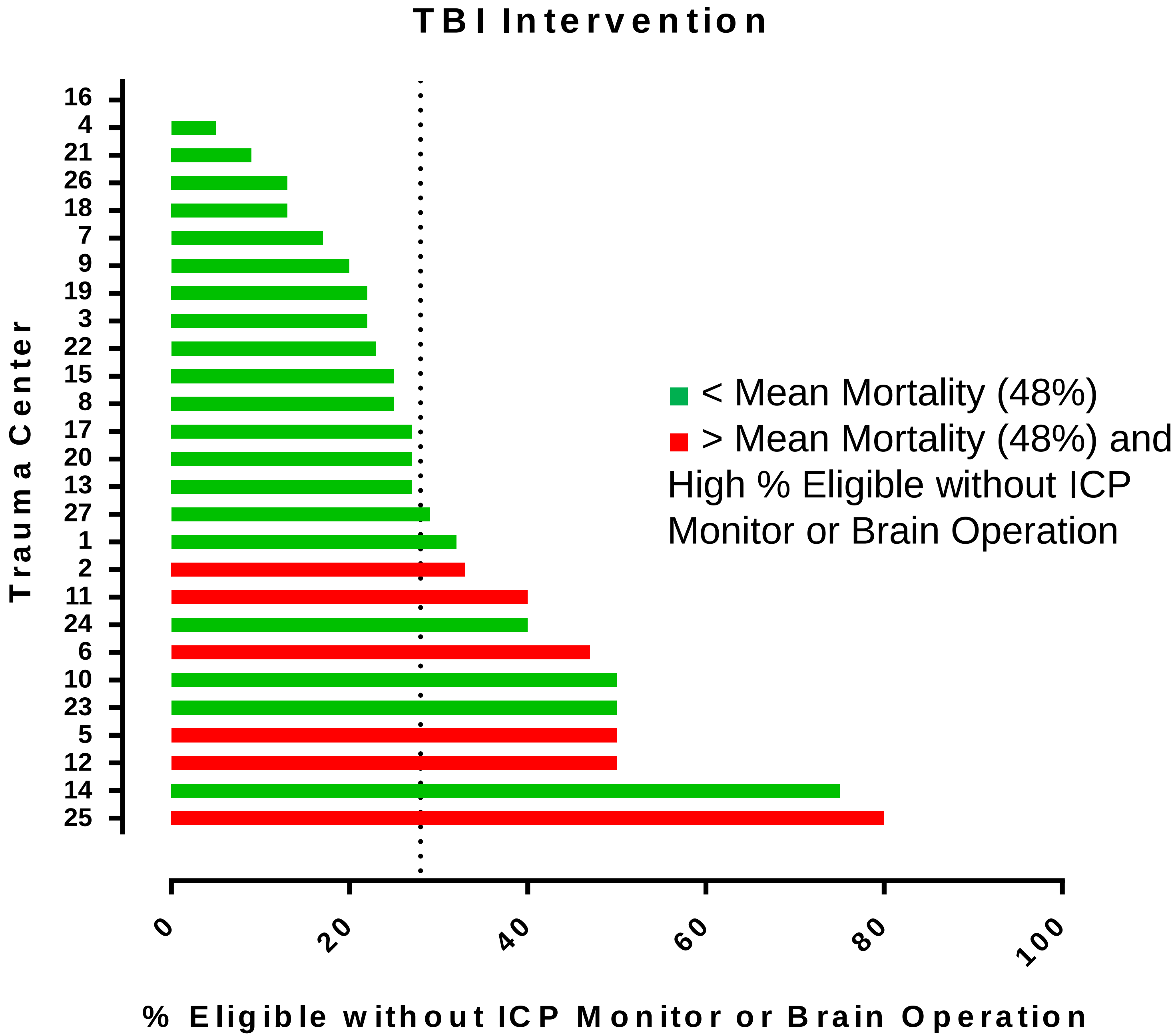


TBI Mortality (Raw)
Trauma Center
24
27
4
20
1
22
17
10
13
14
23
26
19
21
18
15
9
5
8
3
11
6
16
12
2
7
25
< Mean (48%)
> Mean (48%)
0
20
40
60
80
100
% Mortality

Monitor or Operation for Head Injury (3/1/2013 to 9/30/14)

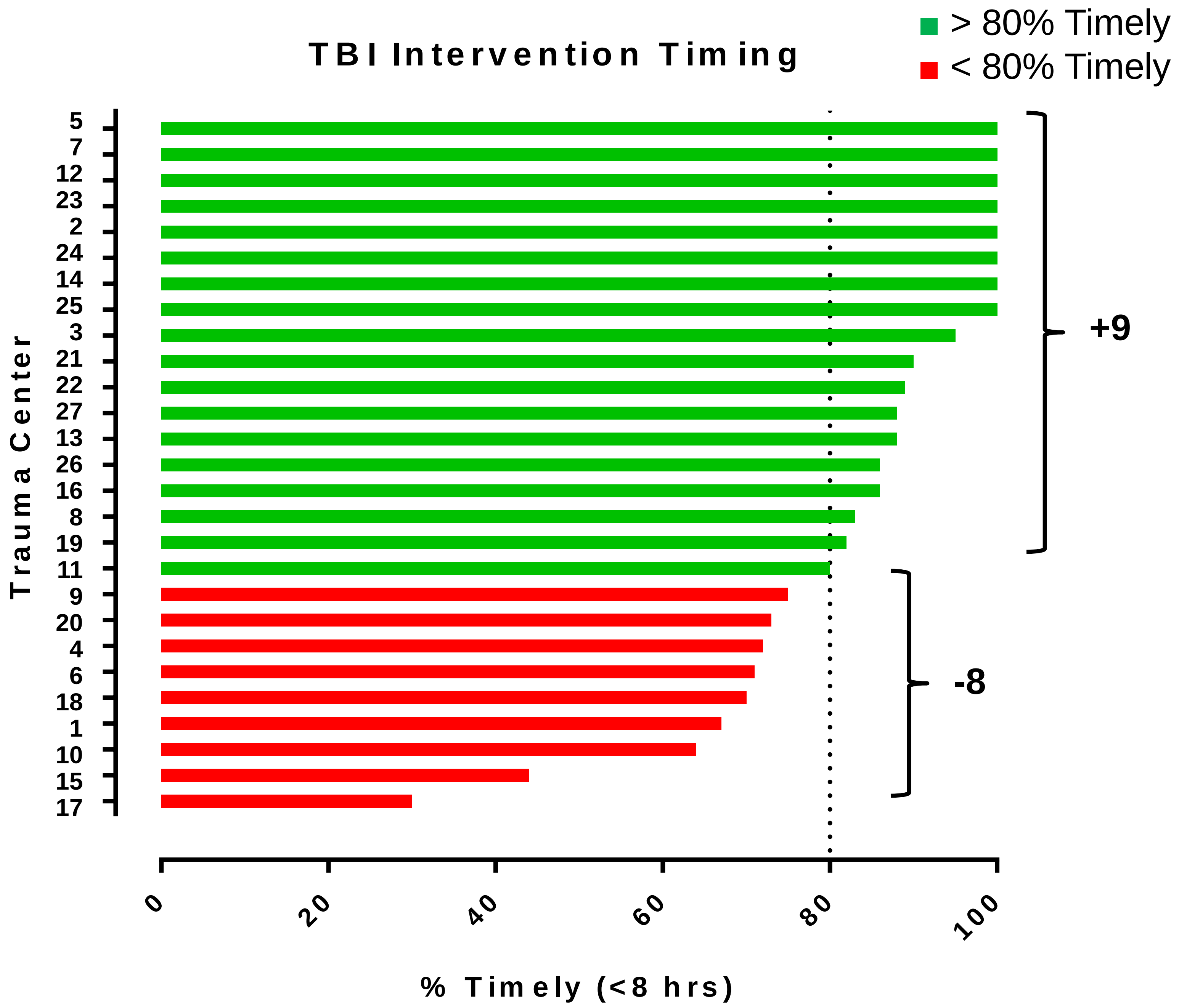
Inclusion:	Exclusion:	
AIS Head > 0	Penetrating Mechanism	No signs of life
	Direct Admit Transfer	Max GCS > 8 & TBI GCS > 8

Trauma Center	N	Dead	Alive w/o Intervent	Alive with Intervent	Dead w/o Intervent	Dead with Intervent	Dead and Intervent Withheld	Eligible & no Intervent	Eligible	% Eligible w/no Interven	% Dead / N
21	78	39	17	22	20	19	16	4	45	9%	50%
27	59	18	25	16	10	8	0	10	34	29%	31%
19	46	21	16	9	12	9	7	5	23	22%	46%
4	46	15	15	16	10	5	9	1	22	5%	33%
3	39	23	8	8	10	13	4	6	27	22%	59%
18	36	18	6	12	10	8	7	3	23	13%	50%
10	33	14	11	8	11	3	0	11	22	50%	42%
1	32	12	10	10	7	5	0	7	22	32%	38%
11	32	19	4	9	13	6	3	10	25	40%	59%
17	28	11	12	5	5	6	1	4	15	27%	39%
20	25	9	8	8	6	3	2	4	15	27%	36%
13	23	10	9	4	6	4	3	3	11	27%	43%
23	22	10	11	1	7	3	3	4	8	50%	45%
5	20	11	5	4	9	2	3	6	12	50%	55%
6	19	12	4	3	7	5	0	7	15	47%	63%
12	18	13	3	2	10	3	5	5	10	50%	72%
14	18	8	9	1	7	1	1	6	8	75%	44%
15	18	9	2	7	7	2	4	3	12	25%	50%
22	16	6	3	7	3	3	0	3	13	23%	38%
7	16	15	1	0	10	5	9	1	6	17%	94%
8	14	8	4	2	4	4	2	2	8	25%	57%
9	13	7	2	4	7	0	6	1	5	20%	54%
26	11	5	3	3	1	4	0	1	8	13%	45%
24	10	3	5	2	2	1	0	2	5	40%	30%
16	10	7	1	2	2	5	2	0	7	0%	70%
2	8	7	0	1	4	3	2	2	6	33%	88%
25	5	5	0	0	4	1	0	4	5	80%	100%
Total	695	335	194	166	204	131	89	115	412	28%	48%


TBI Intervention
Trauma Center
16
4
21
26
18
7
9
19
3
22
15
8
17
20
13
27
1
2
11
24
6
10
23
5
12
14
25
< Mean Mortality (48%)
> Mean Mortality (48%) and High % Eligible without ICP Monitor or Brain Operation
0
20
40
60
80
100
% Eligible without ICP Monitor or Brain Operation

MTQIP 2014 Collaborative Metrics

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



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

Patient List – TBI Intervention

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

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

MTQIP Outcomes

- ArborMetrix Report
- 3/1/2013 to 9/30/2014
- Rates
  - Risk and Reliability-adjusted
  - Red dash line is collaborative mean
- Legend
  - Low-outlier status (better performance)
  - Non-outlier status (average performance
  - High-outlier status (worse performance)

MTQIP Shock - Angio

- 1/1/2013 to 9/30/2014
- Inclusion
  - First ED SBP or Lowest ED SBP ≤ 90 mmHg
  - Angio procedure
    - MTQIP hemorrhage data
    - Procedure data (ICD9 code)
- Exclude
  - Time to angio negative or > 24 hrs

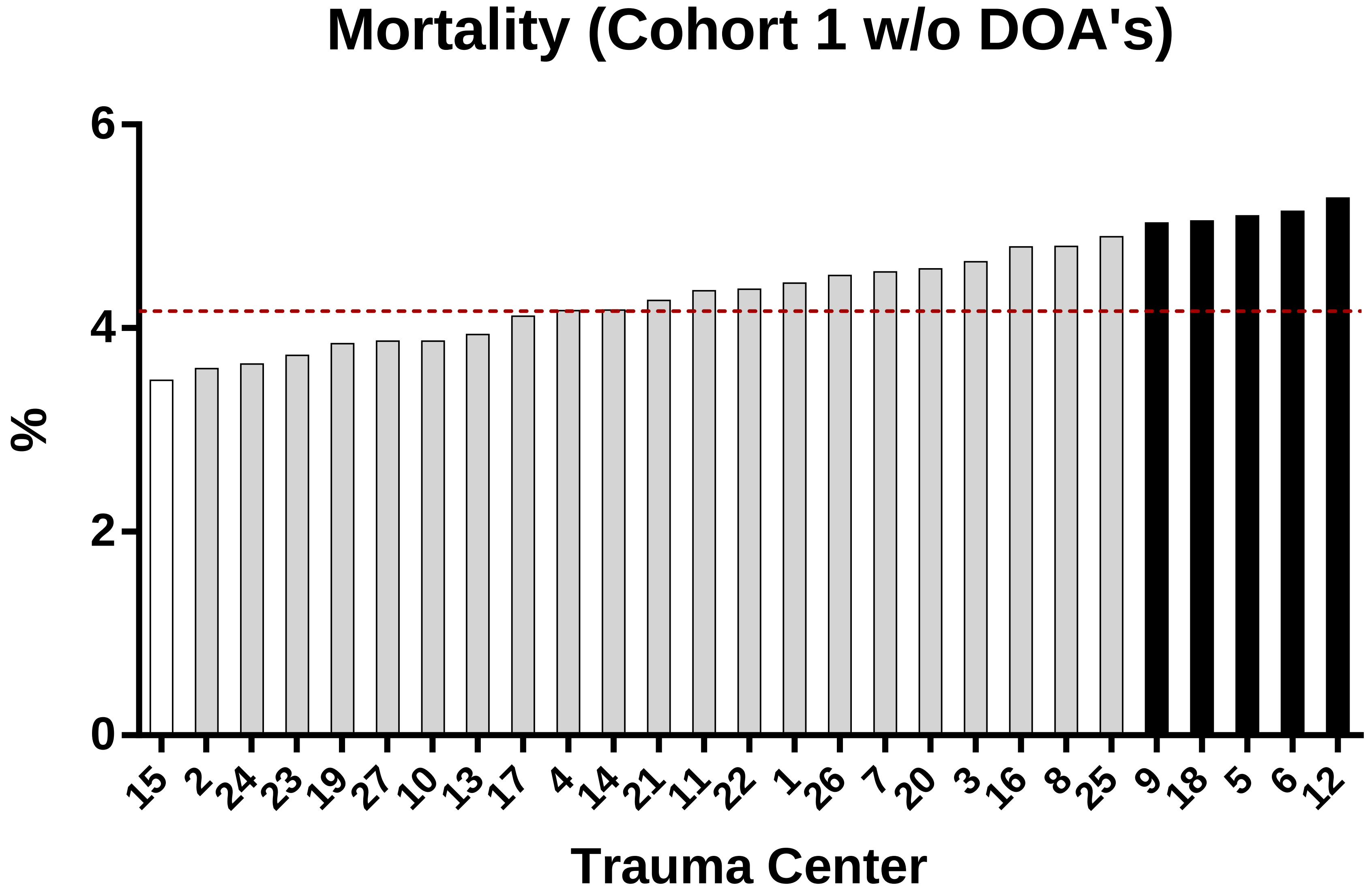
Trauma Center	N Patients	Dead	Mean Time to Angio Procedure hrs	Ratio PRBC/FFP 4 hrs	Ratio PRBC/FFP 24 hrs	Diagnostic	Therapeutic
8	2	1	2.7	0.9	1.2	1	0
3	11	3	3.9	1.1	1.5	5	5
9	2	0	9.3	1	2	2	0
5	3	1	9.7	0.8	0.8	2	1
11	1	0	1.9	1.7	1.5	0	1
23	2	0	8.1	--	2.7	0	1
18	7	2	7.7	1.2	1.3	5	2
10	6	3	6.3	1.1	1.7	2	2
13	1	0	10.5	1	1	0	1
2	2	0	1.8	1.3	1.3	1	1
16	4	1	5.8	1.2	1.6	2	1
22	2	1	1.2	1.2	1.2	1	0
14	3	1	5.7	1.5	1.5	2	1
21	11	1	4.1	1.5	1.1	4	2
7	4	0	2.9	1.9	1.6	4	0
17	1	0	2.4	--	--	0	1
25	1	0	4.8	--	--	0	1
19	11	2	3.5	1.5	1.8	4	6
27	3	1	2.7	1.5	1.5	2	1
4	11	2	7.9	1.9	3	5	6
Total	88	19	5.2	--	--	42	33

Trauma Center	N Patients	Diagnostic	Therapeutic	Liver	Spleen	Kidney	Pelvis	Retro	Neck or Extrem	Aorta	Other
8	2	1	0	0	0	0	0	0	0	0	0
3	11	5	5	1	1	0	3	0	0	0	0
9	2	2	0	0	0	0	0	0	0	0	0
5	3	2	1	0	1	0	0	0	0	0	0
11	1	0	1	0	0	0	1	0	0	0	0
23	2	0	1	1	0	0	0	0	0	0	0
18	7	5	2	0	1	0	2	0	0	0	0
10	6	2	2	1	0	0	1	0	1	0	0
13	1	0	1	1	0	0	0	0	0	0	0
2	2	1	1	0	0	0	1	0	0	0	0
16	4	2	1	0	0	0	0	0	0	0	1
22	2	1	0	0	0	0	0	0	0	0	0
14	3	2	1	0	1	0	0	0	0	0	0
21	11	4	2	1	1	1	0	1	0	0	0
7	4	4	0	0	0	0	0	0	0	0	0
17	1	0	1	0	0	0	0	0	0	0	0
25	1	0	1	0	1	0	0	0	0	0	0
19	11	4	6	1	1	1	2	0	1	0	0
27	3	2	1	0	0	1	0	0	0	0	0
4	11	5	6	1	0	0	5	0	0	0	0
Total	88	42	33	7	7	3	15	1	2	0	1

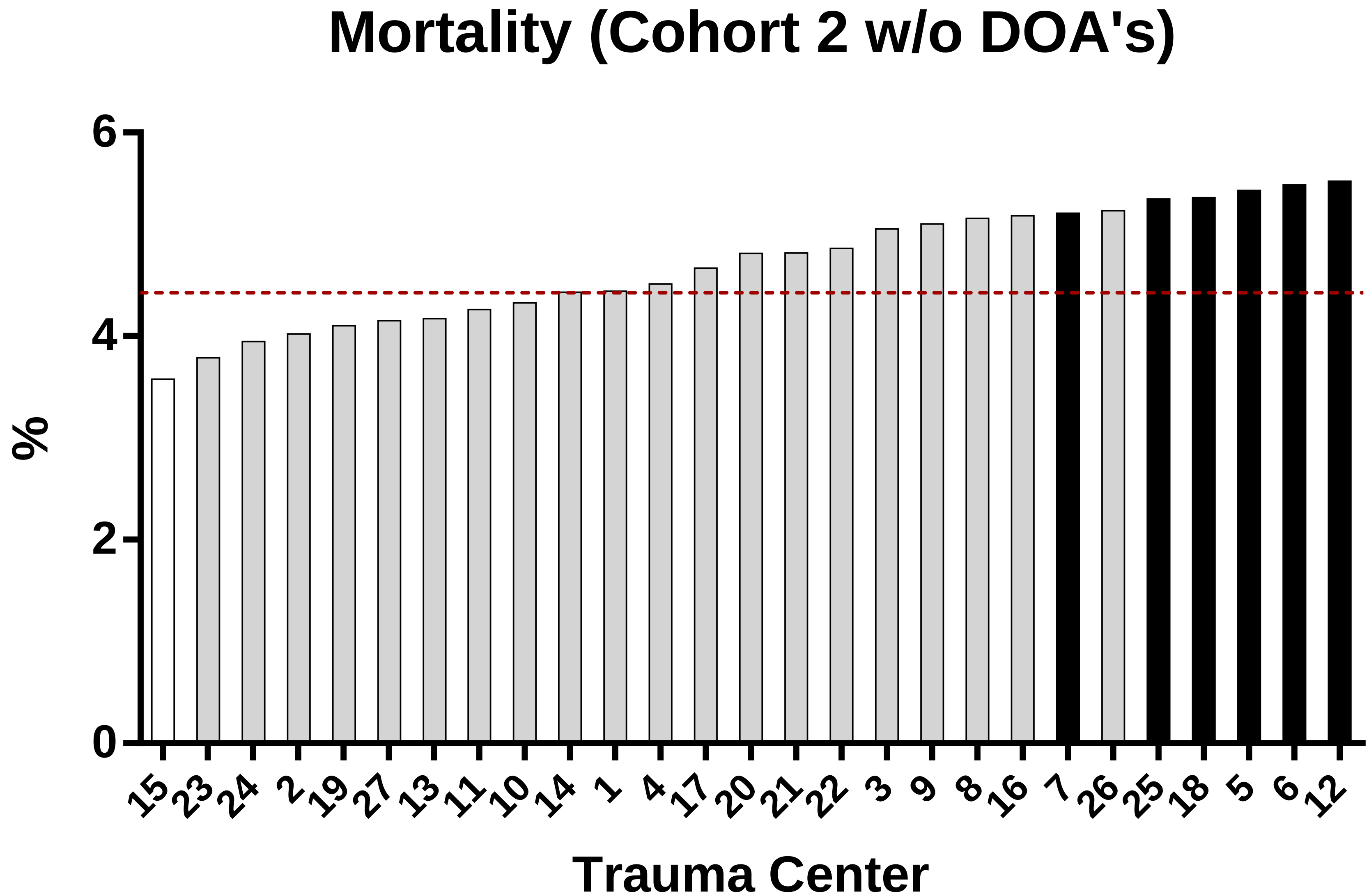
MTQIP Shock - Operation

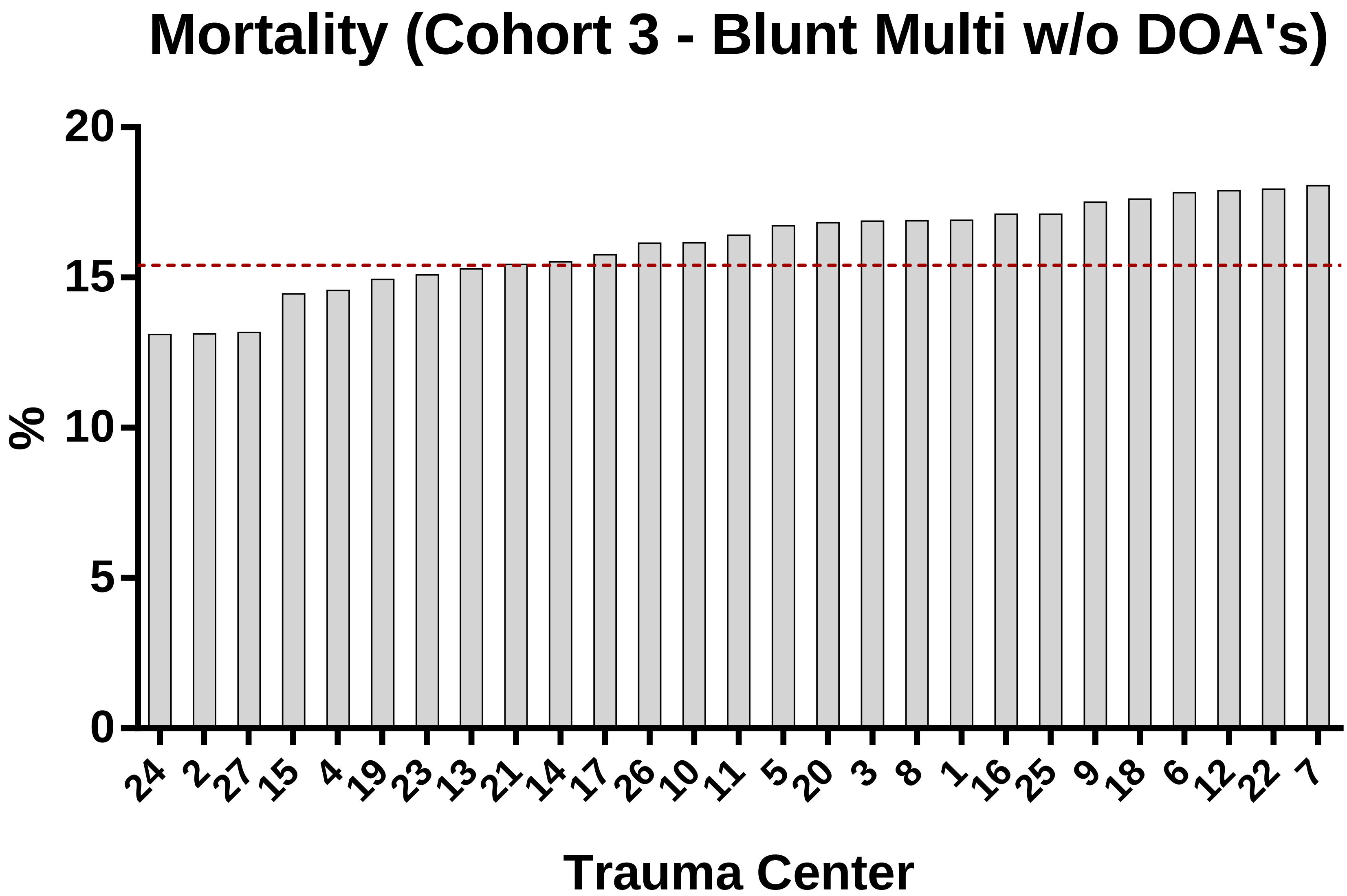
- 1/1/2013 to 9/30/2014
- Inclusion
  - First ED SBP or Lowest ED SBP ≤ 90 mmHg
  - Operation
    - MTQIP hemorrhage data
- Exclude
  - Time to operation negative or > 24 hrs

Trauma Center	N Patients	Dead	Penetrating	Mean Time to Operation hrs	Ratio PRBC/FFP 4 hrs	Ratio PRBC/FFP 24 hrs	Laparotomy	Thoracotomy	Sternotomy	Extremity	Neck	Amputation
8	9	4	6	1.9	1.8	1.9	4	2	0	1	2	0
3	8	3	5	2.6	1.1	1.1	4	0	0	2	2	0
9	2	0	1	2.3	3.7	3.3	1	0	0	1	0	0
5	8	3	1	1.5	2.4	2.4	2	0	0	1	0	0
1	7	4	7	0.4	3.2	3.2	3	2	0	2	0	0
12	2	2	0	0.8	--	3	2	0	0	0	0	0
11	7	4	4	1.1	1.6	1.7	5	0	0	2	0	0
23	3	2	1	3.8	2	2	3	0	0	0	0	0
18	26	10	14	1.5	1.1	1.2	14	6	0	3	1	2
10	17	7	14	2.1	1.8	1.7	8	5	1	3	0	0
13	13	2	6	1.1	3.1	2.5	8	2	0	2	0	1
2	2	2	0	1.1	1.4	1.4	2	0	0	0	0	0
24	1	0	0	2.3	2.2	0.9	1	0	0	0	0	0
16	9	4	6	1.7	3.5	3.2	5	4	0	0	0	0
20	9	2	2	2.7	1.1	0.6	3	0	0	6	0	0
22	6	2	1	1.8	1.1	1.2	2	2	0	2	0	0
14	12	7	7	2.3	1.8	1.6	8	3	0	0	0	1
6	5	3	2	2.3	1.8	1.5	2	3	0	0	0	0
15	31	9	30	0.9	2.9	2.4	11	9	0	11	0	0
21	14	4	3	2.2	2.8	2.8	10	0	1	0	0	0
7	12	4	5	1.6	2.9	2.2	7	1	0	3	0	1
17	11	6	5	2.9	1.3	1.4	6	2	0	1	0	0
19	9	2	8	1.3	1.1	1.1	4	4	0	0	1	0
27	12	5	1	2.7	2	2.1	9	1	0	1	0	1
4	3	2	1	1.4	2.2	1.9	2	1	0	0	0	0
Total	238	93	130	1.8	--	--	126	47	2	41	6	6

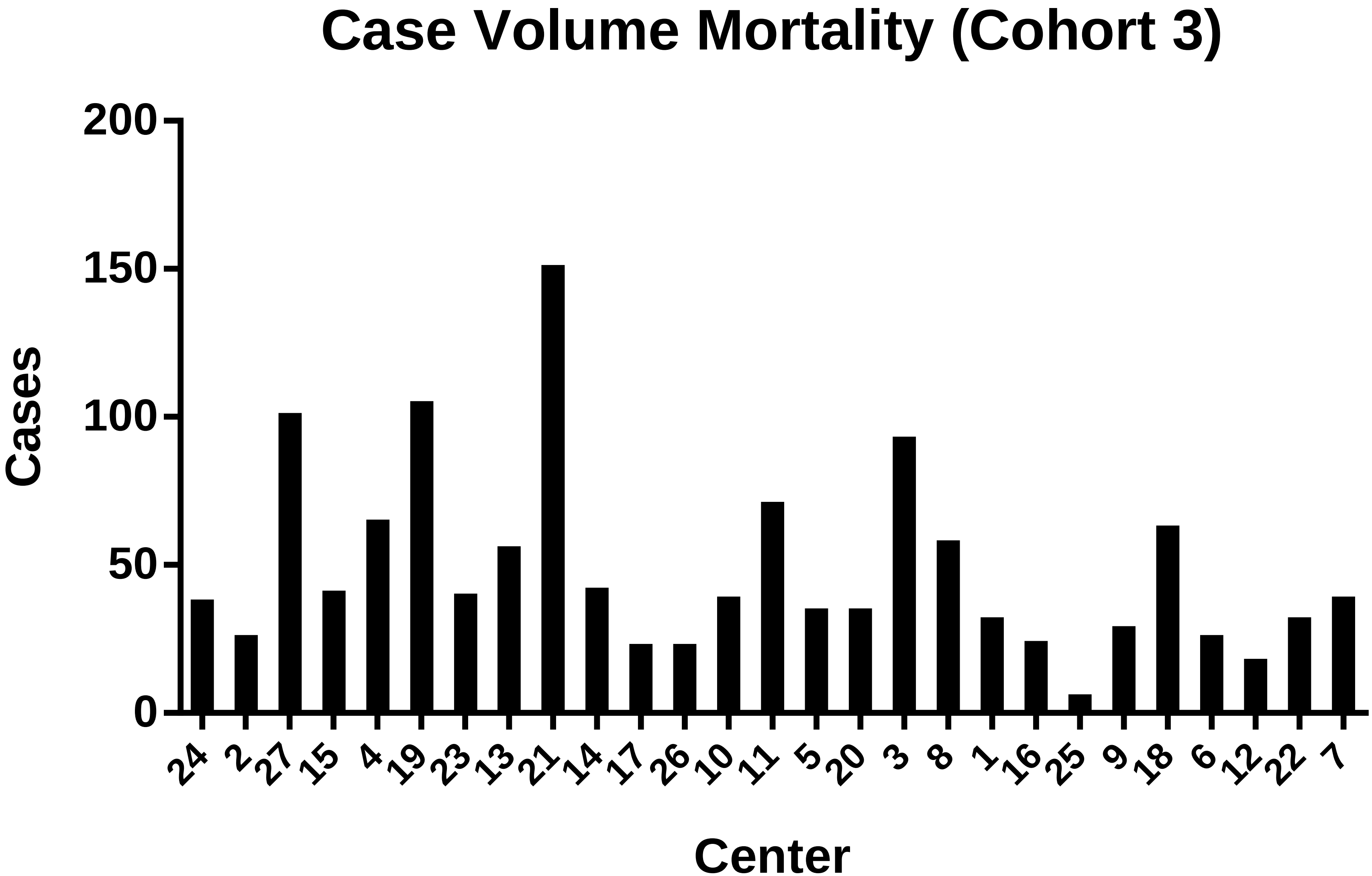


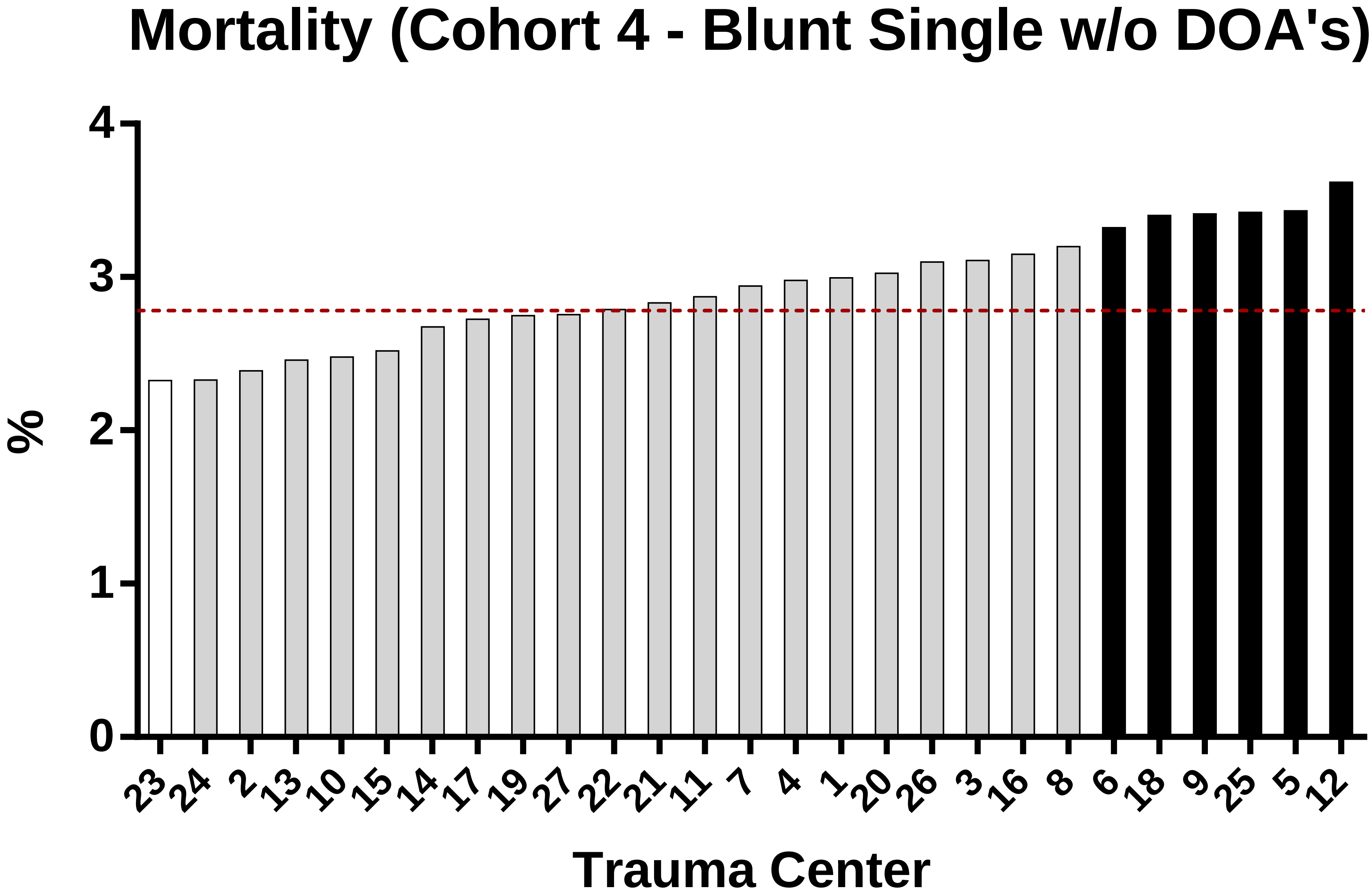
Mortality (Cohort 1 w/o DOA's)
%
0
2
4
6
15
2
24
23
19
27
10
13
17
4
14
21
11
22
1
26
7
20
3
16
8
25
9
18
5
6
12
Trauma Center

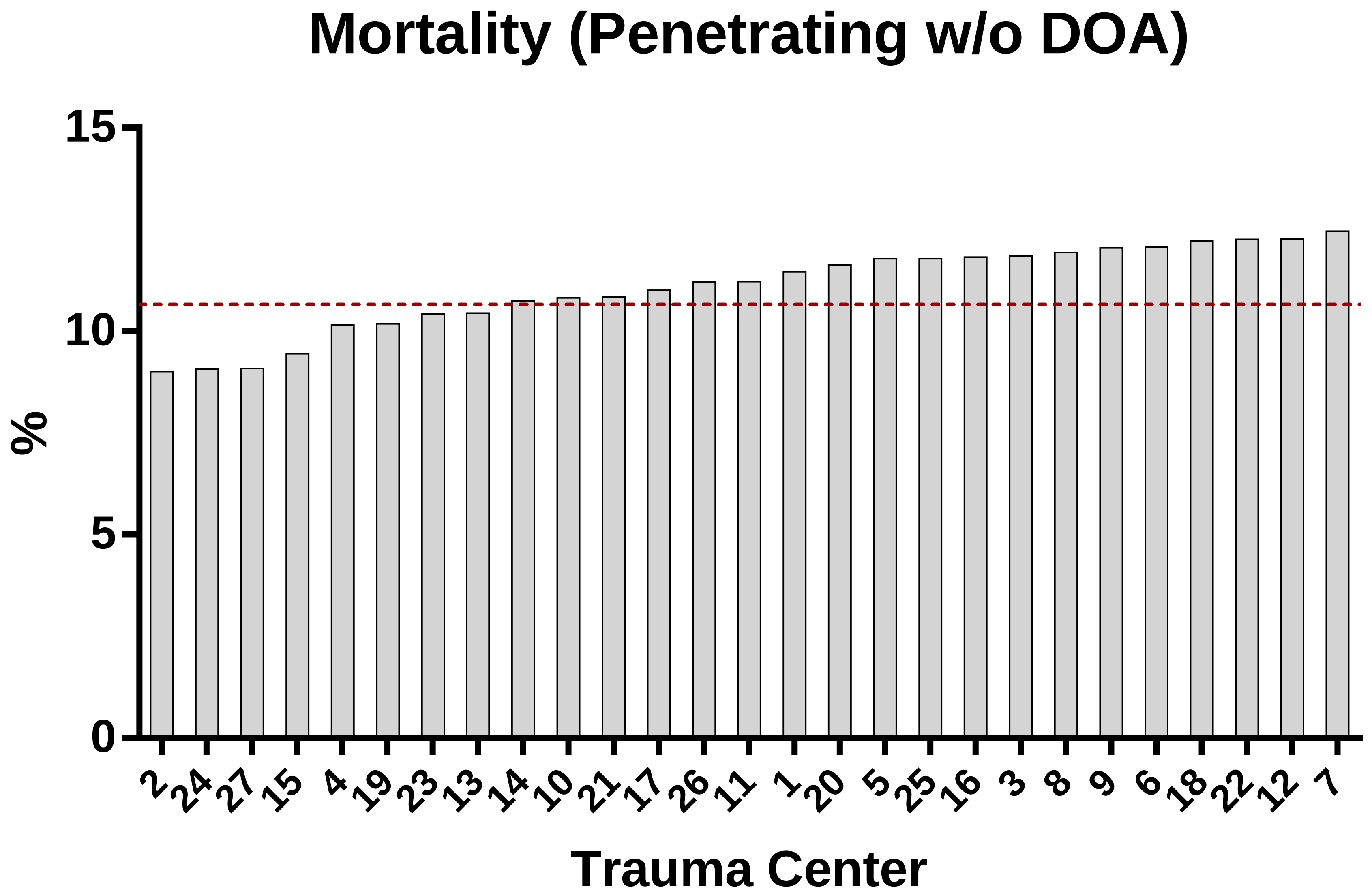

Mortality (Cohort 2 w/o DOA's)
%
6
4
2
0
15
23
24
2
19
27
13
11
10
14
1
4
17
20
21
22
3
9
8
16
7
26
25
18
5
6
12
Trauma Center

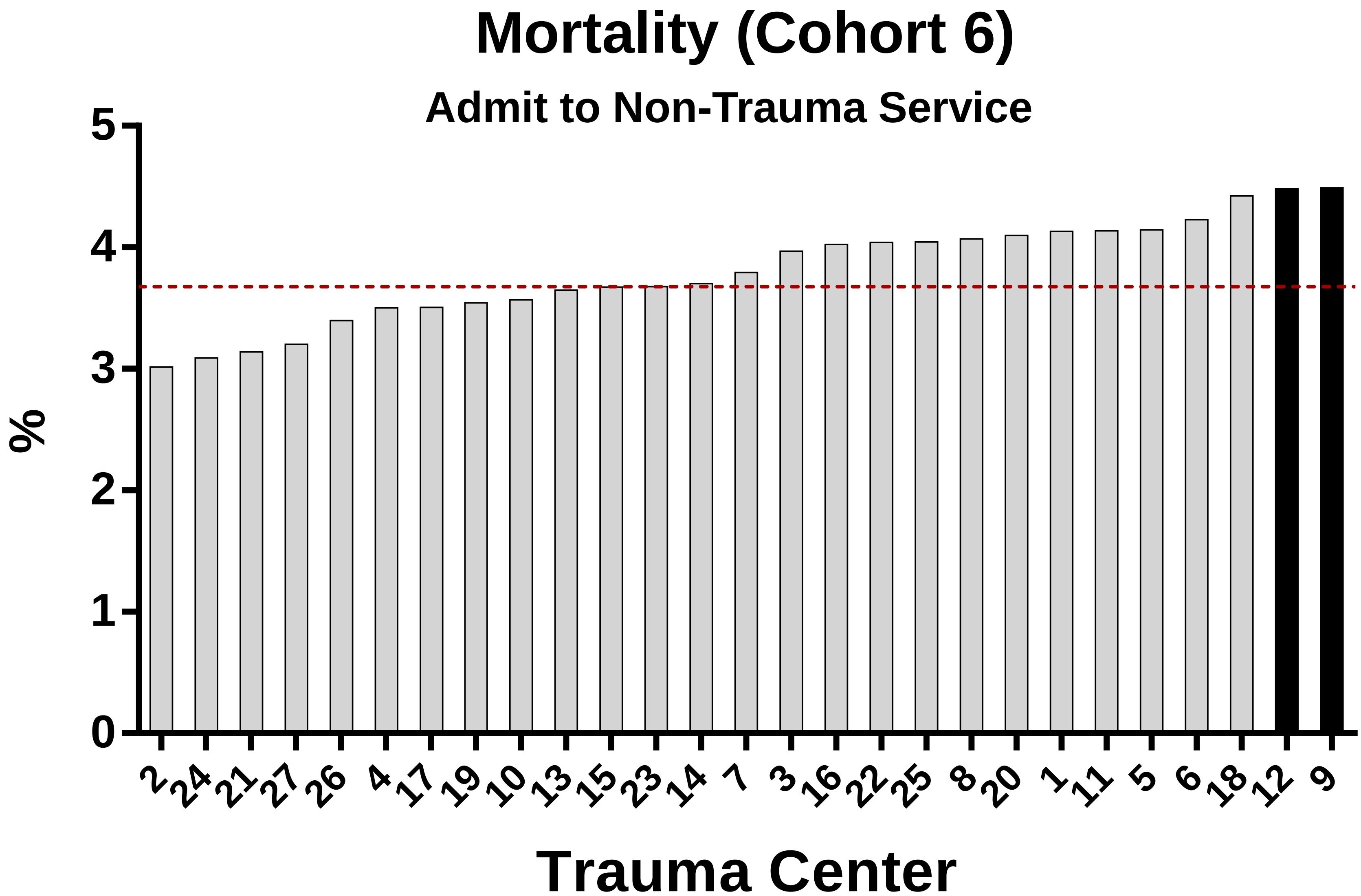


Mortality (Cohort 3 - Blunt Multi w/o DOA's)
20
15
10
5
0
%
24
2
27
15
4
19
23
13
21
14
17
26
10
11
5
20
3
8
1
16
25
9
18
6
12
22
7
Trauma Center

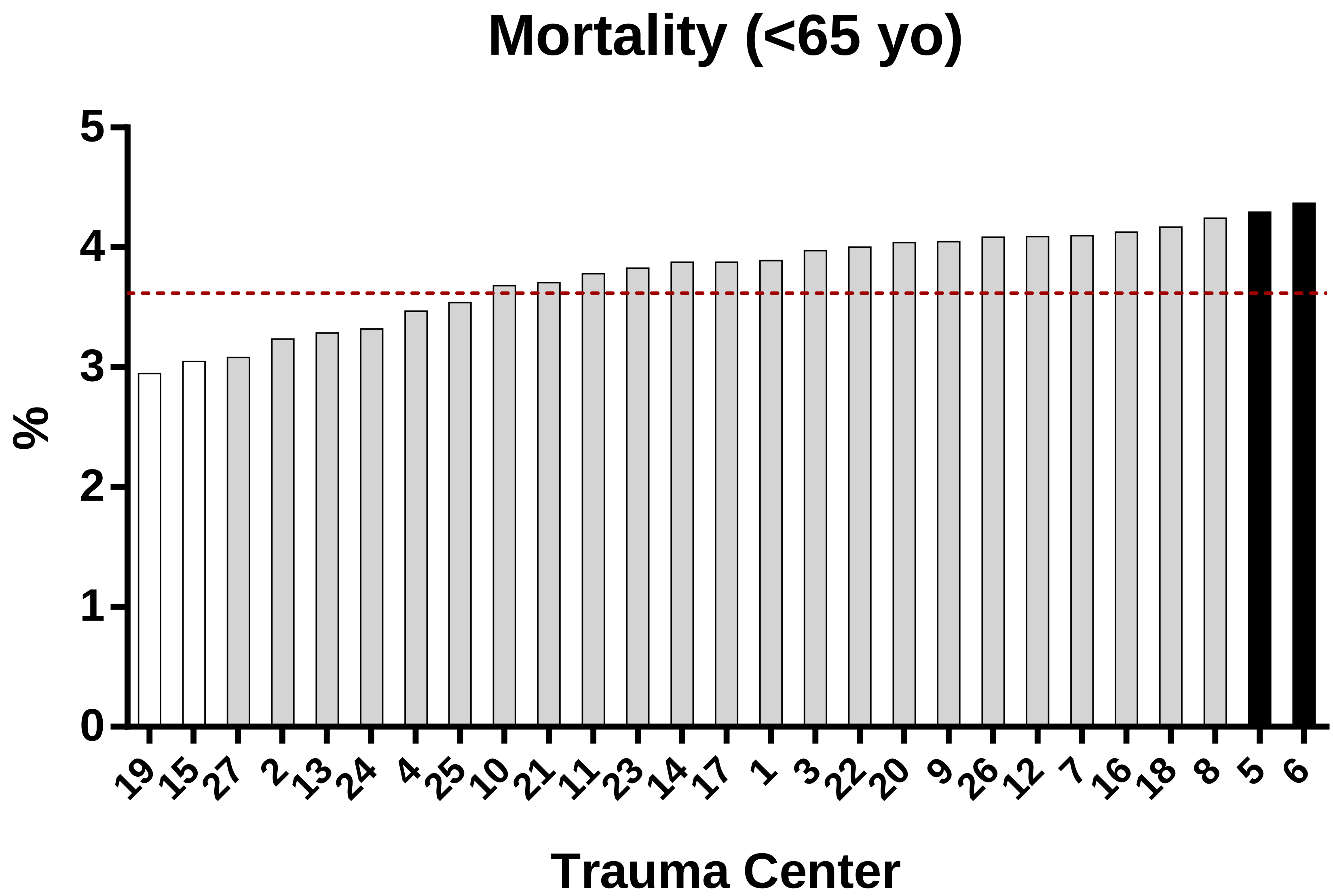

Case Volume Mortality (Cohort 3)
Cases
200
150
100
50
0
24
2
27
15
4
19
23
13
21
14
17
26
10
11
5
20
3
8
1
16
25
9
18
6
12
22
7
Center

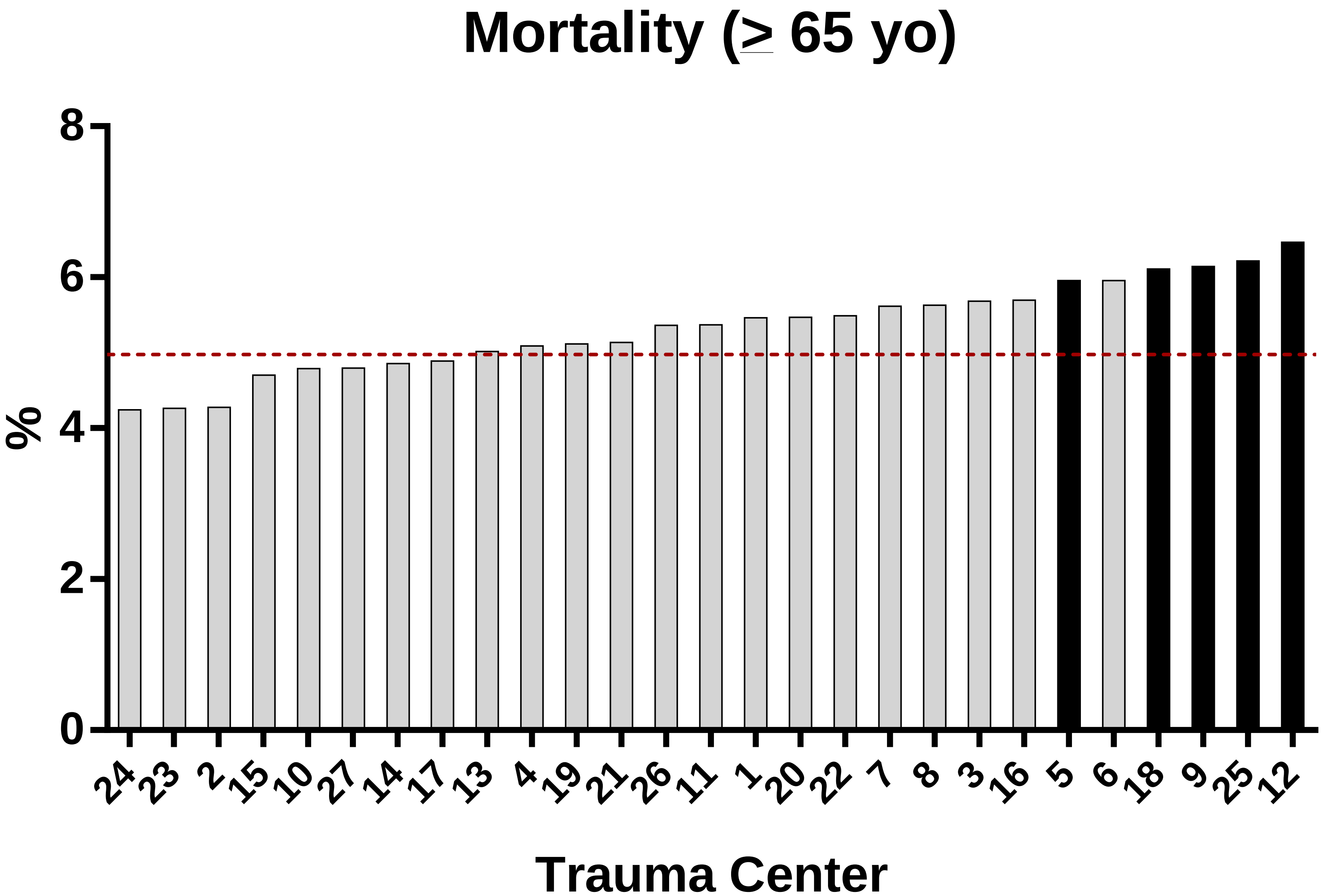

Mortality (Cohort 4 - Blunt Single w/o DOA's)
%
4
3
2
1
0
23
24
2
13
10
15
14
17
19
27
22
21
11
7
4
1
20
26
3
16
8
6
18
9
25
5
12
Trauma Center


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

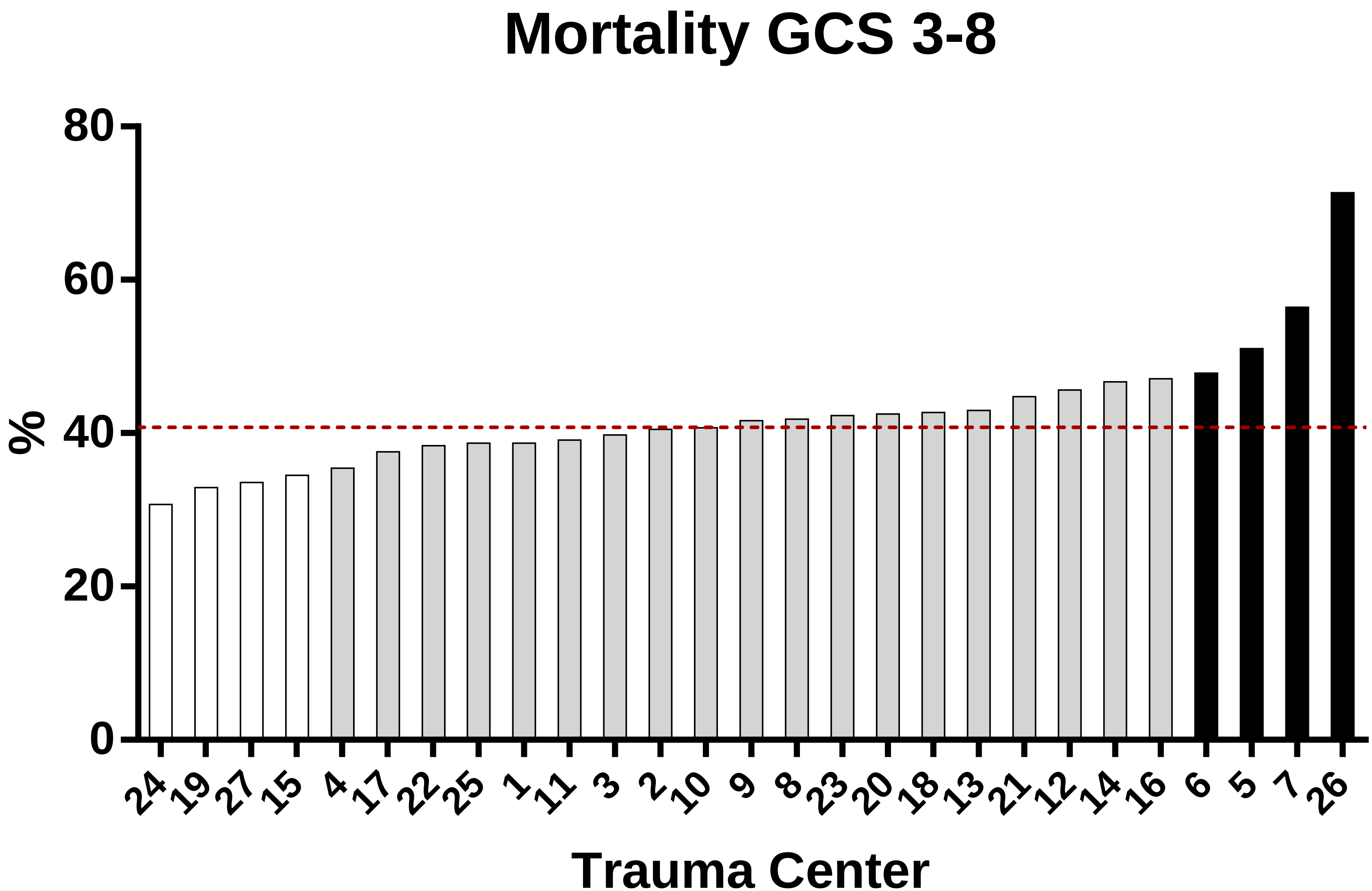


Mortality (Cohort 6)
Admit to Non-Trauma Service
%
0
1
2
3
4
5
2
24
21
27
26
4
17
19
10
13
15
23
14
7
3
16
22
25
8
20
1
11
5
6
18
12
9
Trauma Center


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



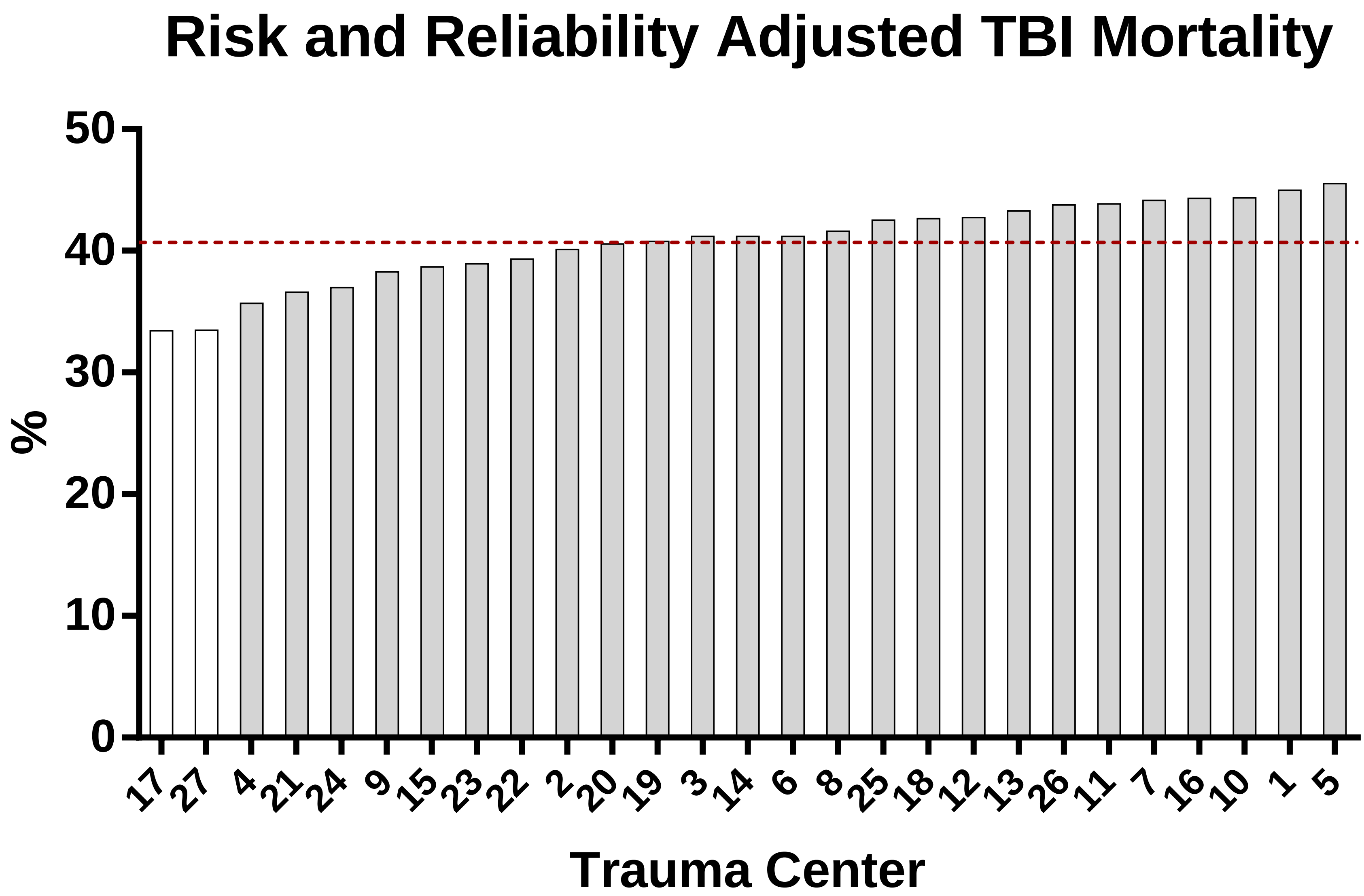
Mortality (≥ 65 yo)
%
0
2
4
6
8
24
23
2
15
10
27
14
17
13
4
19
21
26
11
1
20
22
7
8
3
16
5
6
18
9
25
12
Trauma Center

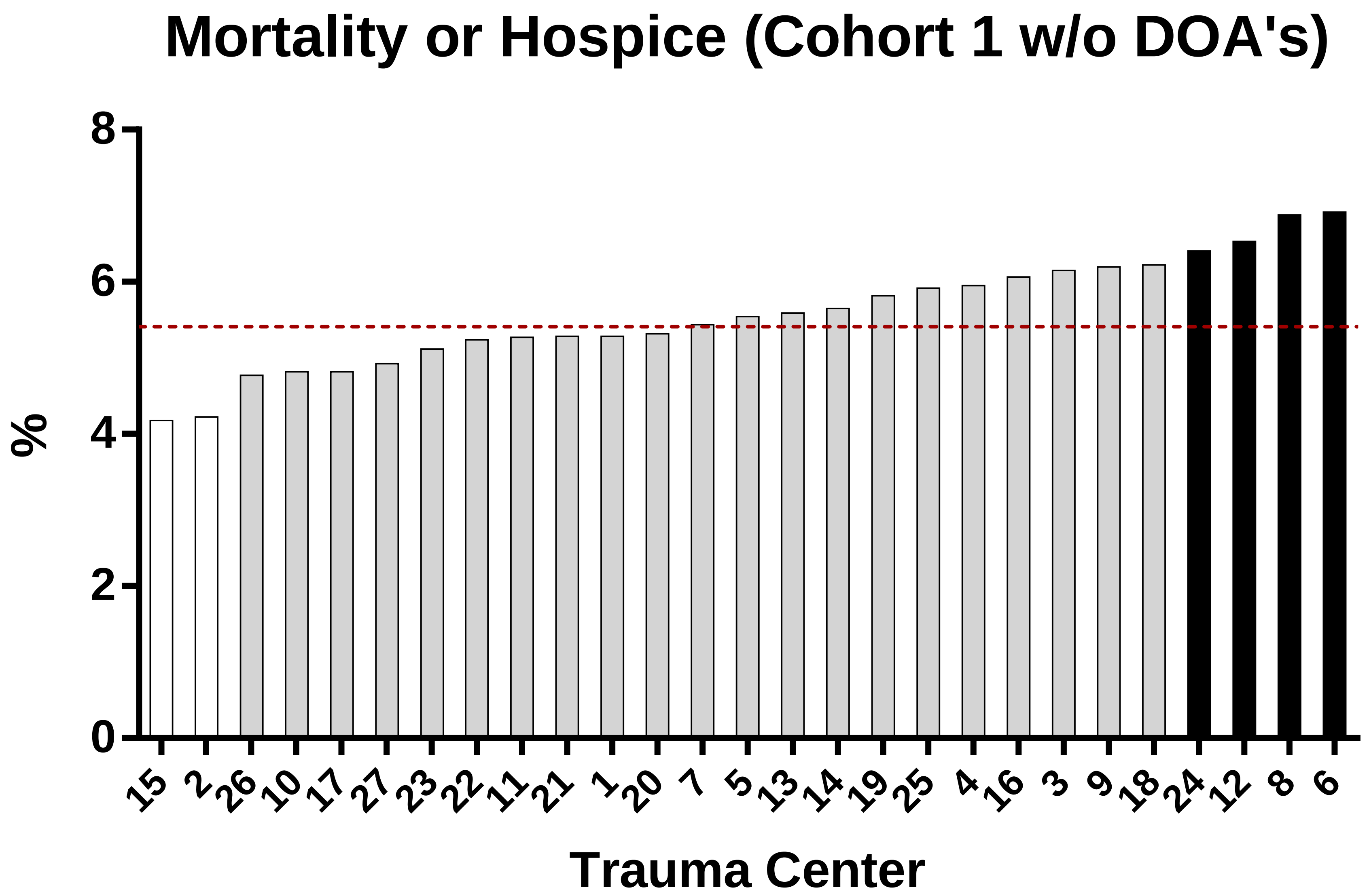


Mortality GCS 3-8
%
80
60
40
20
0
24
19
27
15
4
17
22
25
1
11
3
2
10
9
8
23
20
18
13
21
12
14
16
6
5
7
26
Trauma Center

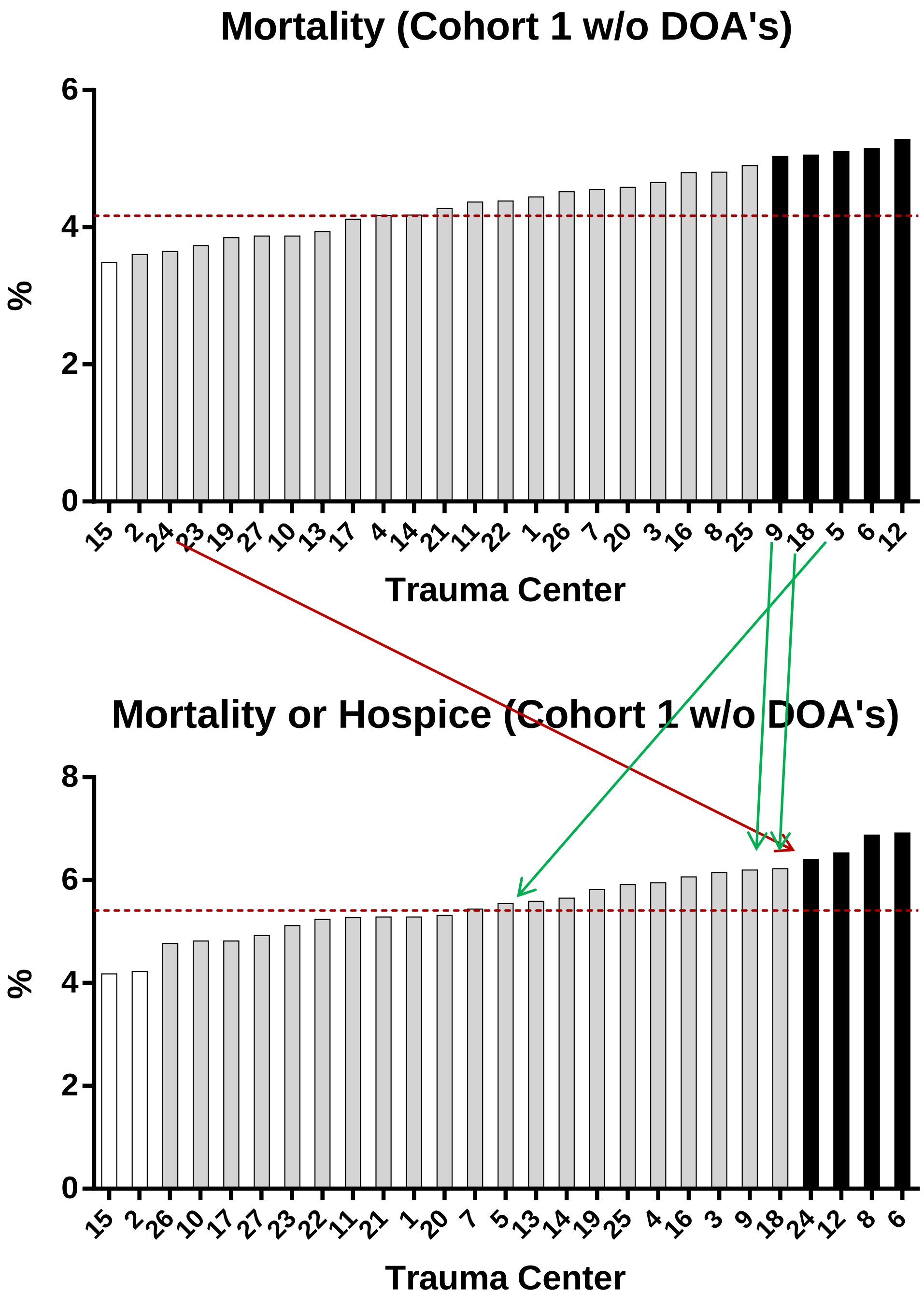
TBI Mortality

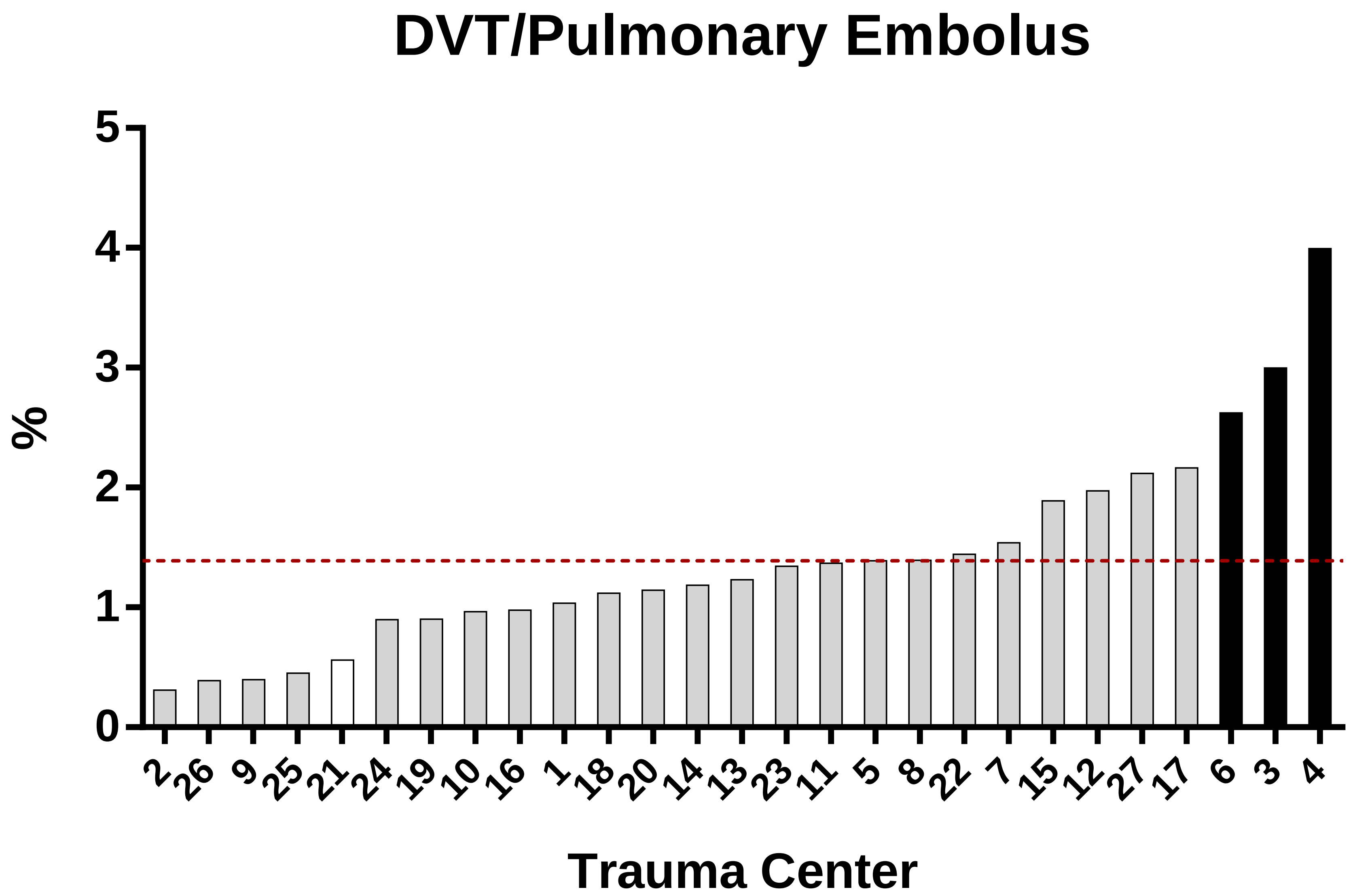
- Brain Injury
  - Selection Criteria
    - AIS Head > 0, excluding vascular, scalp, and bony injuries
    - Exclude if penetrating mechanism
    - Exclude if no signs of life
    - Exclude if direct admission transfer
    - Exclude if Max GCS>8 and TBI GCS>8

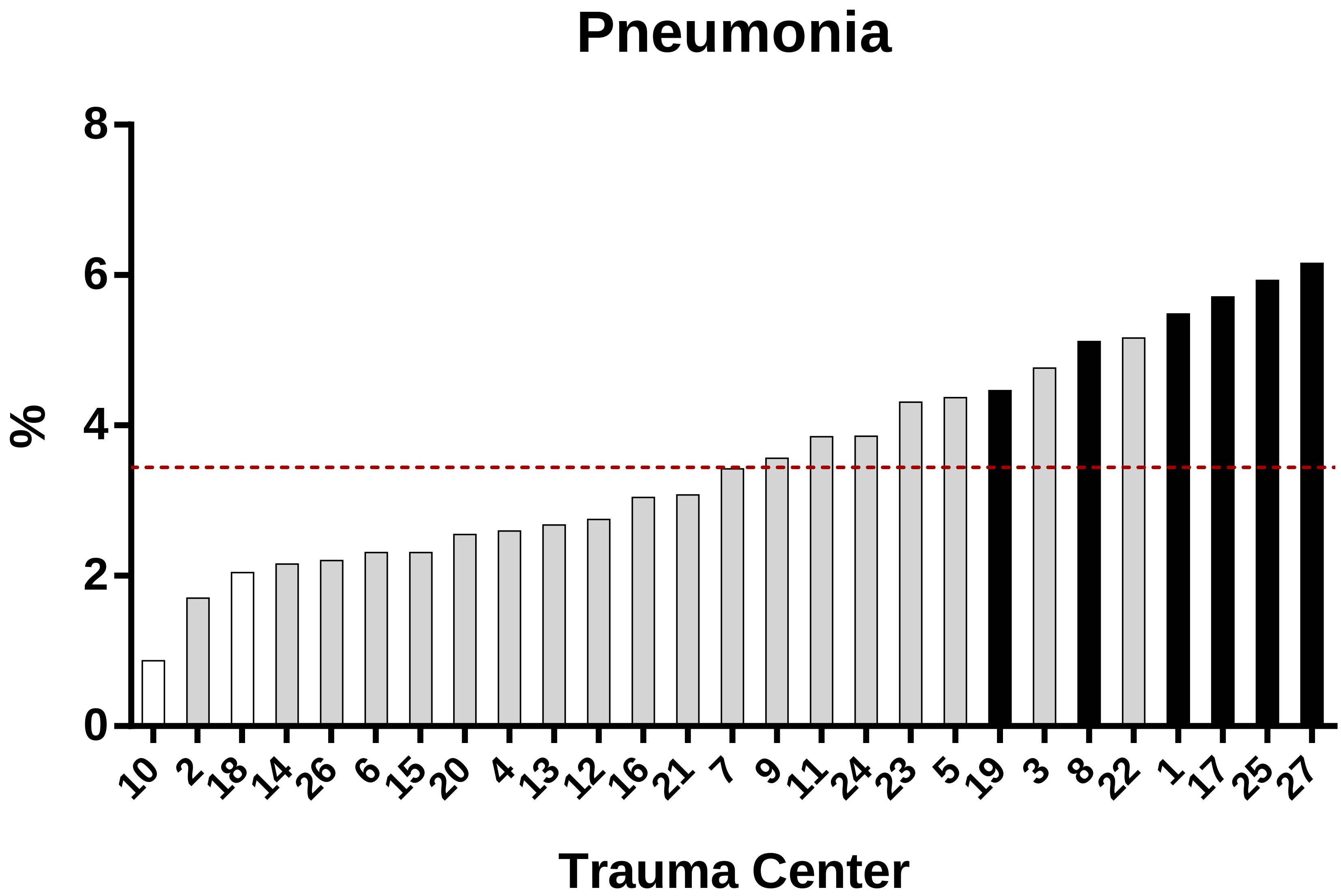

Risk and Reliability Adjusted TBI Mortality
50
40
30
20
10
0
%
17
27
4
21
24
9
15
23
22
2
20
19
3
14
6
8
25
18
12
13
26
11
7
16
10
1
5
Trauma Center

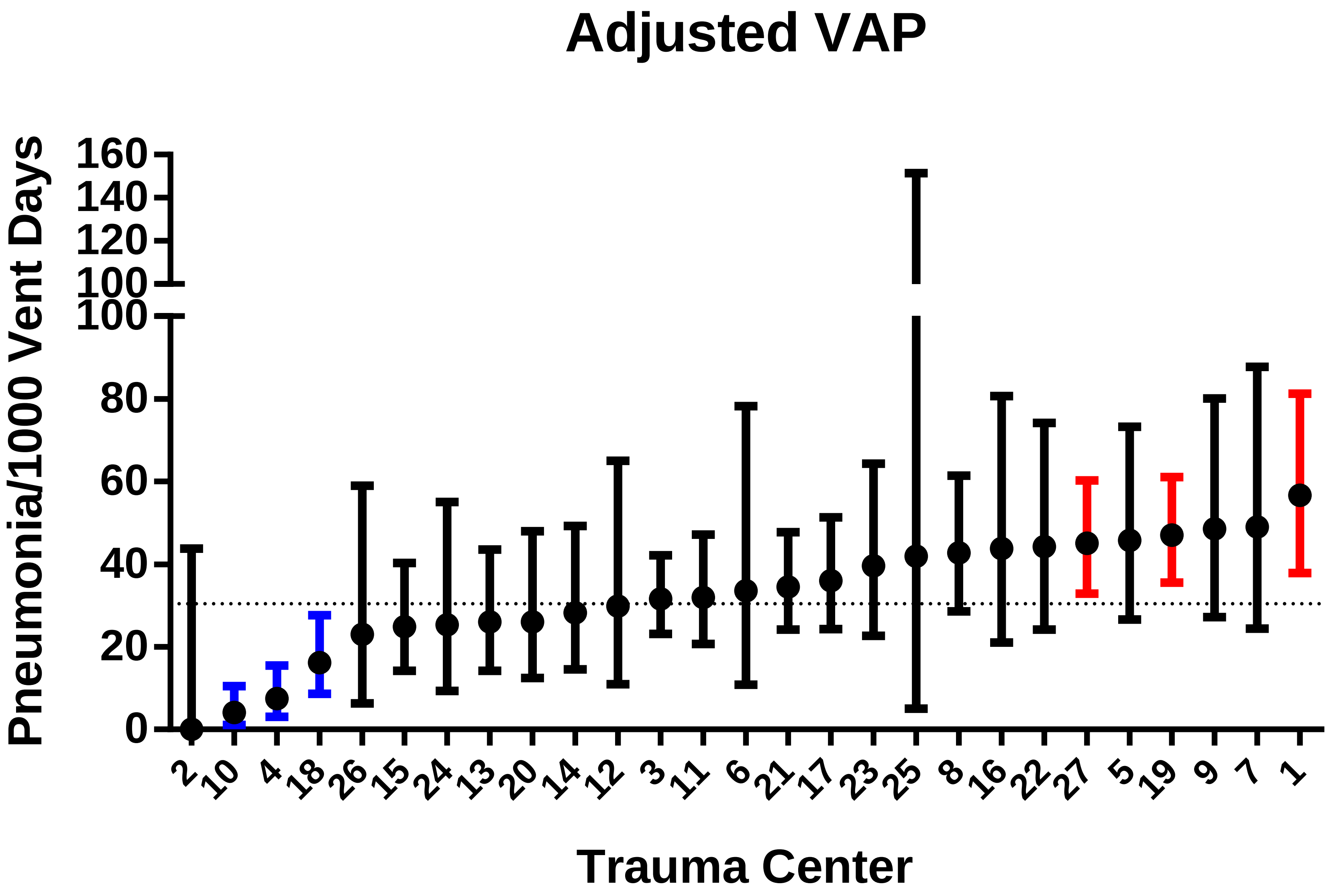


Mortality or Hospice (Cohort 1 w/o DOA's)
%
8
6
4
2
0
15 2 26 10 17 27 23 22 11 21 1 20 7 5 13 14 19 25 4 16 3 9 18 24 12 8 6
Trauma Center

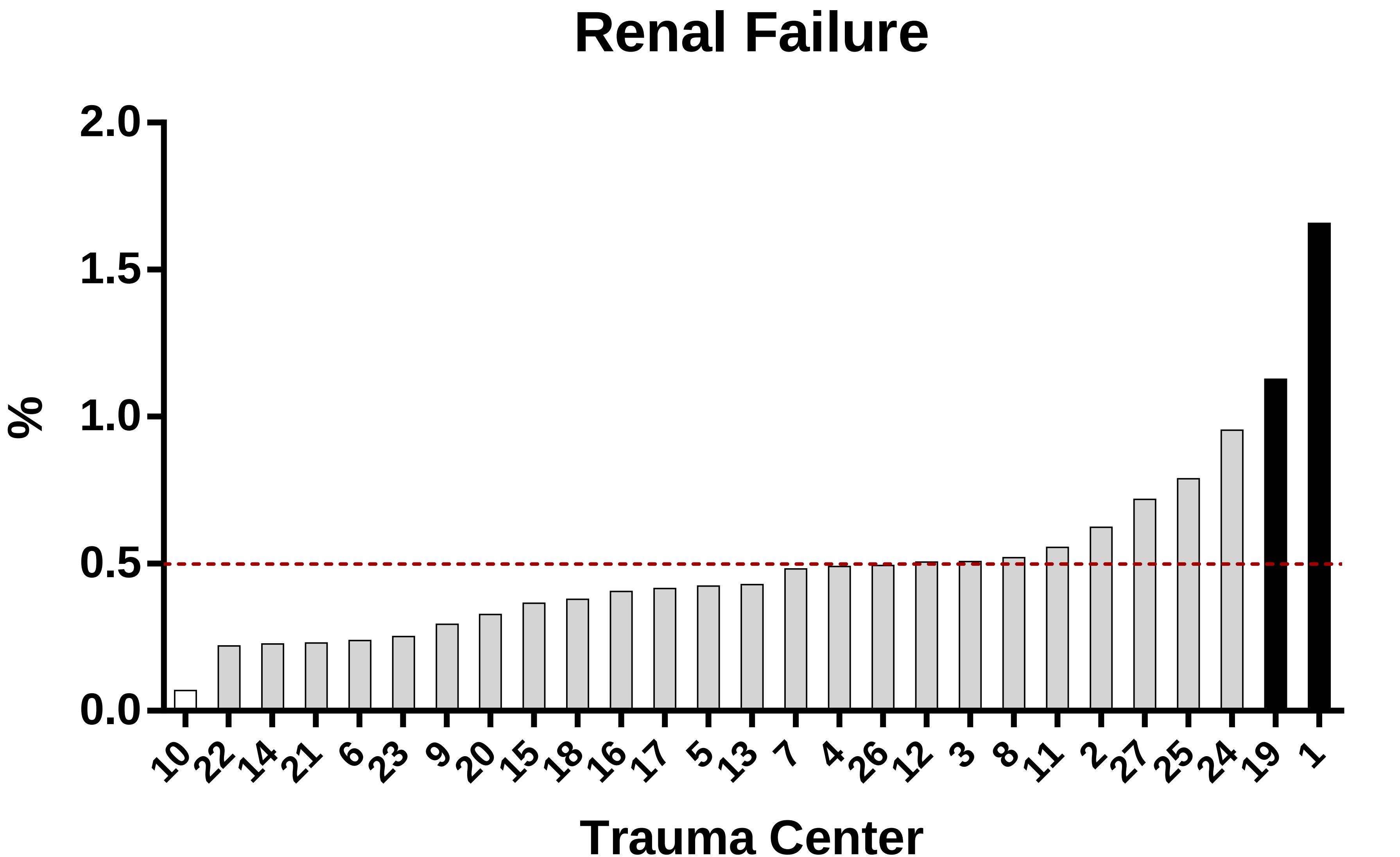

Mortality (Cohort 1 w/o DOA's)
%
0
2
4
6
15 2 24 23 19 27 10 13 17 4 14 21 11 22 1 26 7 20 3 16 8 25 9 18 5 6 12
Trauma Center
Mortality or Hospice (Cohort 1 w/o DOA's)
%
0
2
4
6
8
15 2 26 10 17 27 23 22 11 21 1 20 7 5 13 14 19 25 4 16 3 9 18 24 12 8 6
Trauma Center

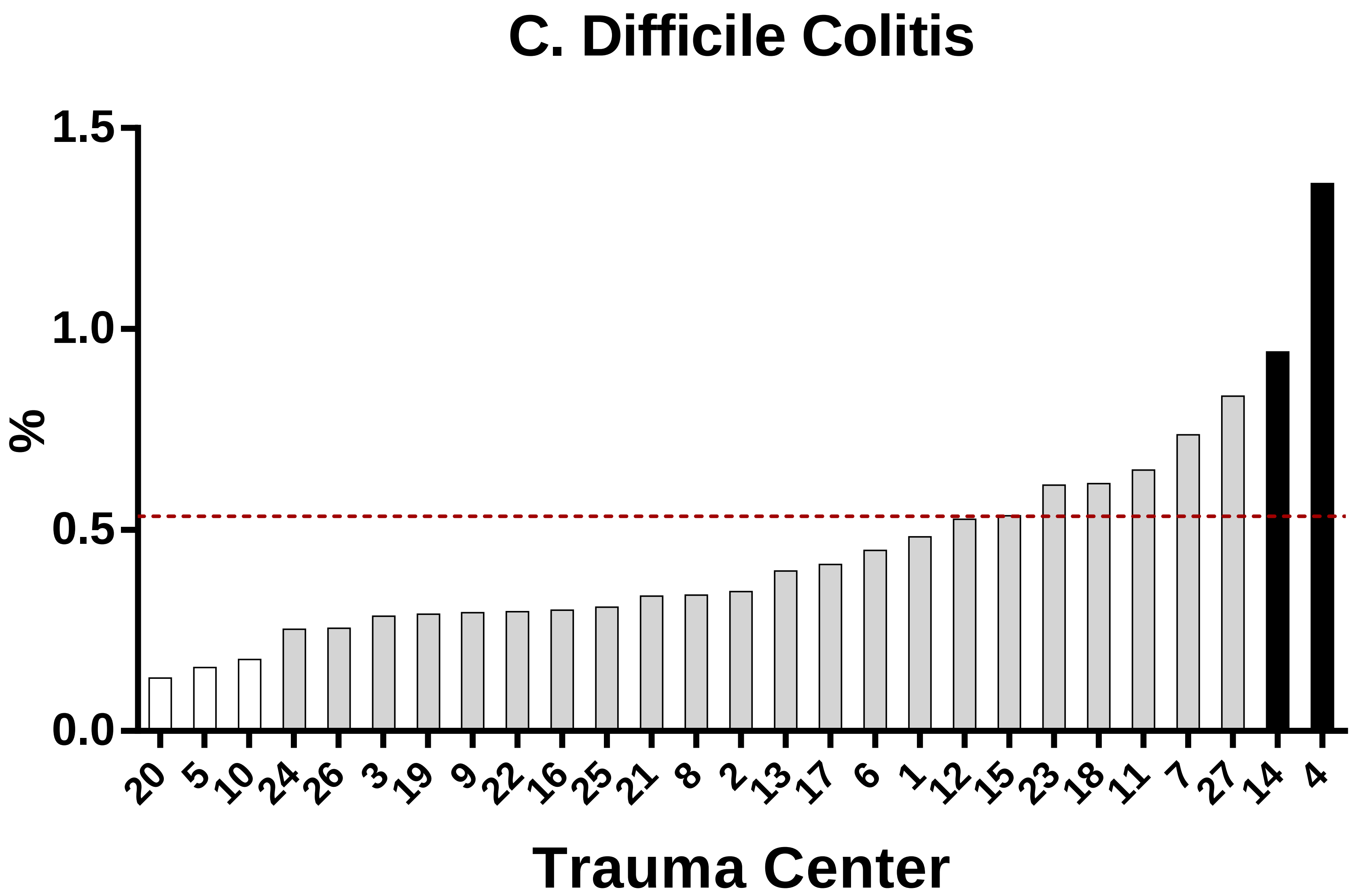

DVT/Pulmonary Embolus
%
Trauma Center
0
1
2
3
4
5
2
26
9
25
21
24
19
10
16
1
18
20
14
13
23
11
5
8
22
7
15
12
27
17
6
3
4

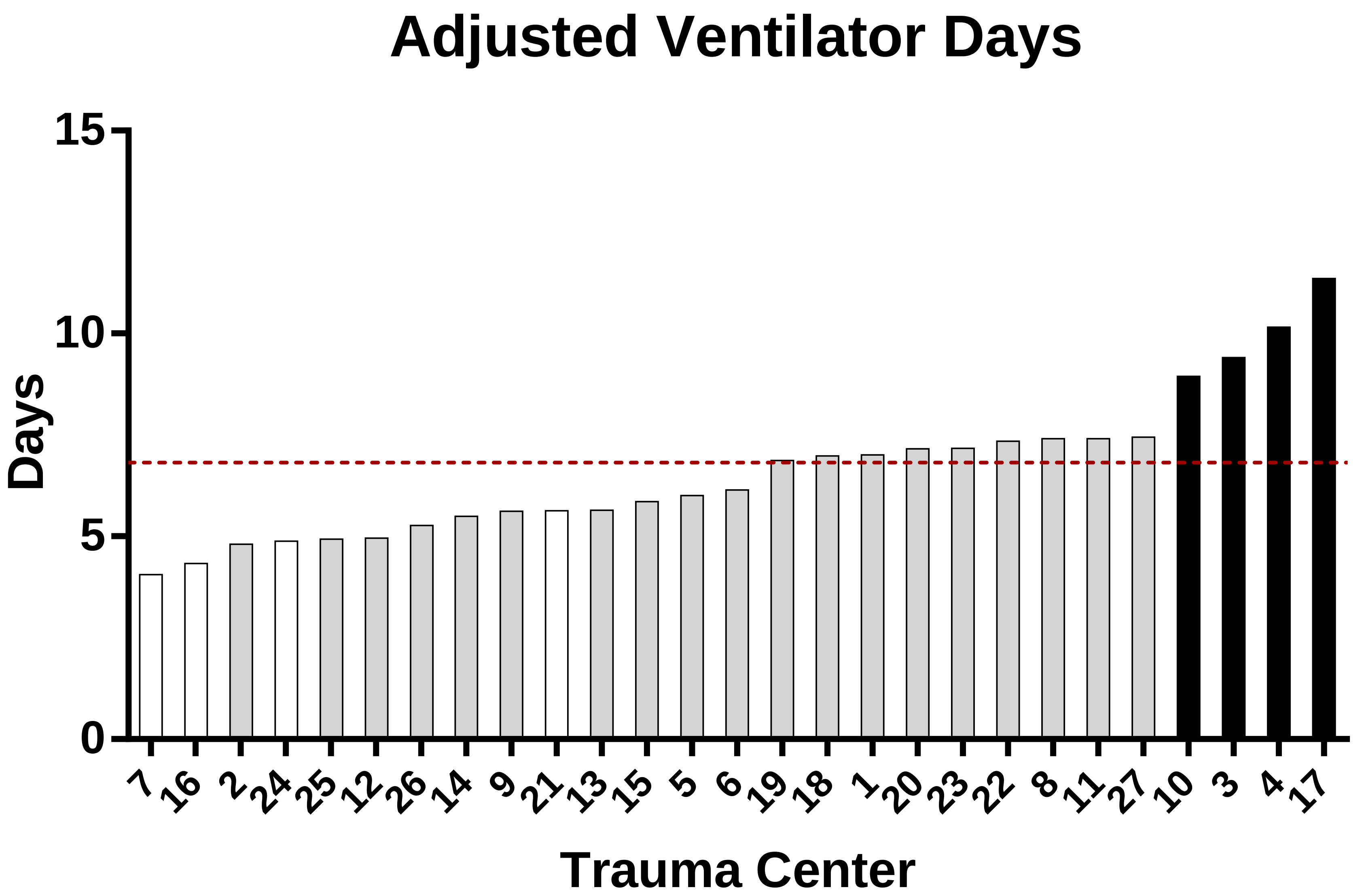

Pneumonia
%
8
6
4
2
0
10 2 18 14 26 6 15 20 4 13 12 16 21 7 9 11 24 23 5 19 3 8 22 1 17 25 27
Trauma Center

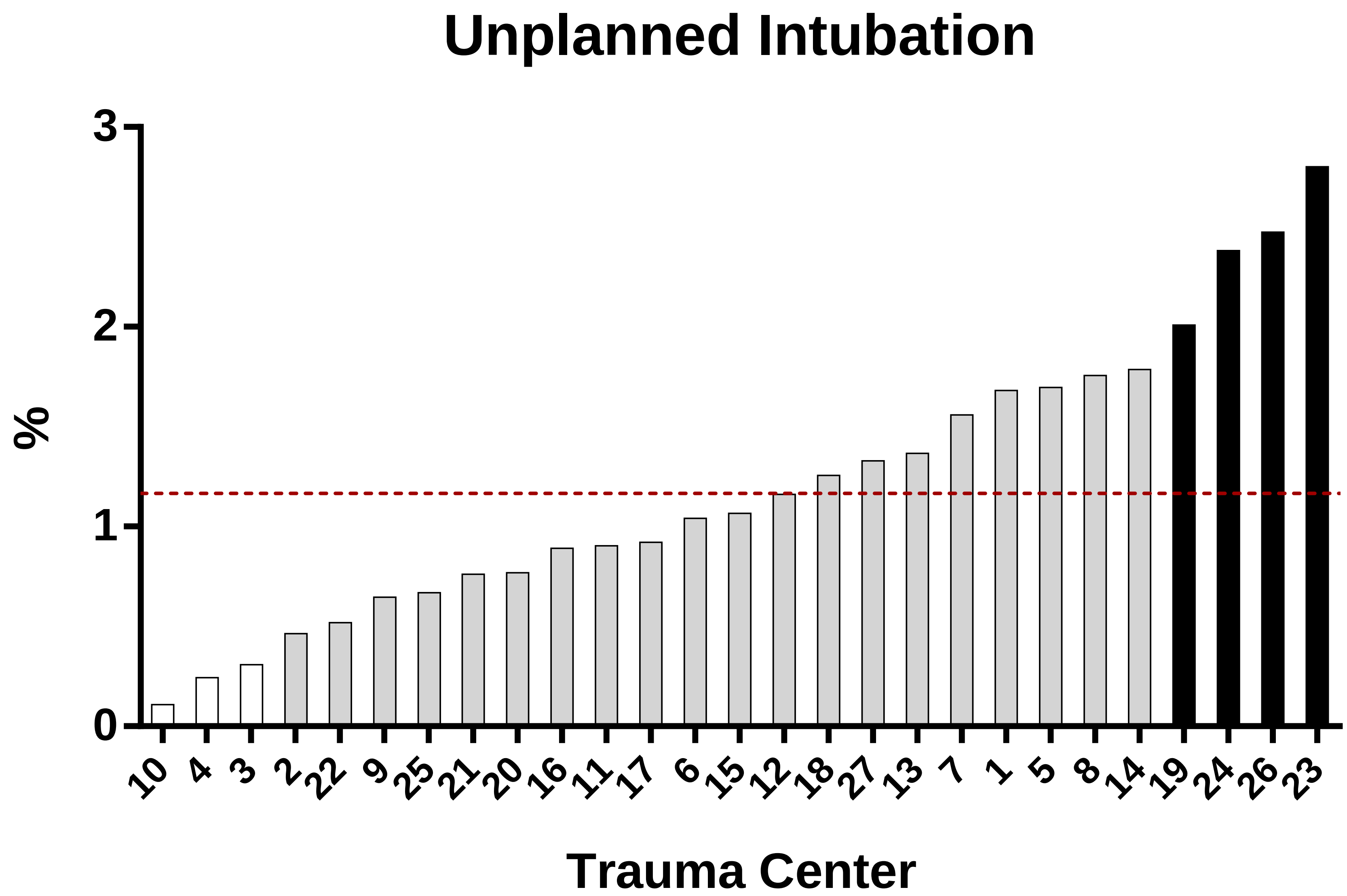


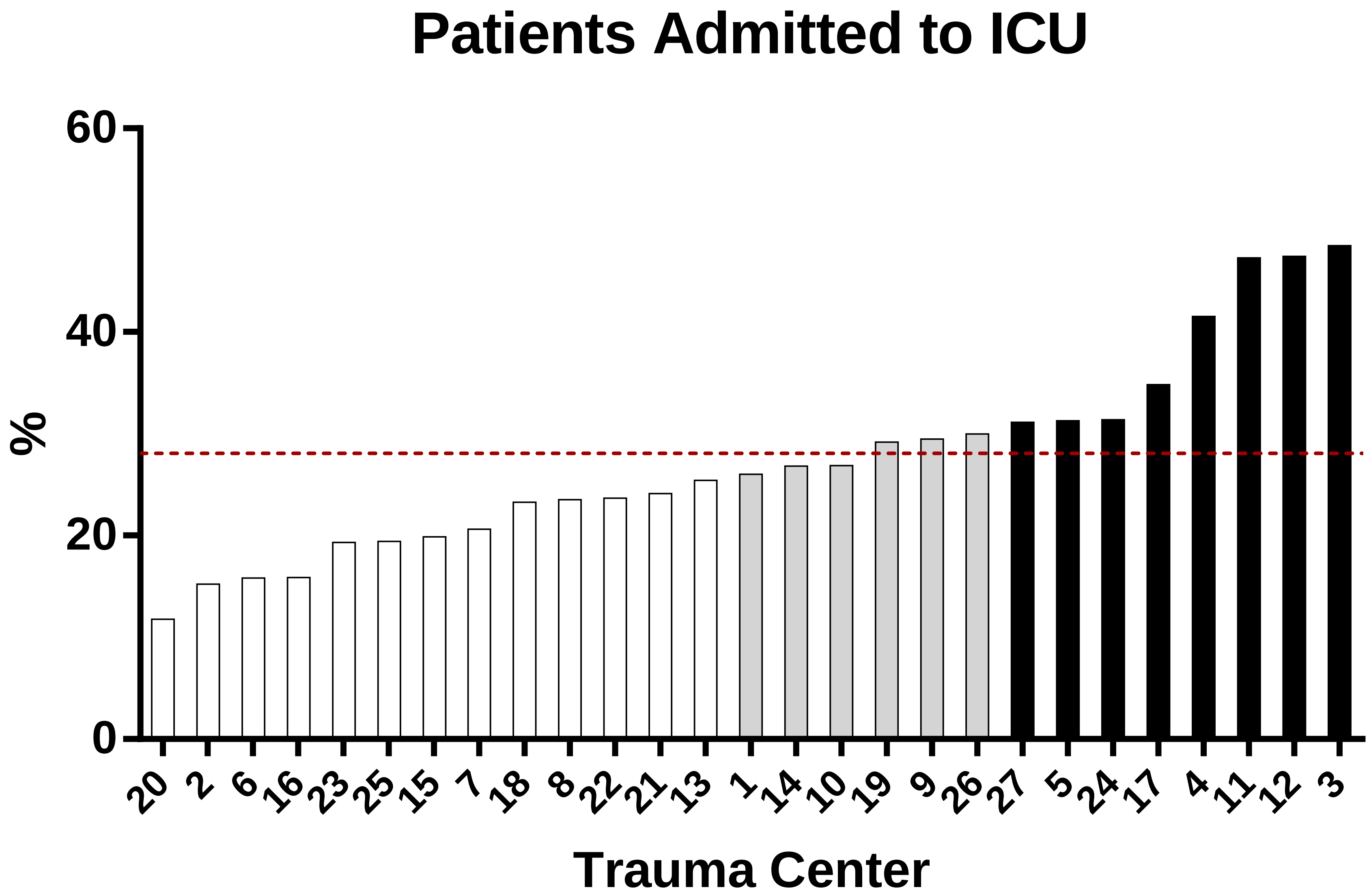
Adjusted VAP
Pneumonia/1000 Vent Days
160
140
120
100
100
80
60
40
20
0
2
10
4
18
26
15
24
13
20
14
12
3
11
6
21
17
23
25
8
16
22
27
5
19
9
7
1
Trauma Center


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

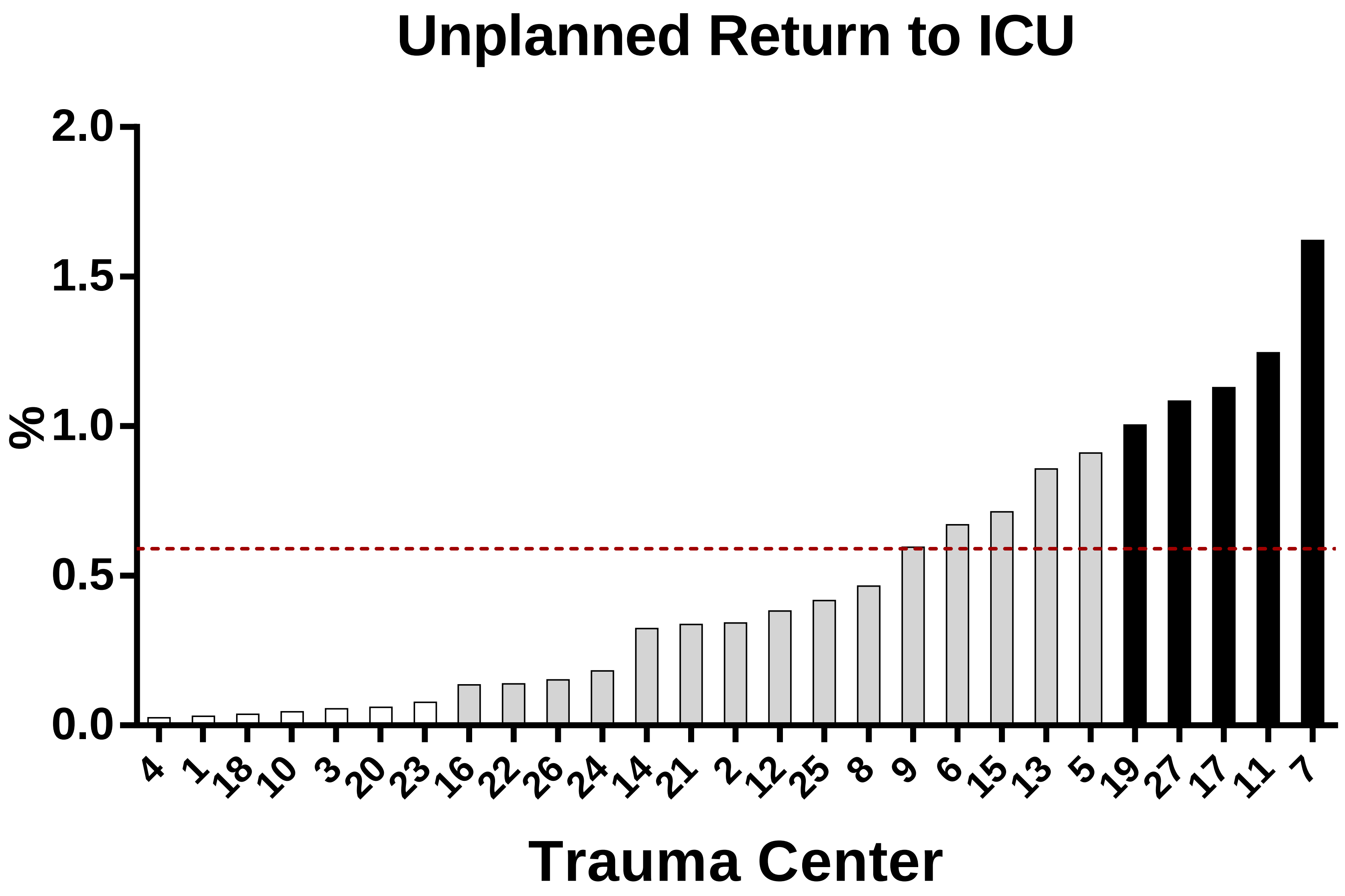

C. Difficile Colitis
%
1.5
1.0
0.5
0.0
20
5
10
24
26
3
19
9
22
16
25
21
8
2
13
17
6
1
12
15
23
18
11
7
27
14
4
Trauma Center

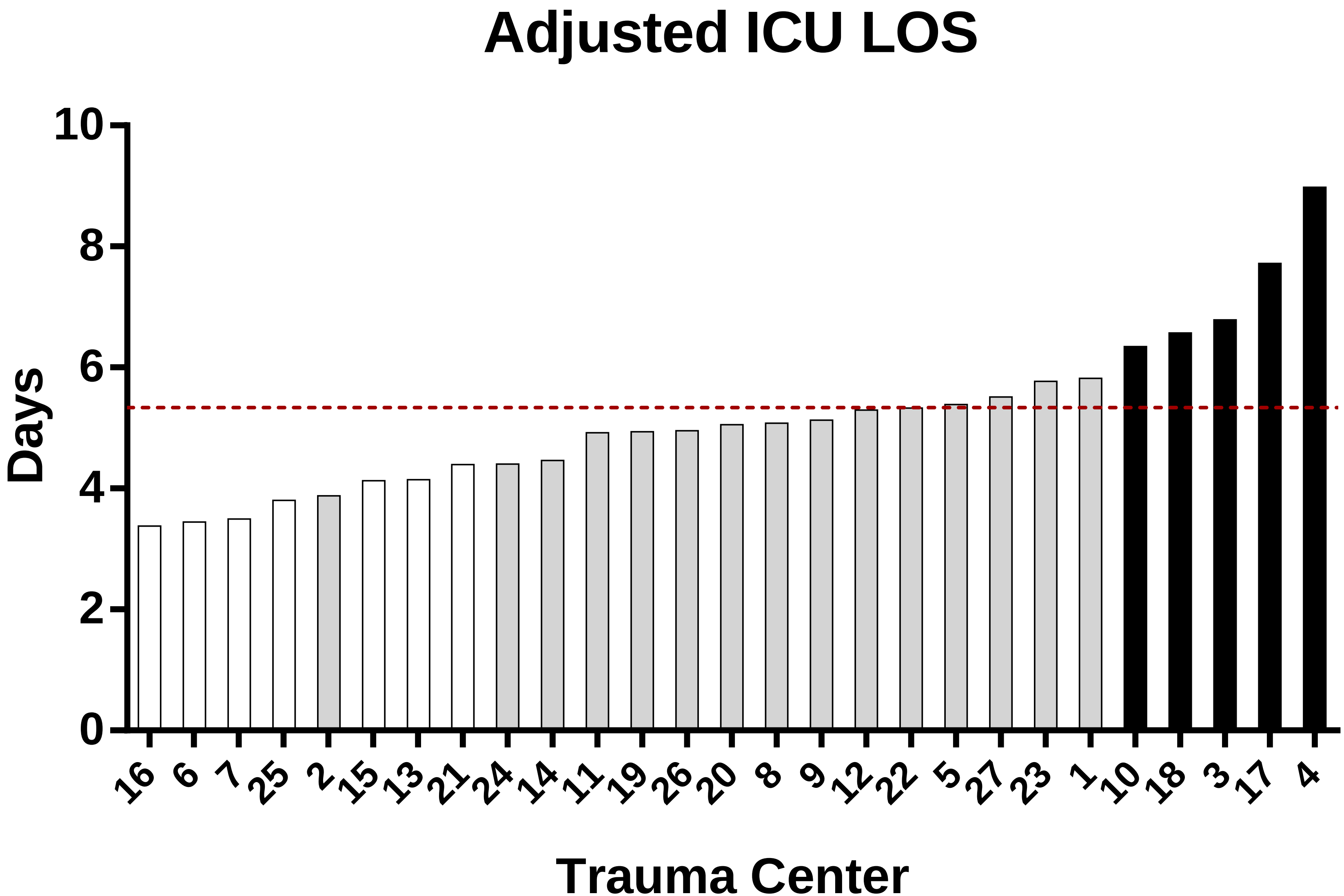

Adjusted Ventilator Days
Days
15
10
5
0
7
16
2
24
25
12
26
14
9
21
13
15
5
6
19
18
1
20
23
22
8
11
27
10
3
4
17
Trauma Center

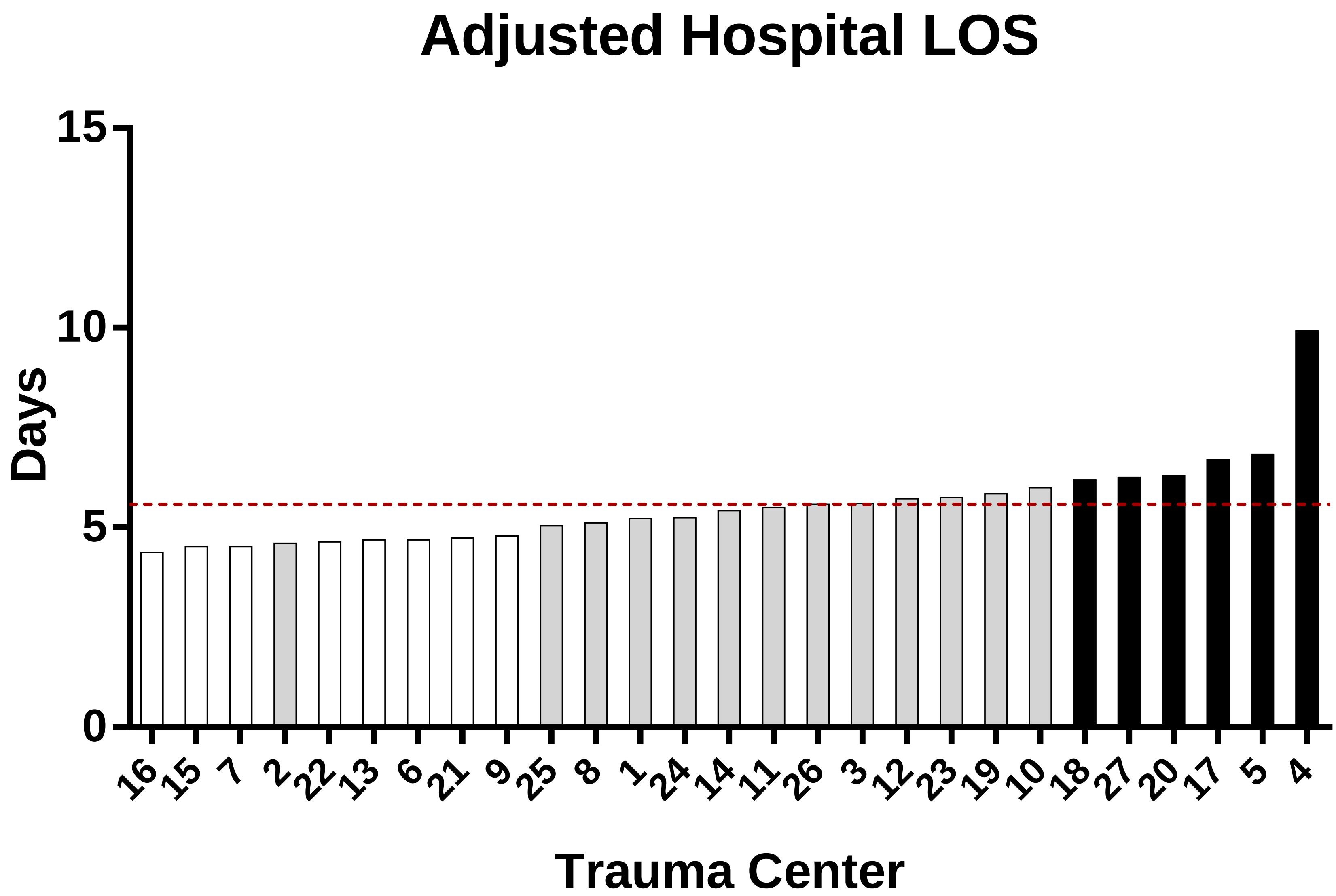

Unplanned Intubation
%
3
2
1
0
10
4
3
2
22
9
25
21
20
16
11
17
6
15
12
18
27
13
7
1
5
8
14
19
24
26
23
Trauma Center



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


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


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


Adjusted Hospital LOS
Days
15
10
5
0
16
15
7
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22
13
6
21
9
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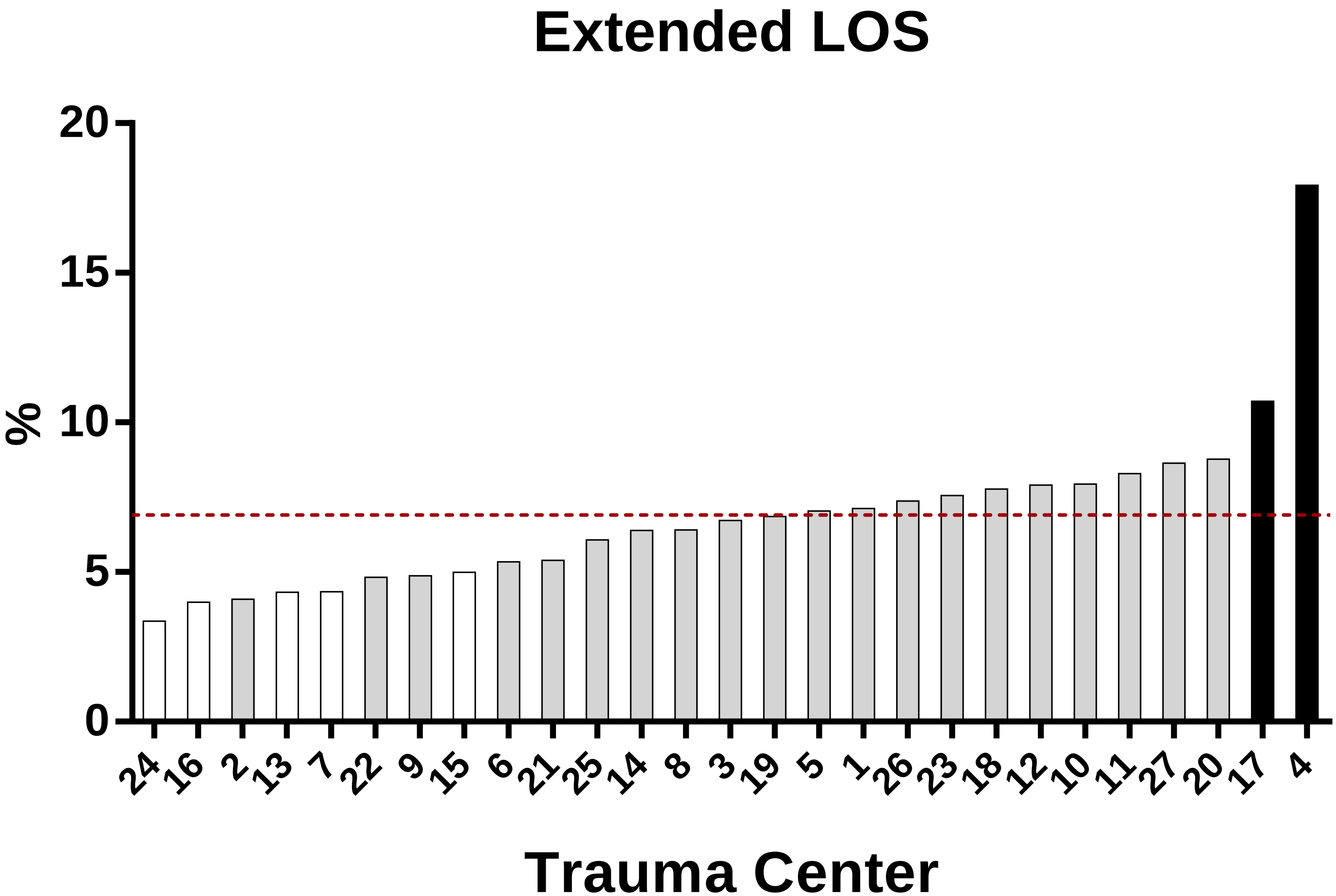
Trauma Center



Extended LOS
%
20
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Trauma Center

ARDS and Ventilators

Pauline Park, MD

M·TQIP

2015 Faculty Disclosure Slide

LIPS-A - NIH/NHLBI U01HL108712

EPVENT2 - NIH/NHLBI UM1HL108724

PETAL - NIH/NHLBI U01HL123031

ARDS Management: Overview 2015

➢ Low tidal volume ventilation
Prone Positioning
Early neuromuscular blockade

~~x HFOV~~
~~iNO~~

? Transpulmonary pressure guided ventilator management
ECMO

❖ Early intervention to reduce lung injury
Long Term Outcomes
Prevention in OR and ED

The Lancet · Saturday 12 August 1967

ACUTE RESPIRATORY DISTRESS IN ADULTS

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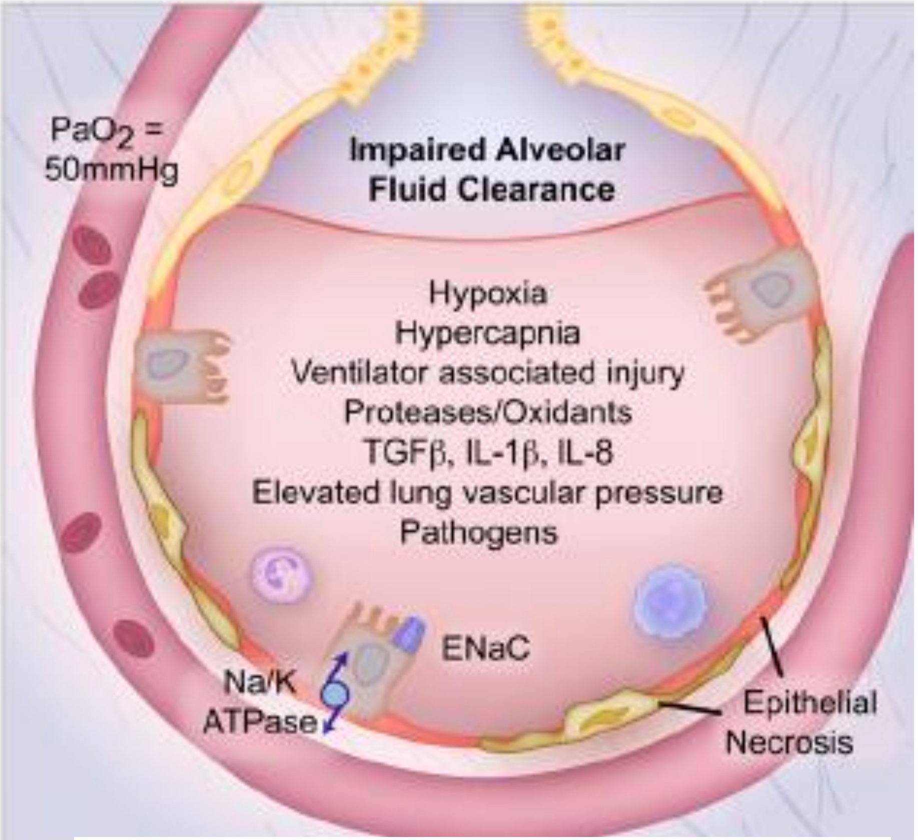
From the Departments of Surgery and Medicine, University of Colorado Medical Center, Denver, Colorado, U.S.A.

Summary The respiratory-distress syndrome in 12 patients was manifested by acute onset of tachypnœa, hypoxæmia, and loss of compliance after a variety of stimuli; the syndrome did not respond to usual and ordinary methods of respiratory therapy. The clinical and pathological features closely resembled those seen in infants with respiratory distress and to conditions in congestive atelectasis and postperfusion lung. The theoretical relationship of this syndrome to alveolar



Am J Respir Crit Care Med Vol 189, Iss 11, pp 1301–1308, Jun 1, 2014

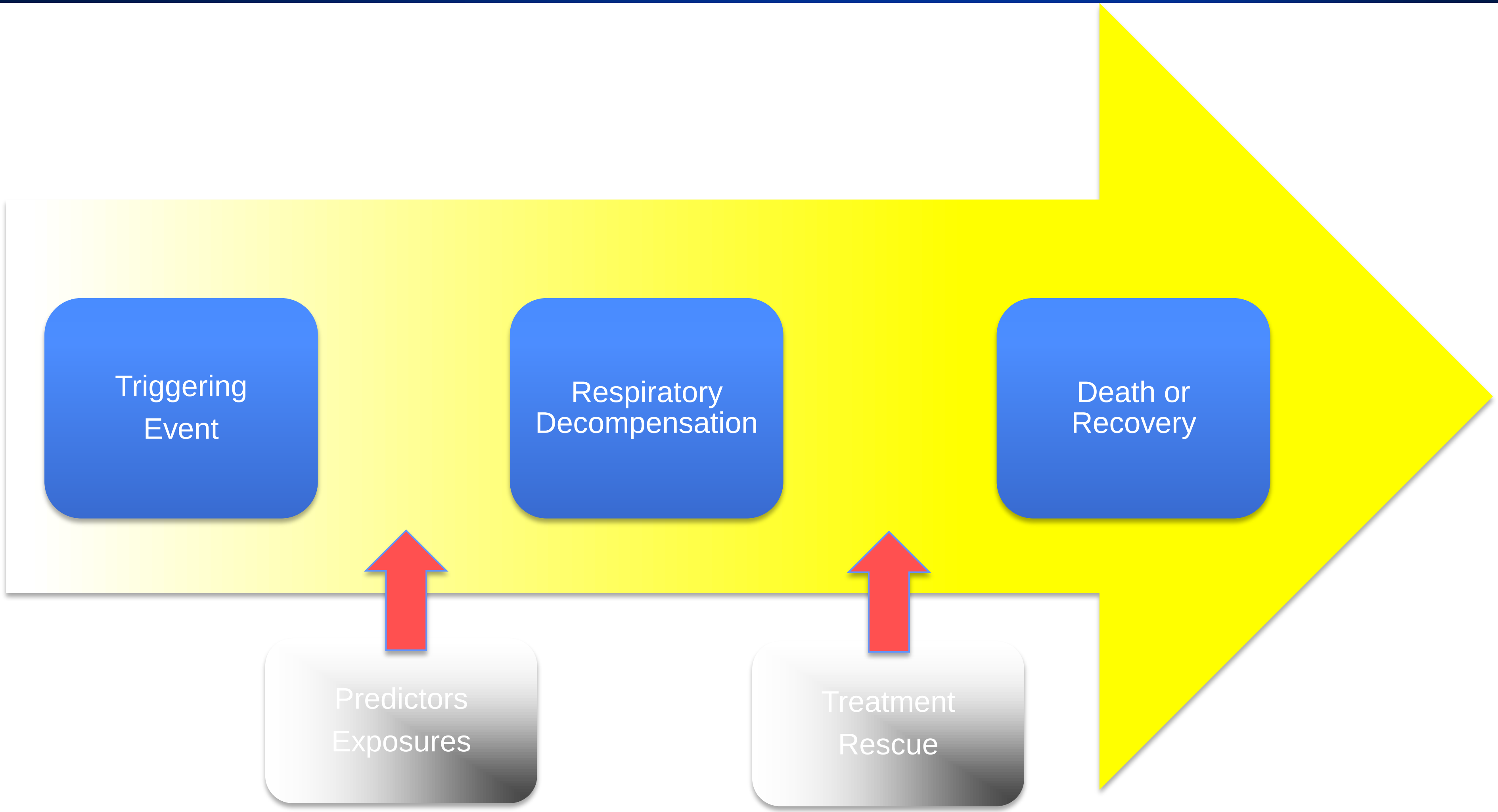
Normal Ventilation (rat lung)

(courtesy Gary Nieman, SUNY Upstate)

Injury (rat lung)

(courtesy Gary Nieman, SUNY Upstate)

Despite therapy, some patients will develop refractory hypoxemia



Acute Respiratory Distress Syndrome
The Berlin Definition

ARDS Definition Task Force, JAMA 2012 Jun 20; 307 (23): 25-26

	Mild	**Moderate**	**Severe**
Timing	Acute within one week		
Hypoxia	300 – 201	$\leq$ 200	**$\leq$ 100**
PEEP	$\leq$ 5	$\leq$ 5	$\leq$ 10
Radiology	Bilateral	Bilateral	> 3 quadrants
Vent			Ve > 10L CRS < 40

Acute Respiratory Distress Syndrome
The Berlin Definition

ARDS Definition Task Force, JAMA 2012 Jun 20; 307 (23): 25-26

	Mild	Moderate	Severe
Timing	Acute within one week		
Hypoxia	300 – 201	$\leq$ 200	**$\leq$ 100**
PEEP	$\leq$ 5	$\leq$ 5	< 10
Radiology	Bilateral	Bilateral	> 3 [illegible] its
Vent			[illegible] S <
Anticipated			
Incidence	23%	63%	14%
Mortality	10%	32%	62%

In absence of known predisposing risk factor* or not fully explained, assessment for cardiac failure required.

*Pneumonia, aspiration, inhalation, pulmonary contusion, drowning sepsis, transfusion, trauma, pancreatitis, noncardiogenic shock, drug overdose

Criteria for additional severity of disease did not enhance model and dropped from final definition

What do we actually think we know?

- Ventilation with high airway pressures is bad

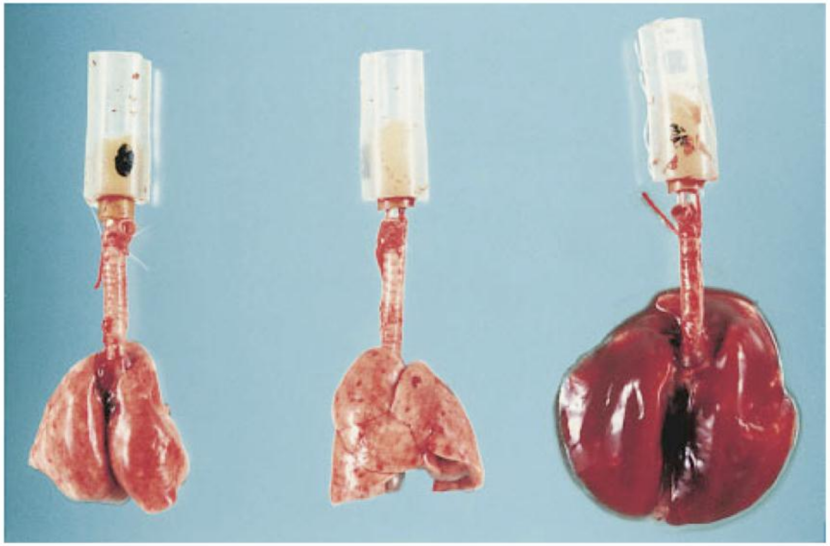
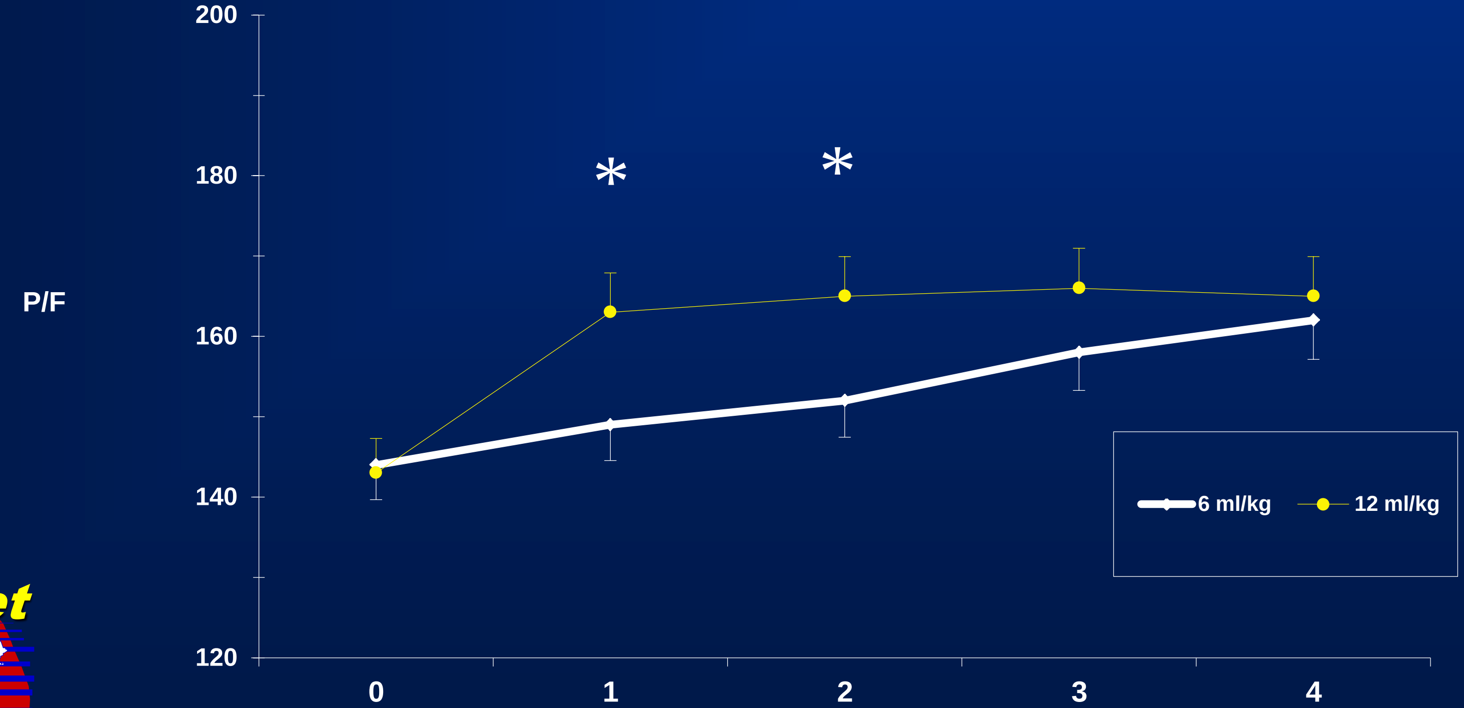


Figure 5. Macroscopic aspect of rat lungs after mechanical ventilation at 45 cm H_2O peak airway pressure. *Left*: normal lungs; *middle*: after 5 min of high airway pressure mechanical ventilation. Note the focal zones of atelectasis (in particular at the left lung apex); *right*: after 20 min, the lungs were markedly enlarged and congestive; edema fluid fills the tracheal cannula.

Am J Respir Crit Care Med Vol 157. pp 294–323, 1998

What do we actually think we know?

- Lower tidal volume ventilation with pressure limitation is good
- Correction of hypoxia is not a good surrogate for mortality

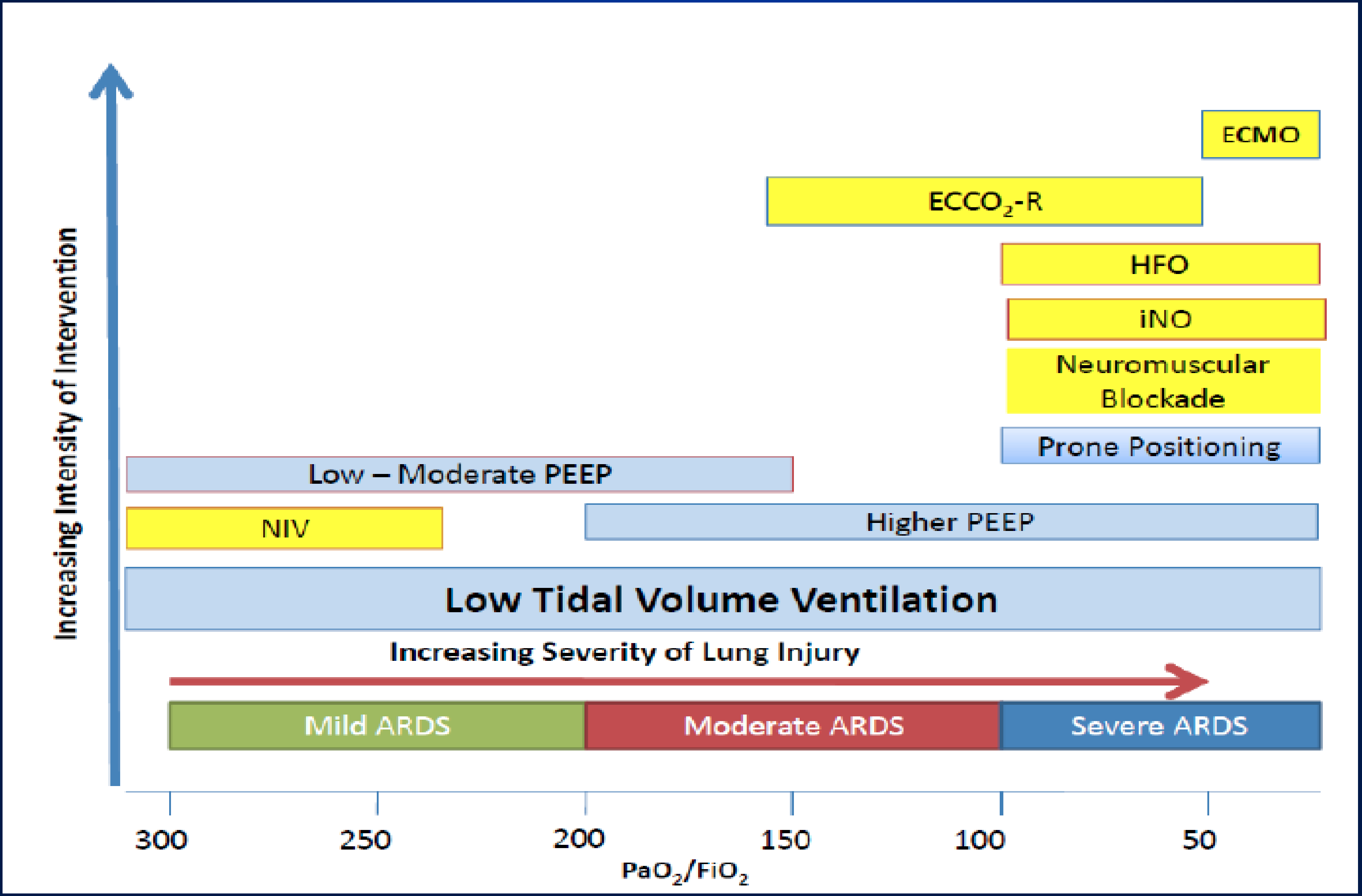


ARDSnet
NIH NHLBI ARDS Clinical Trials Network

➢ Standard of Care Lung Protective Ventilation

- 6ml/kg of predicted body weight
  - – Males 50 + 2.3 * (height in inches above 60")
  - – Females 45.5 + 2.3 * (height in inches above 60")
- Maintain Pplat < 30 with volume titration
- Permissive hypercapnia, treat acidosis with supplemental bicarbonate

Treatment Strategies in ARDS

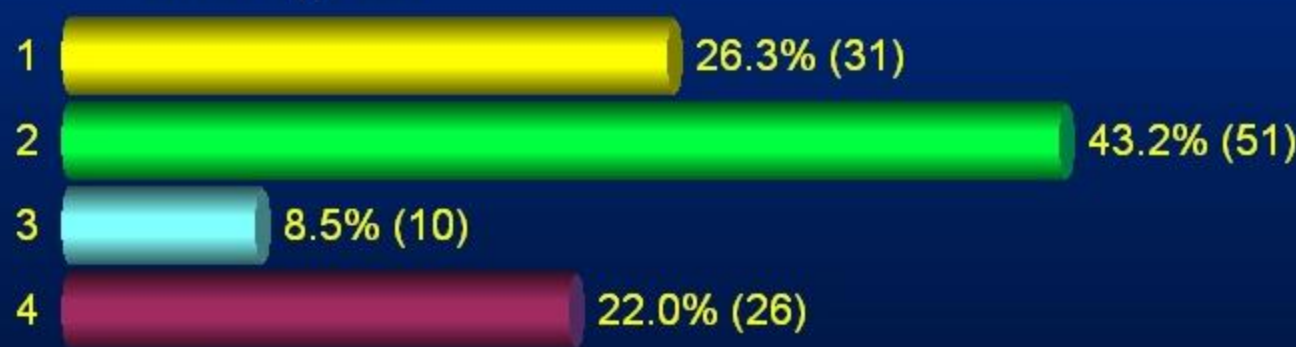


➢ Prone Positioning

Question 13 - Prone

How often do you use prone positioning in ARDS?

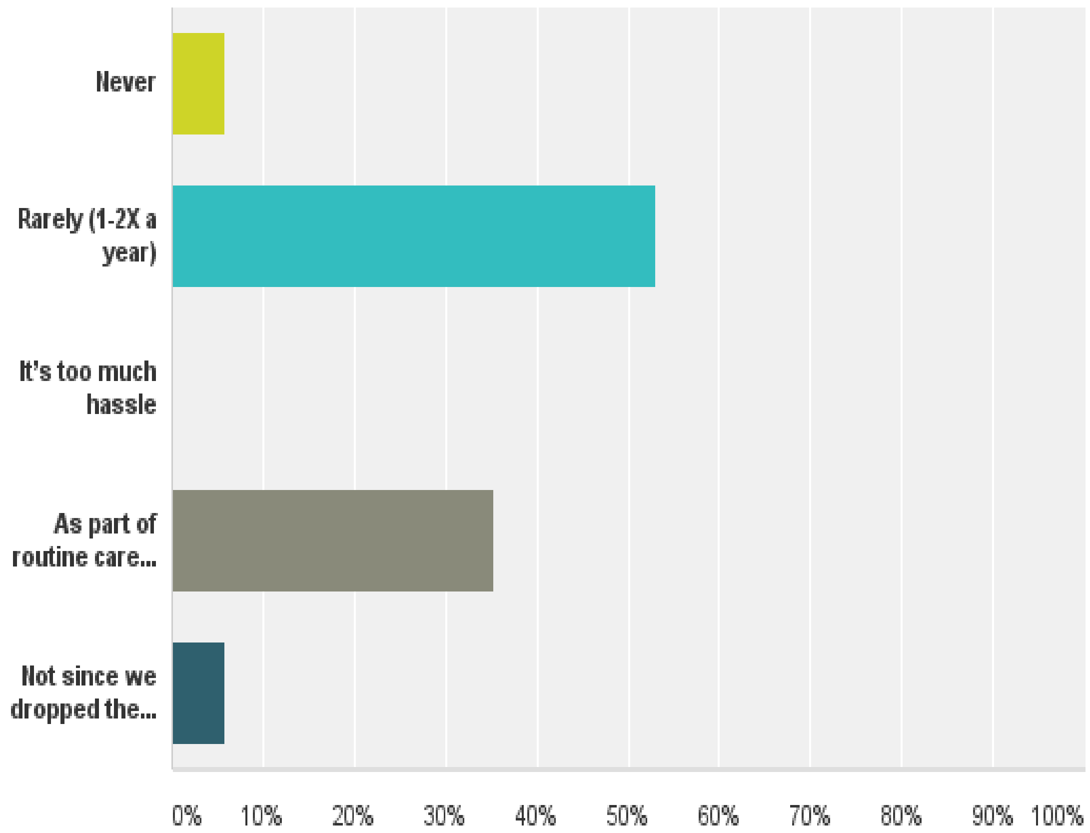
1. Never
2. Rarely (1-2x a year)
3. It's too much hassle
4. As part of routine care in patients with posterior atelectasis and severe hypoxia



Total: 118

Q9: How often do you use prone positioning in ARDS?

Answered: 17 Skipped: 1



➢ Prone Positioning

- Previously, years of study, no clear impact
- Makes anatomic and physiologic sense
- Recent trial suggests mortality advantage early on in moderate to severe ARDS

ARDS

Bilateral patchy opacities

- "Baby Lung" Sitting on Top of a Consolidated Lung
- Posterior dependent lung consolidation
- Difficult to recruit

PROSEVA (Proning Patients with Severe ARDS)

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JUNE 6, 2013 VOL. 368 NO. 23

Prone Positioning in Severe Acute Respiratory Distress Syndrome

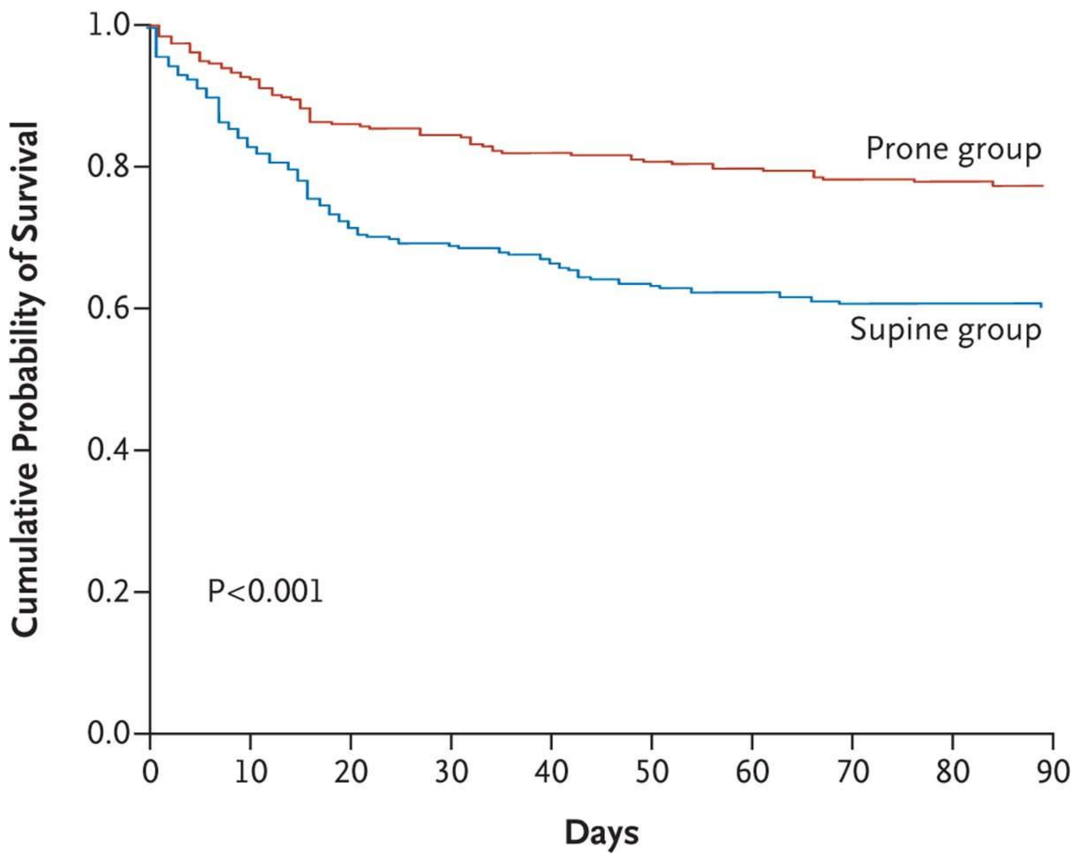
Claude Guérin, M.D., Ph.D., Jean Reignier, M.D., Ph.D., Jean-Christophe Richard, M.D., Ph.D., Pascal Beuret, M.D., Arnaud Gacouin, M.D., Thierry Boulain, M.D., Emmanuelle Mercier, M.D., Michel Badet, M.D., Alain Mercat, M.D., Ph.D., Olivier Baudin, M.D., Marc Clavel, M.D., Delphine Chatellier, M.D., Samir Jaber, M.D., Ph.D., Sylvène Rosselli, M.D., Jordi Mancebo, M.D., Ph.D., Michel Sirodot, M.D., Gilles Hilbert, M.D., Ph.D., Christian Bengler, M.D., Jack Richecoeur, M.D., Marc Gainnier, M.D., Ph.D., Frédérique Bayle, M.D., Gael Bourdin, M.D., Véronique Leray, M.D., Raphaele Girard, M.D., Loredana Baboi, Ph.D., and Louis Ayzac, M.D., for the PROSEVA Study Group*

Guerin C, et. al, NEJM, 368(23): 2159-68 June 6, 2013

PROSEVA - Study Overview

- Placing patients who require mechanical ventilation in the prone rather than the supine position improves oxygenation
- Enrolled Early Severe ARDS (P/F < 150 mm Hg on $FiO_2 \geq 0.6$, PEEP $\geq$ 5 cm H_2O, within 36 hours of onset)
- Prone 16 hours per day until improvement in supine position, mean 4.4 sessions per patient

PROSEVA – Probability of Survival from Randomization to Day 90



No. at Risk

Prone group	237	202	191	186	182
Supine group	229	163	150	139	136

Guérin C et al. N Engl J Med 2013;368:2159-2168

PROSEVA

Table 3. Primary and Secondary Outcomes According to Study Group.*

Outcome	Supine Group (N=229)	Prone Group (N=237)	Hazard Ratio or Odds Ratio with the Prone Position (95% CI)	P Value
Mortality — no. (% [95% CI])				
At day 28				
Not adjusted	75 (32.8 [26.4–38.6])	38 (16.0 [11.3–20.7])	0.39 (0.25–0.63)	<0.001
Adjusted for SOFA score†			0.42 (0.26–0.66)	<0.001
At day 90				
Not adjusted	94 (41.0 [34.6–47.4])	56 (23.6 [18.2–29.0])	0.44 (0.29–0.67)	<0.001
Adjusted for SOFA score†			0.48 (0.32–0.72)	<0.001
Successful extubation at day 90 — no./total no. (% [95% CI])	145/223 (65.0 [58.7–71.3])	186/231 (80.5 [75.4–85.6])	0.45 (0.29–0.70)	<0.001
Time to successful extubation, assessed at day 90 — days				
Survivors	19±21	17±16		0.87
Nonsurvivors	16±11	18±14		
Length of ICU stay, assessed at day 90 — days				
Survivors	26±27	24±22		0.05
Nonsurvivors	18±15	21±20		
Ventilation-free days				
At day 28	10±10	14±9		<0.001
At day 90	43±38	57±34		<0.001
Pneumothorax — no. (% [95% CI])	13 (5.7 [3.9–7.5])	15 (6.3 [4.9–7.7])	0.89 (0.39–2.02)	0.85
Noninvasive ventilation — no./total no. (% [95% CI])				
At day 28	10/212 (4.7 [1.9–7.5])	4/228 (1.8 [0.1–3.5])	0.36 (0.07–3.50)	0.11
At day 90	3/206 (1.5 [0.2–3.2])	4/225 (1.8 [0.1–3.5])	1.22 (0.23–6.97)	1.00
Tracheotomy — no./total no. (% [95% CI])				
At day 28	12/229 (5.2 [2.3–8.1])	9/237 (3.8 [1.4–6.0])	0.71 (0.27–1.86)	0.37
At day 90	18/223 (8.1 [4.5–11.7])	15/235 (6.4 [3.3–9.5])	0.78 (0.36–1.67)	0.59

* Plus–minus values are means ±SD. Hazard ratios are shown for mortality and successful extubation; odds ratios are shown for other outcomes. CI denotes confidence interval.
† There were no significant differences between the groups in organ dysfunction as assessed from the SOFA score (Table S4 in the Supplementary Appendix).

C'est possible?
Incredible effect size

- **Day 28 and Day 90 Adjusted and Unadjusted Mortality OR 0.39 to 0.48 with proning**
- **Majority of patients in both groups received neuromuscular blockade**

Guérin C et al. N Engl J Med 2013;368:2159-2168

The NEW ENGLAND JOURNAL of MEDICINE

PROSEVA - Conclusions

- In this trial, the investigators found a benefit with respect to all-cause mortality with this change in body position in patients with severe ARDS

- In patients with severe ARDS, early application of prolonged prone-positioning sessions significantly decreased 28-day and 90-day mortality

Guérin C et al. N Engl J Med 2013;368:2159-2168

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UM SICU Demonstrates Prone Method

- 4 people
- 2 sheets
- Easy to do
- Easy to teach
- Quick
- Easy access to patient

With flat sheet, pull patient to one side of the bed.

Tuck flat sheet around patient arm in order to protect it and move patient.

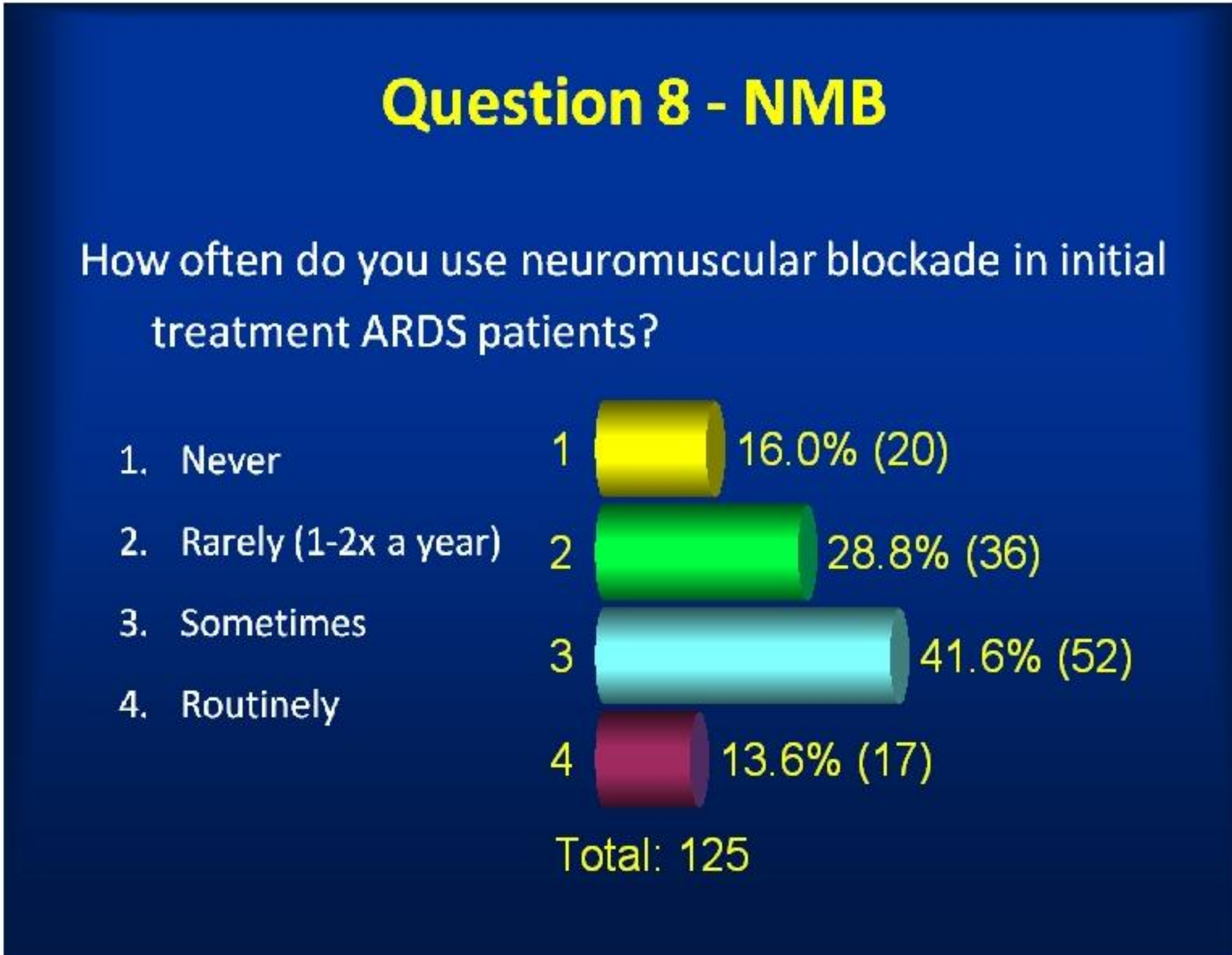
Place a second flat sheet on the bed, tuck under patient. Everything will pull through when you turn the patient.

Carefully turn the patient over and position prone by pulling the sheet. This will allow the arm and sheet to pulled across the bed.

Discard the sheet that was pulled through, position lines and tubes.

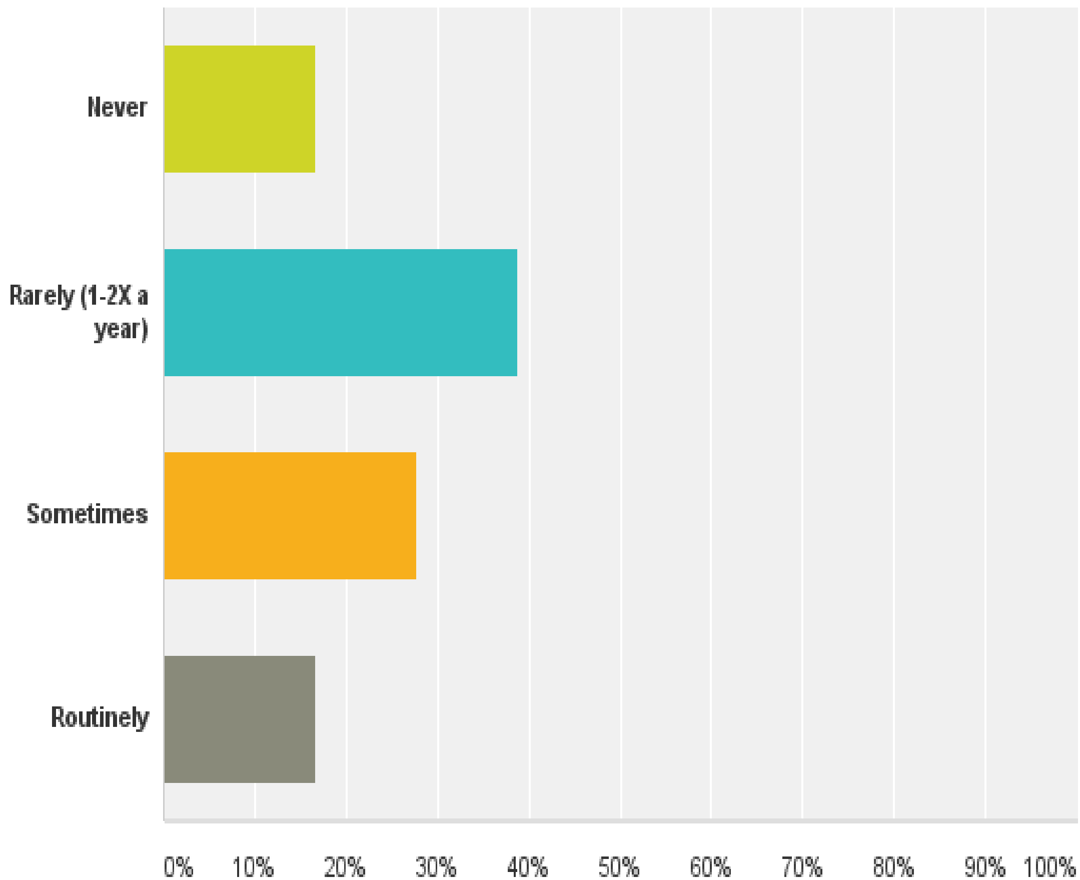
Patient now prone. Place arms in swimmers position (one positioned up toward head, one at side. Place in Reverse Trendelenberg.

➢ Neuromuscular Blockade


Question 8 - NMB
How often do you use neuromuscular blockade in initial treatment ARDS patients?
1. Never
2. Rarely (1-2x a year)
3. Sometimes
4. Routinely
1 16.0% (20)
2 28.8% (36)
3 41.6% (52)
4 13.6% (17)
Total: 125

Q6: How often do you use neuromuscular blockade in the initial treatment of ARDS patients?

Answered: 18   Skipped: 0



➢ Neuromuscular Blockade

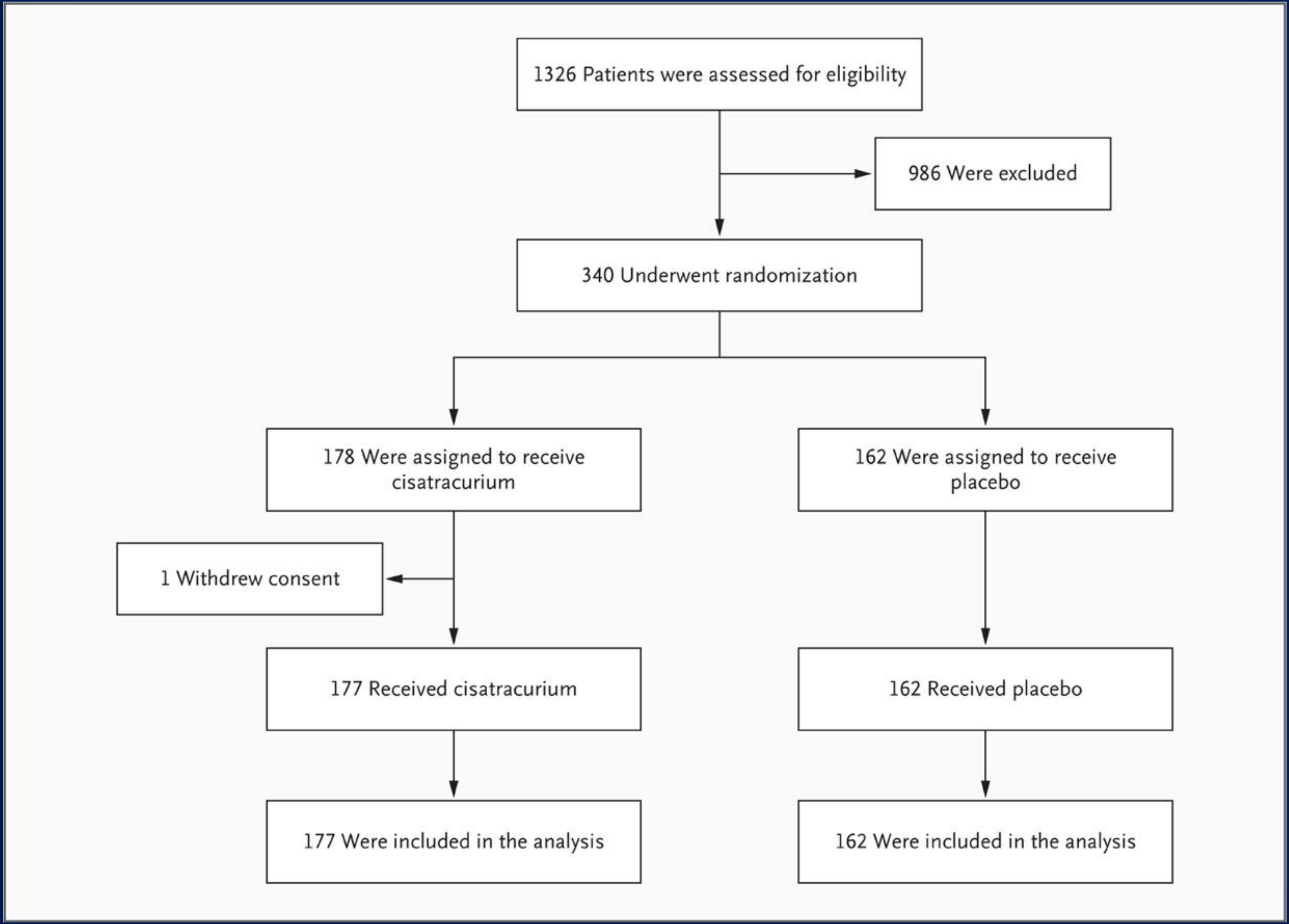
- Frequently used to facilitate controlled ventilation
- Concerns regarding long term weakness and conflict with reduction in sedation protocols
- Recent trials suggest mortality advantage early on in moderate to severe ARDS

ACURASYS – Study Overview

- The investigators induced muscle paralysis in patients with the acute respiratory distress syndrome (ARDS) by administering a neuromuscular blocking agent, cisatracurium besylate
- Continuous cisatracurium infusion for 48h in early ARDS(15mg bolus, 37.5mg per hour)
- RCT, 20 ICUs, 340 patients
- Moderate to severe ARDS (P/F <150), onset $\leq$ 48h
- Lung protective ventilation

Papazian L et al. N Engl J Med 2010;363:1107-1116

ACURASYS – Enrollment



Papazian L et al. N Engl J Med 2010;363:1107-1116

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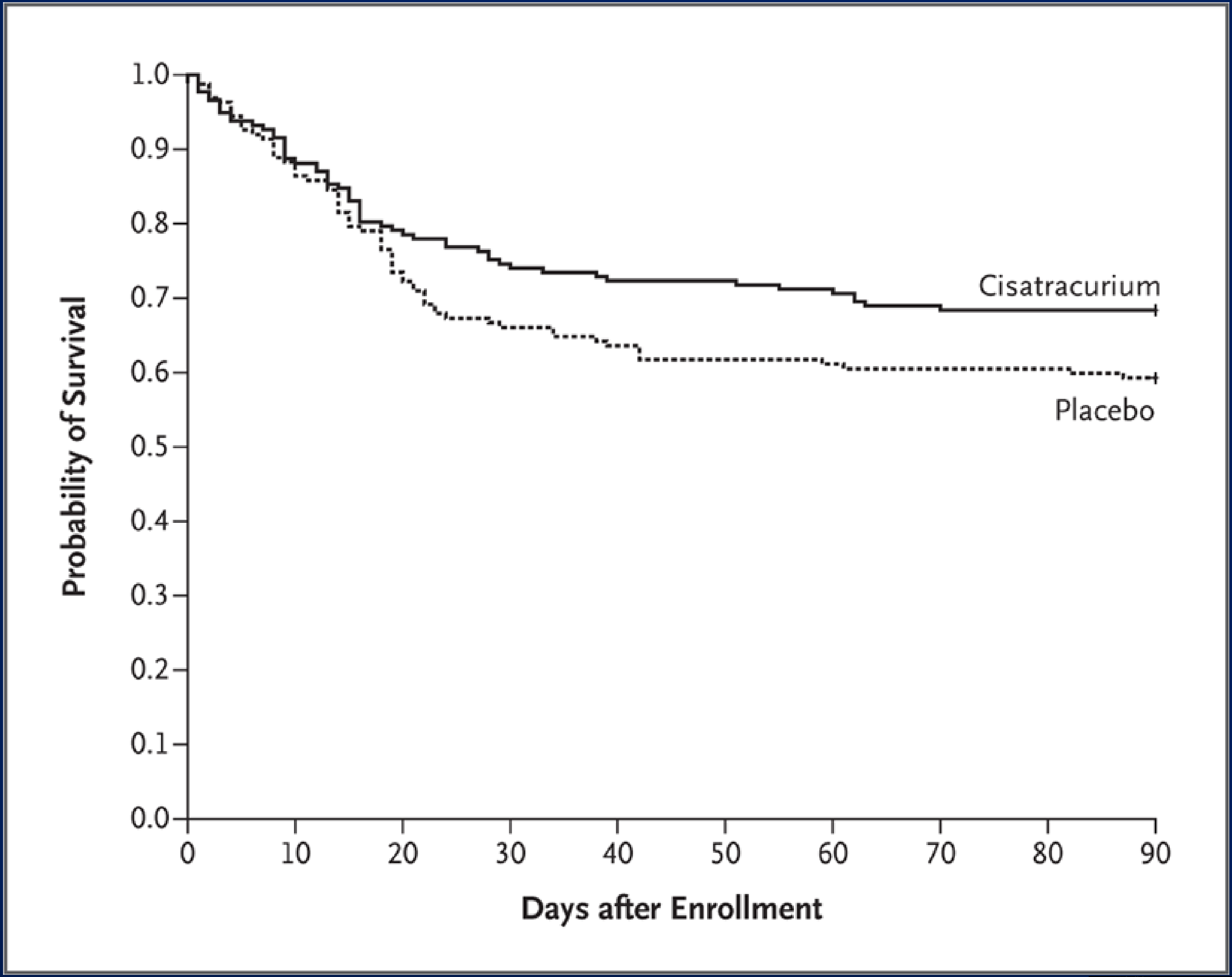
ACURASYS - Probability of Survival through Day 90



Papazian L et al. N Engl J Med 2010;363:1107-1116

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ACURASYS – Results

- Reduction in mortality from 40.7% to 31.6% (hazard ratio 0.68)
- Increased oxygenation, ventilator-free days and organ-failure free days
- No observed increases in functional weakness at day 28 or ICU discharge

Papazian L et al. N Engl J Med 2010;363:1107-1116

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ACURASYS – Questions

- Underpowered
- No monitoring of neuromuscular blockade
- 40% received steroids for septic shock in both arms
- But same effect size as lung protective ventilation?

ACURASYS -Conclusions

- As compared with placebo, cisatracurium resulted in a lower adjusted 90-day mortality without more severe sequelae of neuromuscular blockade

- In patients with severe ARDS, early administration of a neuromuscular blocking agent improved the adjusted 90-day survival and increased the time off the ventilator without increasing muscle weakness.

Papazian L et al. N Engl J Med 2010;363:1107-1116

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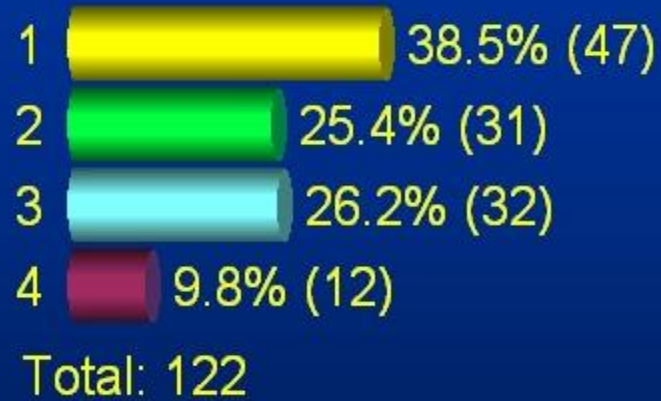
x High Frequency Oscillatory Ventilation

Question 2 - HFOV

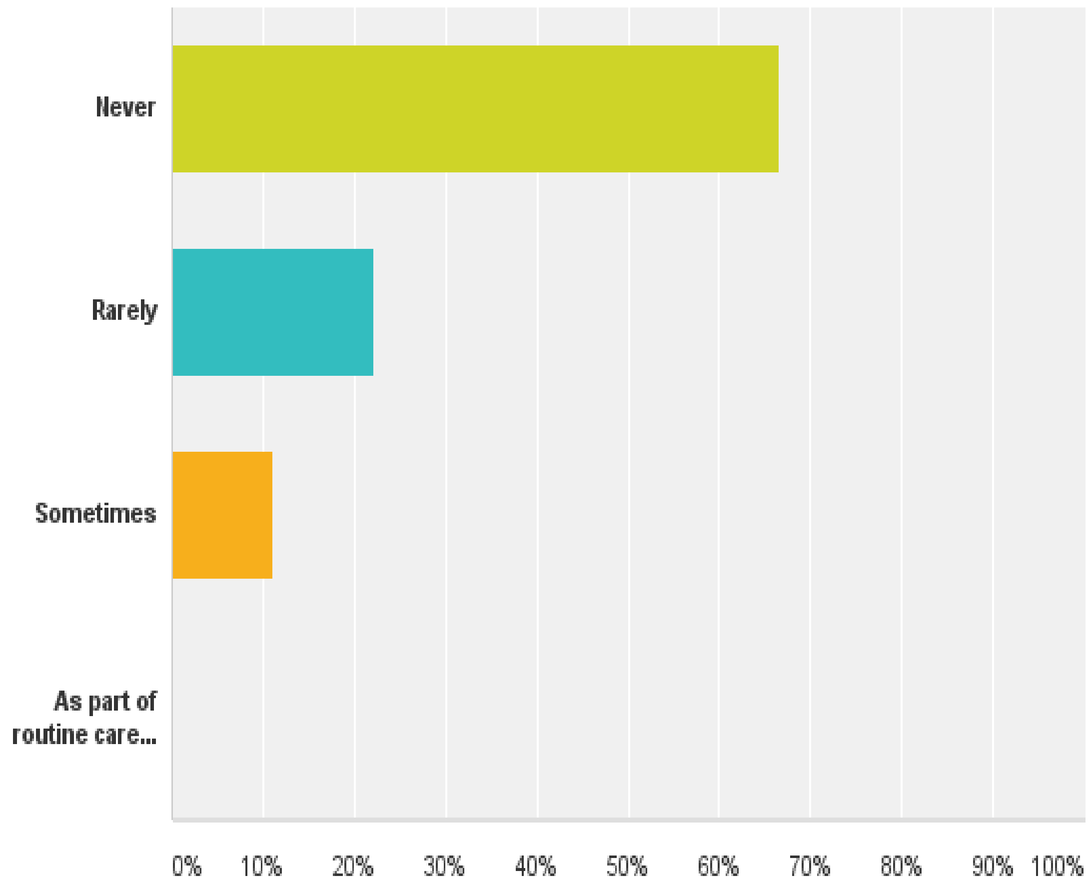
How often do you use high frequency oscillatory ventilation in ARDS?

1. Never
2. Rarely (1-2x a year)
3. Sometimes
4. As part of routine care in severe ARDS



Q1: How often does your center use high frequency oscillatory ventilation (HFOV) in ARDS?

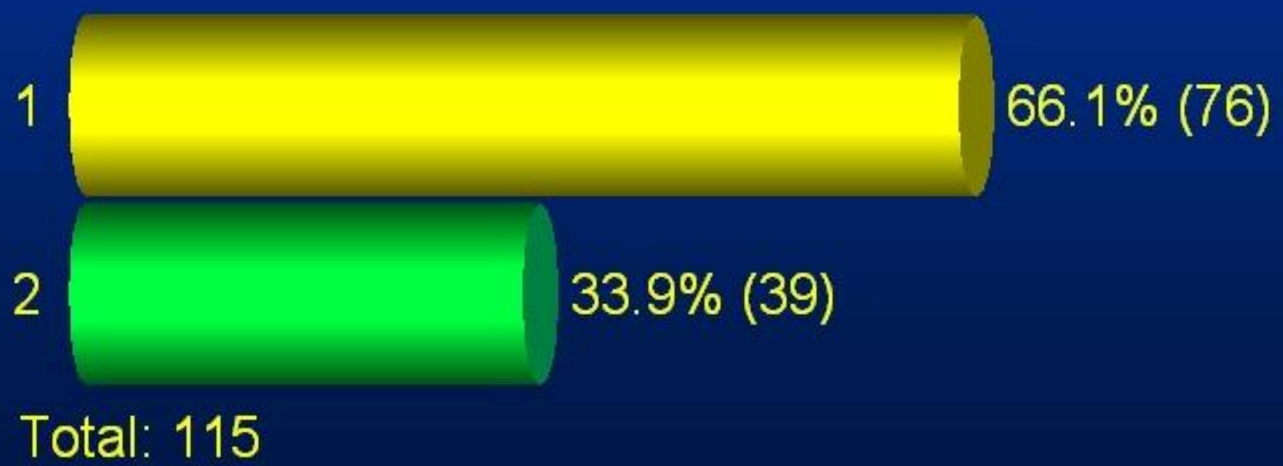
Answered: 18   Skipped: 0



Question 4 - HFOV

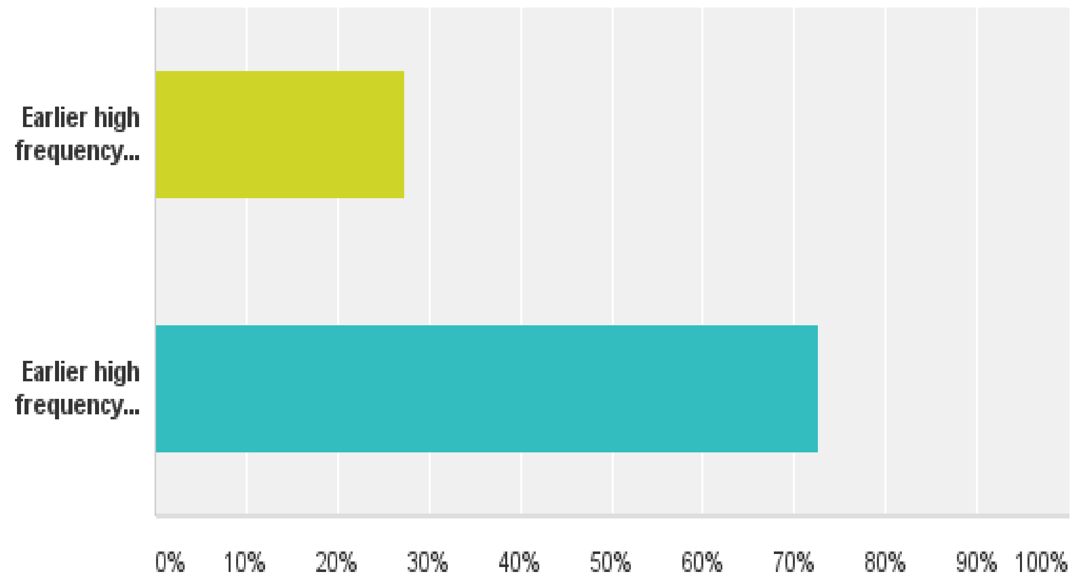
What do you think will be the answer?

1. Earlier HFOV better
2. Earlier HFOV worse



Q3: What do you think will be the answer?

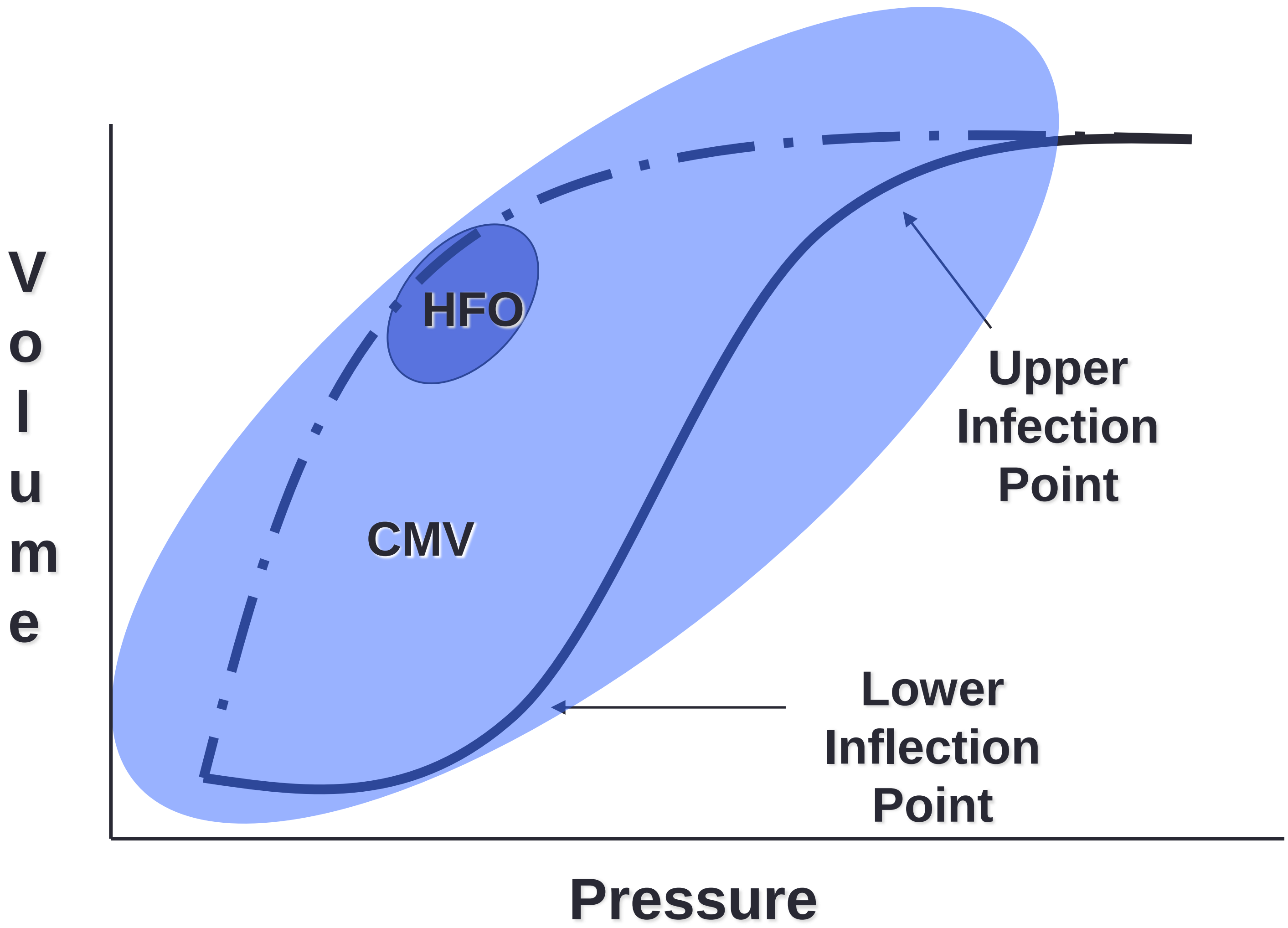
Answered: 11   Skipped: 7

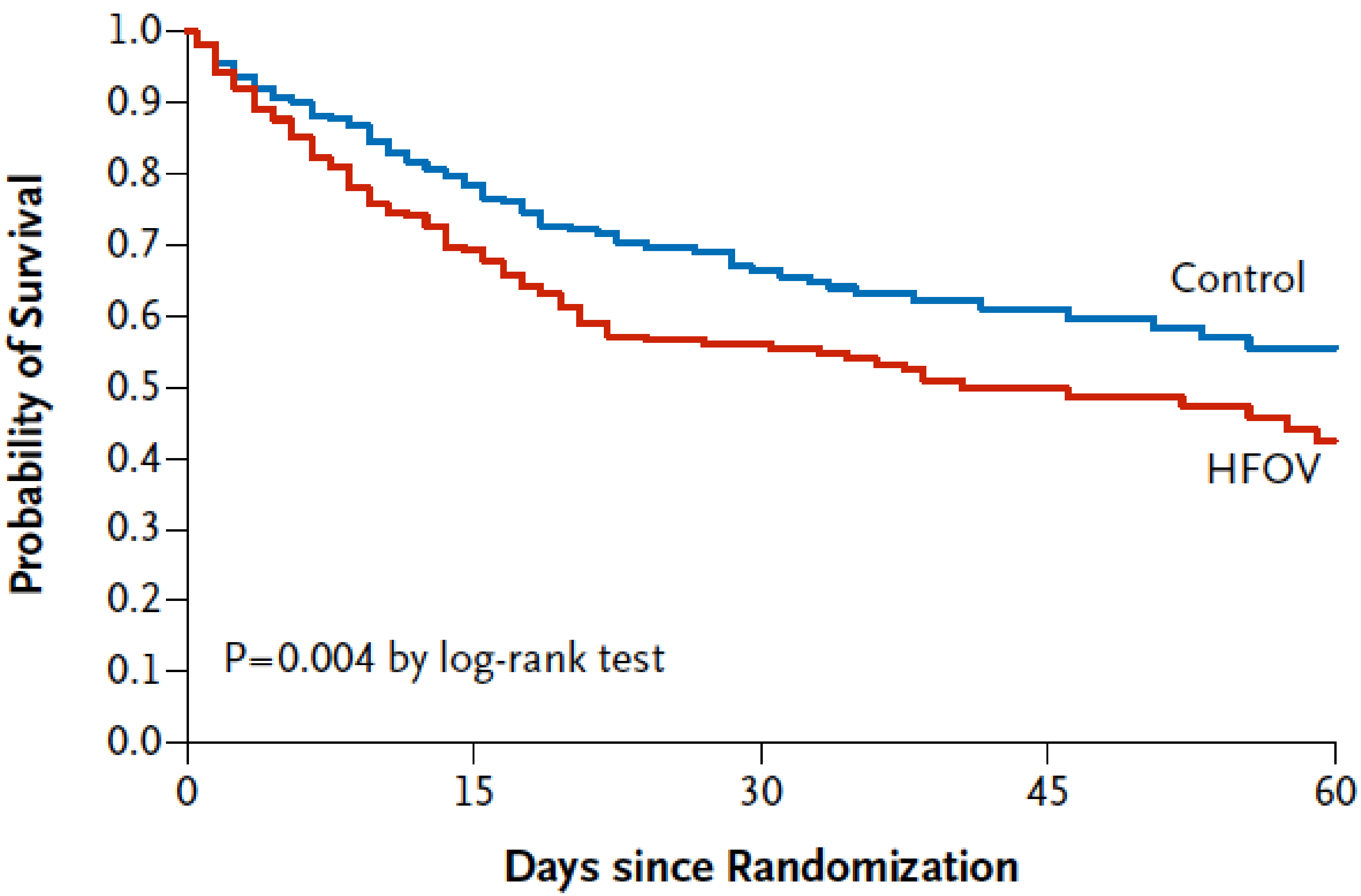


x High Frequency Oscillatory Ventilation

- 2 large randomized trials failed to show benefit, possible harm
- Usage falling off like a rock

Targeting Lung Recruitment



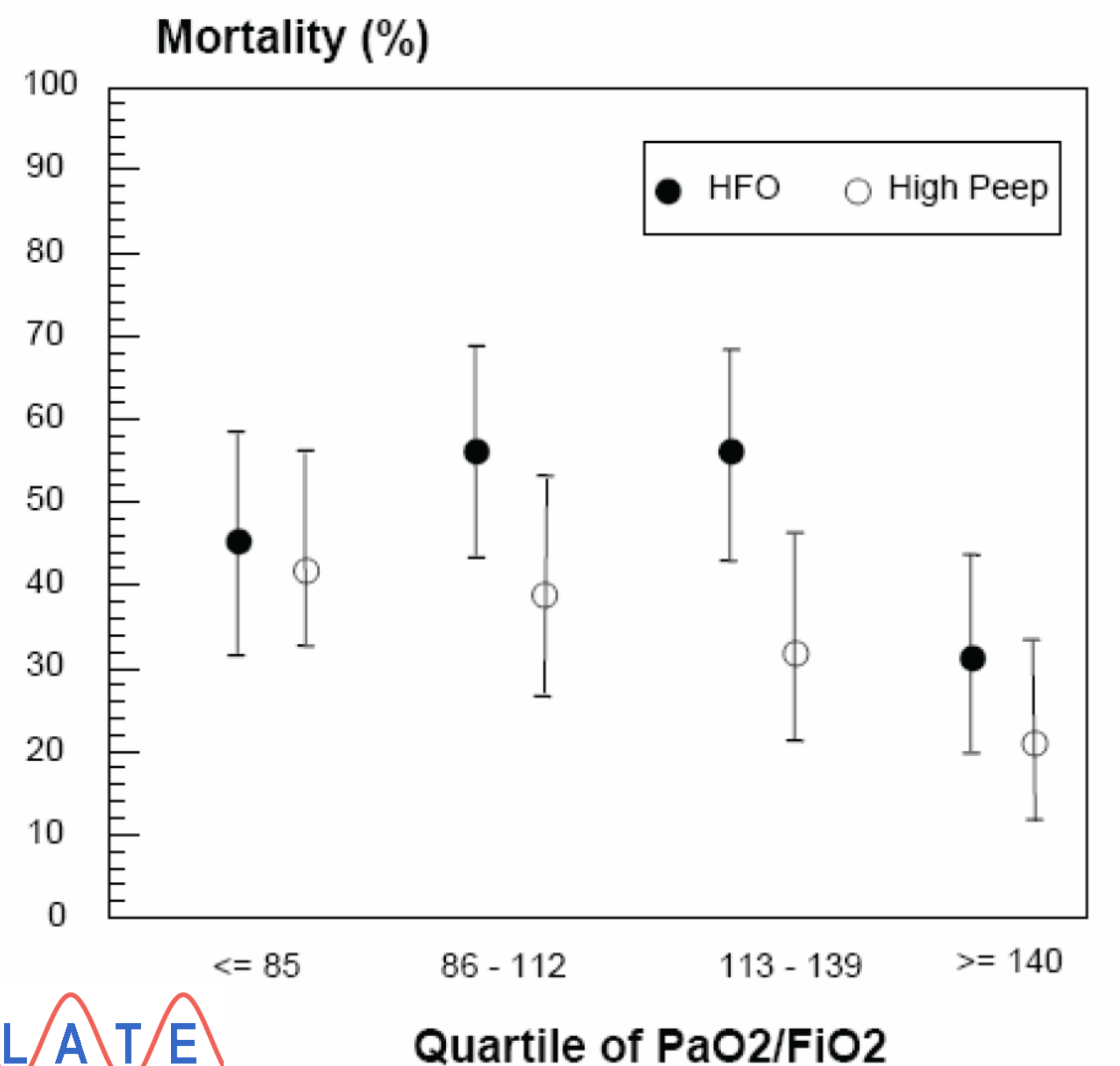


No. at Risk

HFOV	275	169	98	54	26
Control	273	181	92	54	39

OSCILLATE

Subgroup – Baseline Hypoxemia

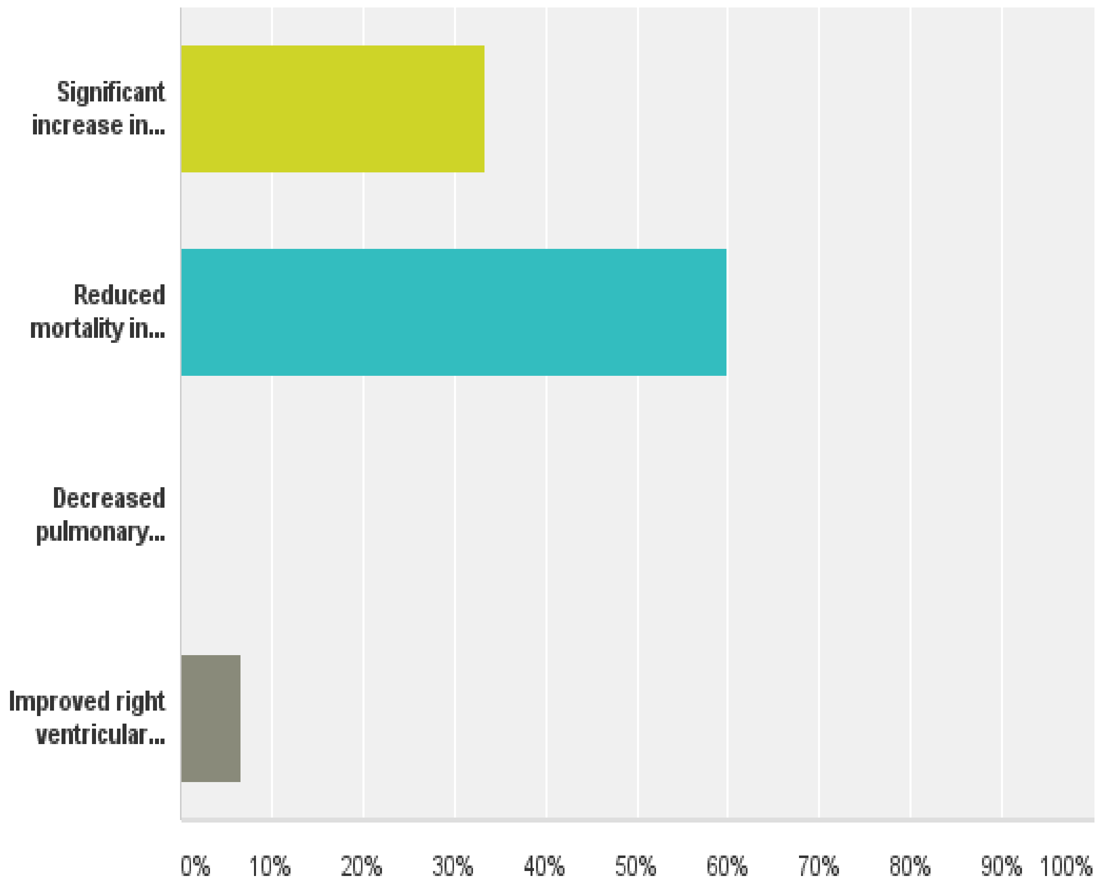


x Inhaled vasodilators

- Cannot prove a mortality benefit in ARDS
- Still used in rescue, transport

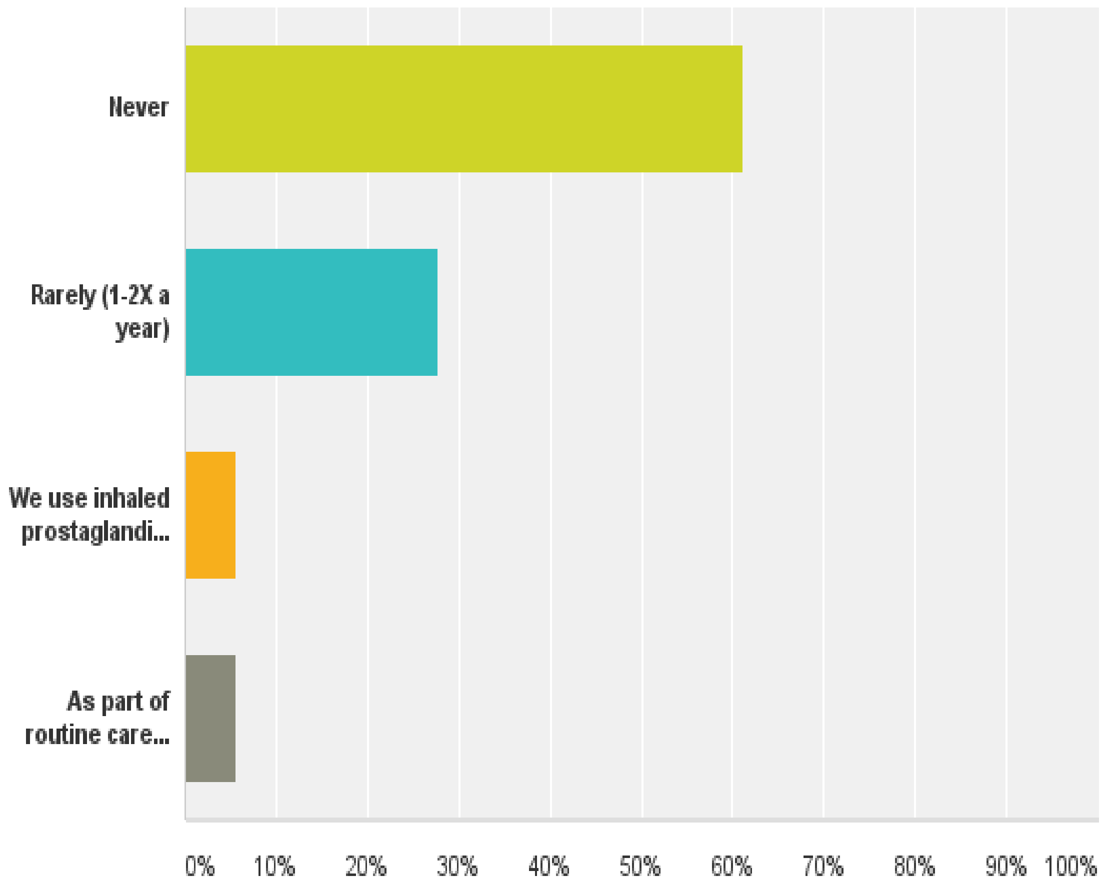
Q8: All of the following have been demonstrated as beneficial effects of inhaled nitric oxide in adult ARDS patients EXCEPT:

Answered: 15   Skipped: 3



Q7: How often do you use inhaled nitric oxide (NO) in ARDS?

Answered: 18   Skipped: 0

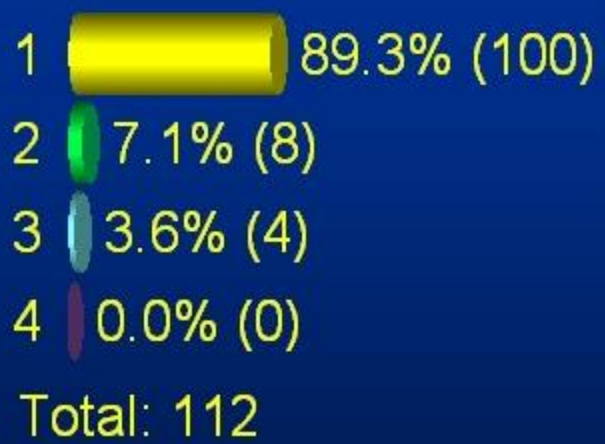


? Transpulmonary Pressure-guided ventilator management (Pes)

Question 5 - Ptp

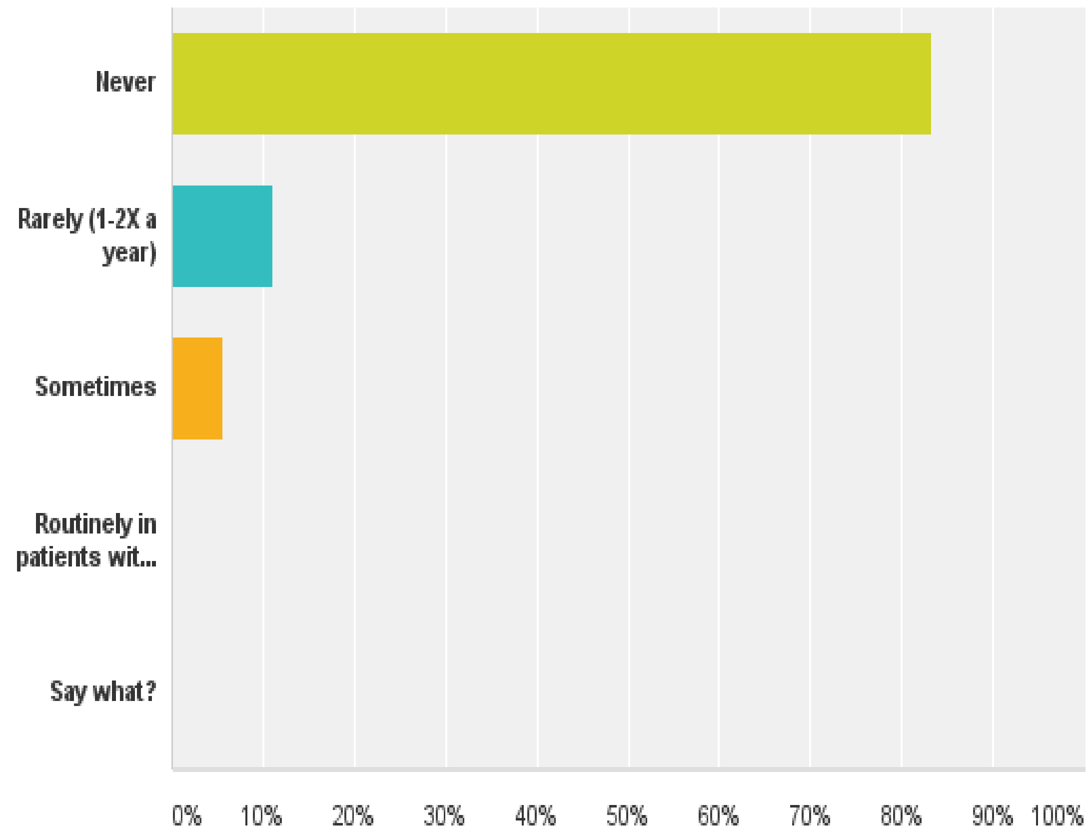
How often do you use esophageal pressure monitoring and transpulmonary pressure guided ventilator titration in ARDS?

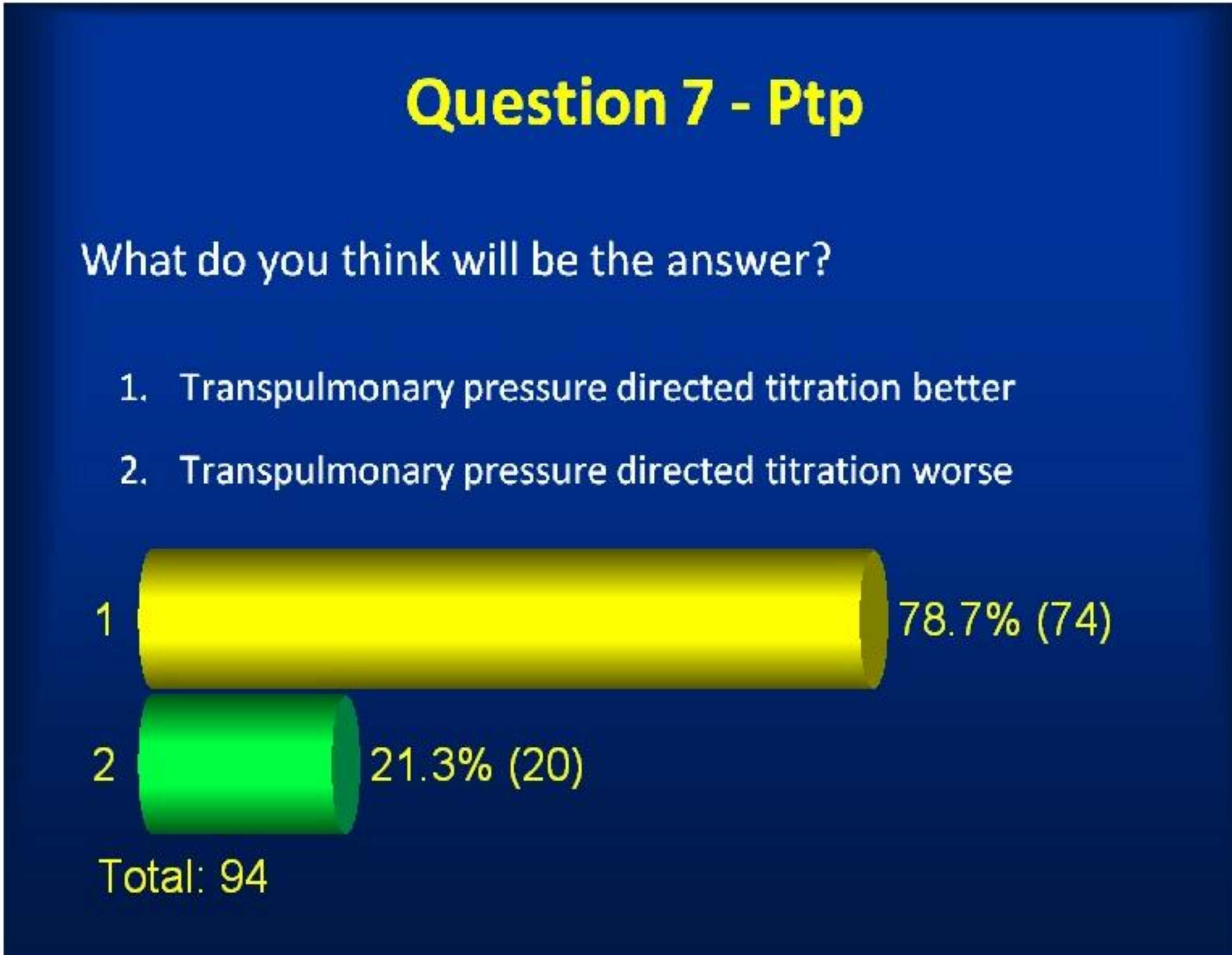
1. Never
2. Rarely (1-2x a year)
3. Sometimes
4. Routinely in patients with high BMI



Q4: How often do you use esophageal pressure monitoring and transpulmonary pressure guided ventilator titration in ARDS?

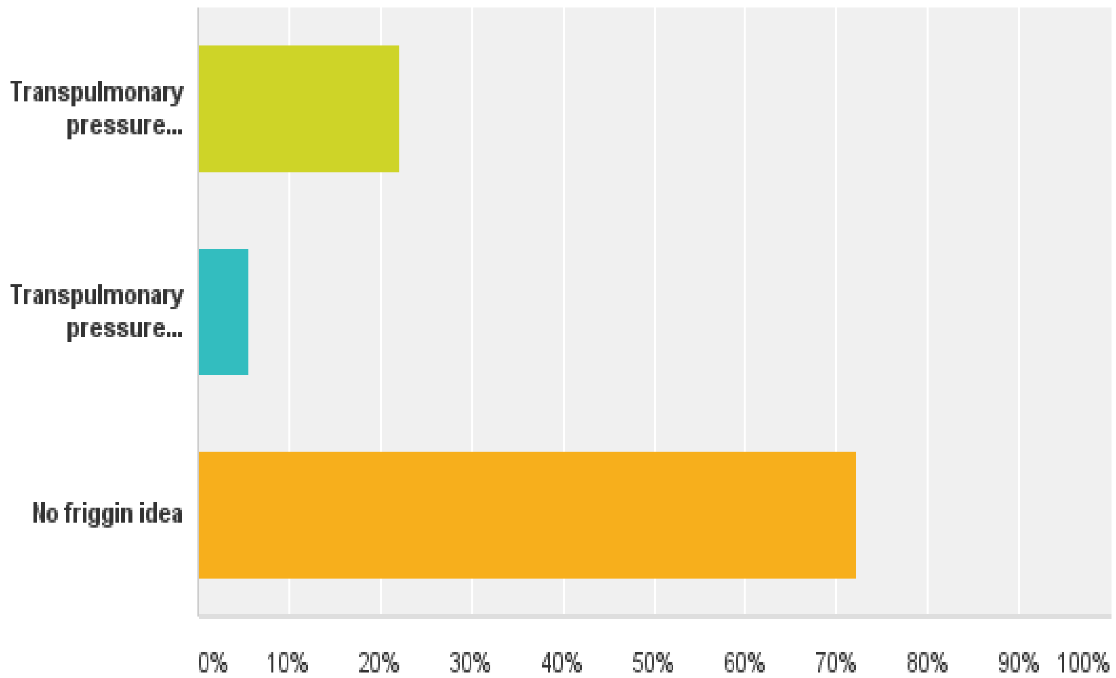
Answered: 18 Skipped: 0



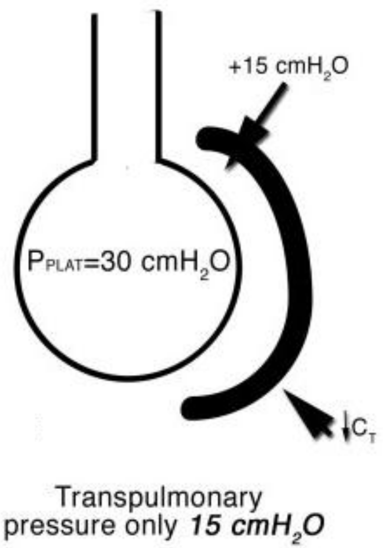

Question 7 - Ptp
What do you think will be the answer?
1. Transpulmonary pressure directed titration better
2. Transpulmonary pressure directed titration worse
1
78.7% (74)
2
21.3% (20)
Total: 94

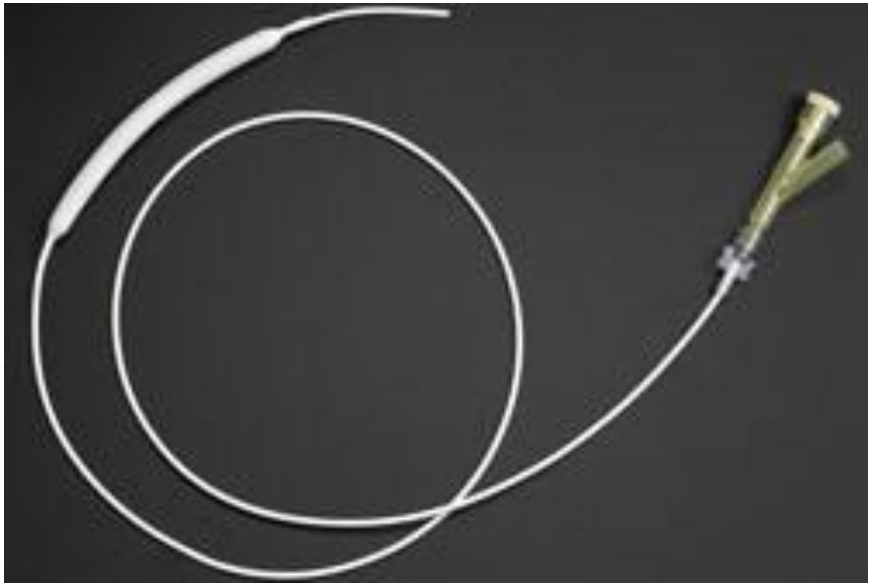
Q5: What do you think will be the answer?

Answered: 18 Skipped: 0



Ptp - Esophageal balloon catheter





Ptp ≈ airway pressure – esophageal pressure

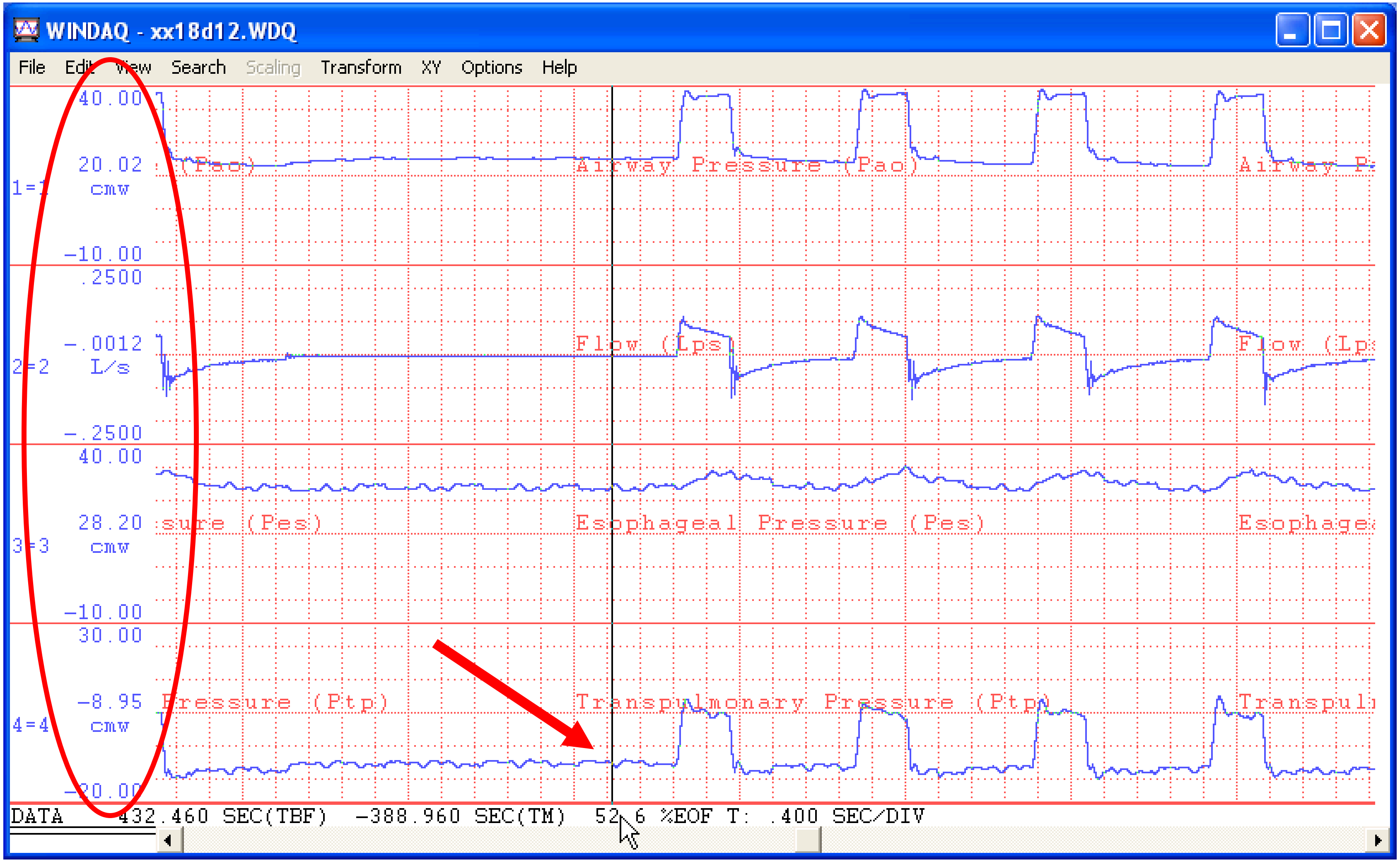
Mechanical Ventilation Guided by Esophageal Pressure in Acute Lung Injury

Daniel Talmor, M.D., M.P.H., Todd Sarge, M.D., Atul Malhotra, M.D., Carl R. O'Donnell, Sc.D., M.P.H., Ray Ritz, R.R.T., Alan Lisbon, M.D., Victor Novack, M.D., Ph.D., and Stephen H. Loring, M.D.

- Used esophageal balloon catheter to estimate transpulmonary pressure to guide PEEP settings
- 61 patients randomized
- Altered PEEP settings: down or to 5 cm H_2O in 40%
  up 6 – 10 cmH_2O in 40%
- Increased P/F ratio
  Mortality signal at 180 days
- Phase II trial funded and enrollment has begun

NEJM 2008; 359: 2095-104

HOLDS – END EXPIRATORY



Position cursor near end of the hold

Question 5

A 56 year old man is admitted to the ICU with ARDS and sepsis 4 days after emergency colectomy and splenectomy following an MVC. His height is 65 inches; his weight is 285 pounds. On lung protective ventilator settings, FiO2 0.80, PEEP 15 cmH_2O his:

Peak inspiratory pressure (PIP) is 35 cm H_2O
Plateau pressure (P_{plat}) is 30 cm H_2O
End expiratory airway pressure (Paw) is 20 cm H_2O
Esophageal balloon pressure (Pes) is 17 cm H_2O.

Transpulmonary pressure (Ptp_{exp}) is estimated by the formula:

A. Pes-PEEP

B. PEEP-Pes

C. Pplat-Paw

D. Paw-Pes

Question 5

A 56 year old man is admitted to the ICU with ARDS and sepsis 4 days after emergency colectomy and splenectomy following an MVC. His height is 65 inches; his weight is 285 pounds. On lung protective ventilator settings, FiO2 0.80, PEEP 15 cmH_2O his:

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A. Pes-PEEP

B. PEEP-Pes

C. Pplat-Paw

D. Paw-Pes

Beth Israel Deaconess Medical Center | A teaching hospital of Harvard Medical School

EPVENT II-PROTOCOL

A PHASE II PROSPECTIVE RANDOMIZED CONTROLLED TRIAL OF VENTILATION DIRECTED BY ESOPHAGEAL PRESSURE MEASUREMENTS.

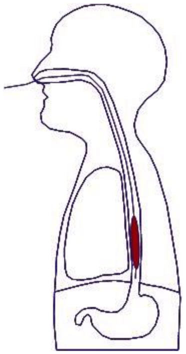
WILL ENROLL 200 PATIENTS WITH MODERATE TO SEVERE ARDS BY THE BERLIN CONFERENCE DEFINITION IN SEVEN ACADEMIC MEDICAL CENTERS IN NORTH AMERICA

BETH ISRAEL DEACONESS MEDICAL CENTER

BOSTON, MA

DANIEL TALMOR MD MPH, BIDMC

VENTILATION PROTOCOLS- EPVENT GROUP



Measure Ptpexp during an end-expiratory hold.

Increase (or decrease) PEEP to achieve Ptpexp = 0

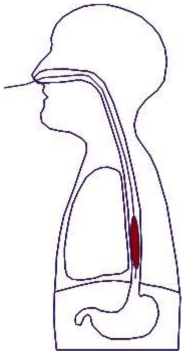
- Incrementally changes according to the formula: [new PEEP] = [initial PEEP] – Ptpexp

Repeat this procedure until Ptpexp = 0.

- If this formula dictates an increase in PEEP of more than 10 cmH2O, increase PEEP in increments of 10 cmH2O or less

When Ptpexp = 0, reassess oxygenation

VENTILATION PROTOCOLS- CONTROL AND EPVENT GROUPS



The control group PEEP and tidal volume will be managed without reference to the esophageal pressure measurements.

FIO2 and PEEP must be kept within one column of this table, moving right or left one column at a time as required.

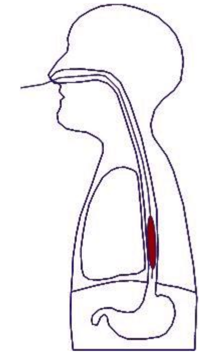
Table 4- Oxygenation Management Table – Control Group

Step	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
F_IO_2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.7	0.8	0.8	0.9	1.0	1.0
PEEP	5	8	10	10	12	14	16	18	18	20	20	20	20	22	22	22	24

Table 1- Oxygenation Management Table - EPVent group

Step	1	2	3	4	5	6	7	8	9	10	11	12	13
F_IO_2	0.3	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.8	0.9	0.9	1.0
Ptp_{exp}	0	0	0	2	2	3	3	4	4	5	5	6	6

VENTILATION PROTOCOLS- CONTROL AND EPVENT GROUPS



91 patients enrolled in US/Canada as of December, 2014

Table 4- Oxygenation Management Table – Control Group

Step	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
F_IO_2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.7	0.8	0.8	0.9	1.0	1.0
PEEP	5	8	10	10	12	14	16	18	18	20	20	20	20	22	22	22	24

Table 1- Oxygenation Management Table - EPVent group

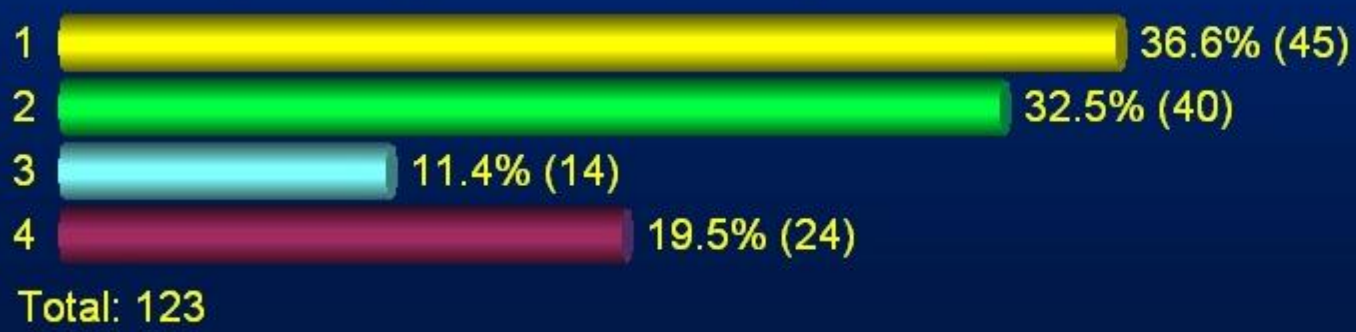
Step	1	2	3	4	5	6	7	8	9	10	11	12	13
F_IO_2	0.3	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.8	0.9	0.9	1.0
Ptp_{exp}	0	0	0	2	2	3	3	4	4	5	5	6	6

? Extracorporeal Membrance Oxygenation (ECMO)

Question 15 - ECMO

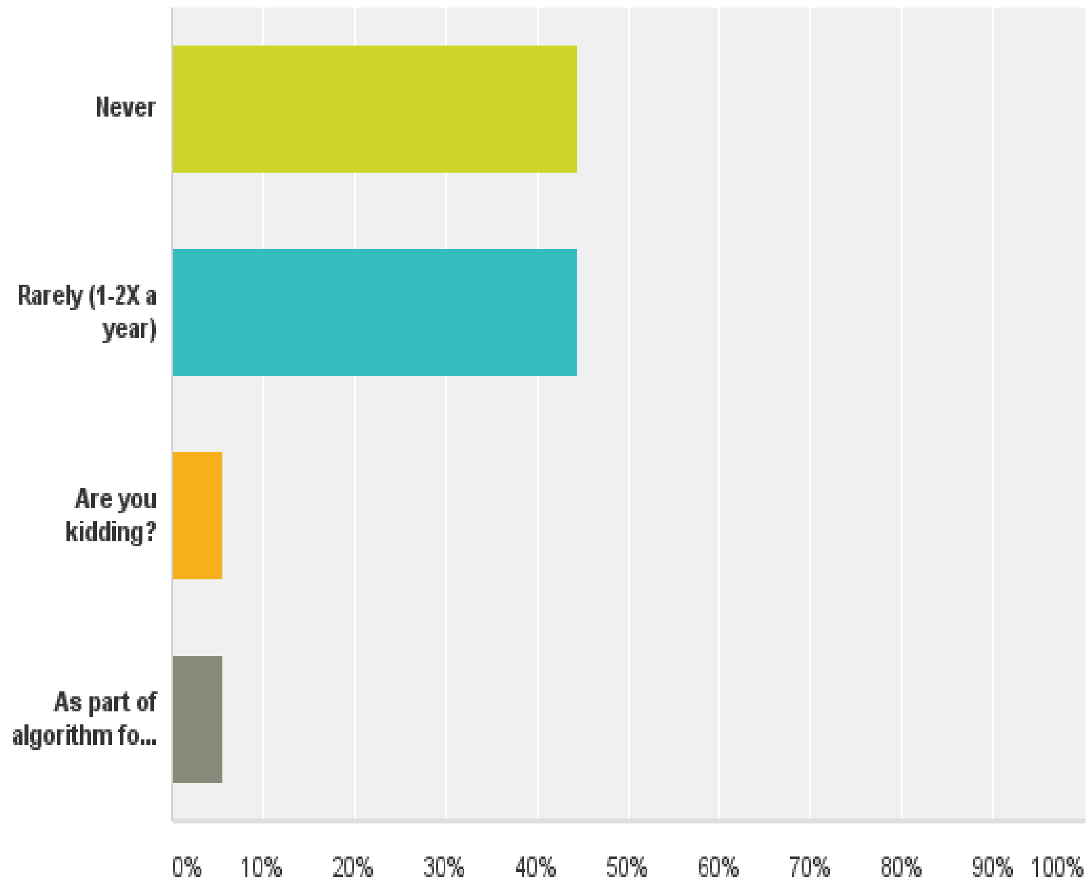
How often do you use or refer for ECMO in ARDS?

1. Never
2. Rarely (1-2x a year)
3. Are you kidding?
4. As part of algorithm for care in patients with severe ARDS



Q11: How often do you use or refer for extracorporeal membrane oxygenation (ECMO) in ARDS?

Answered: 18 Skipped: 0



Question 16 - ECMO

Which of the following is true regarding ECMO in adult patients with ARDS?

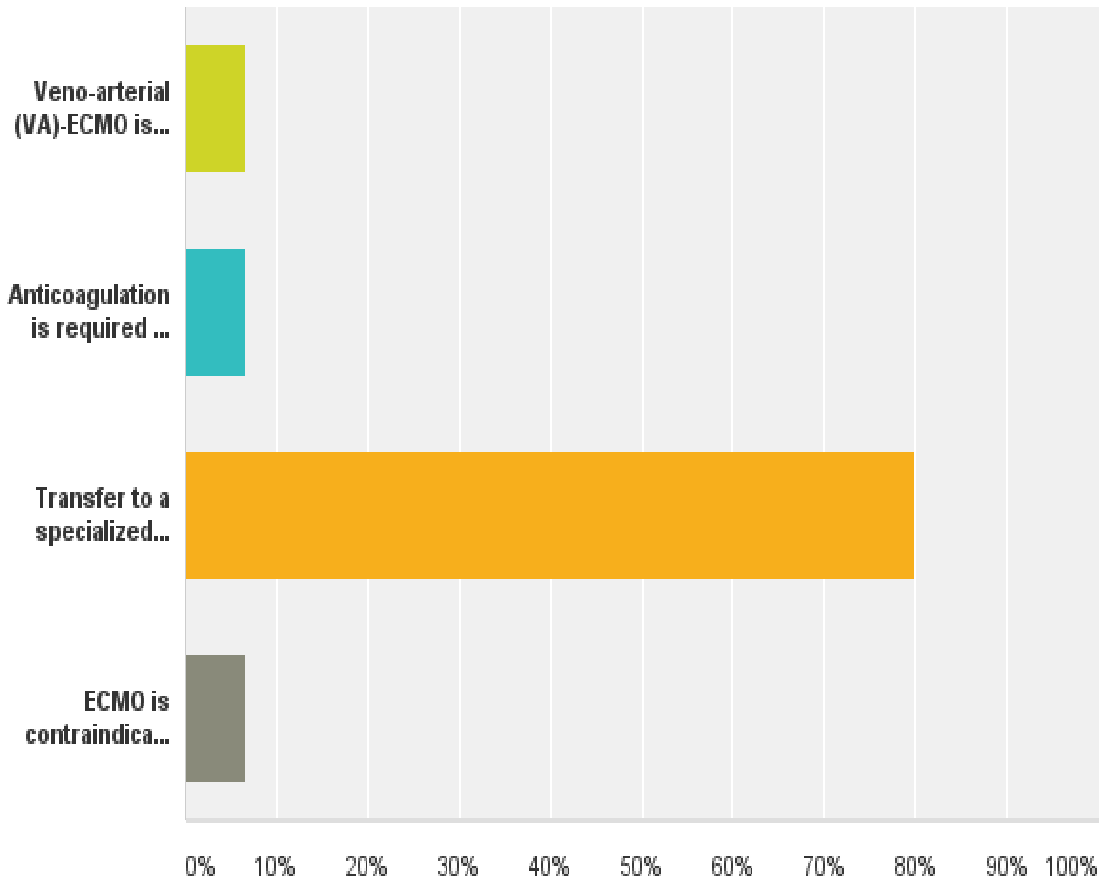
1. VA-ECMO is associated with decreased mortality compared to VV-ECMO
2. Anticoagulation is required but is not associated with increased complications
3. **Transfer to a specialized center with ECMO capabilities is associated with decreased mortality**
4. ECMO is contraindicated after ≥ 5 days of mechanical ventilation

Answer: 3

Total: 92

Q12: Which of the following is true regarding ECMO in adult patients with ARDS?

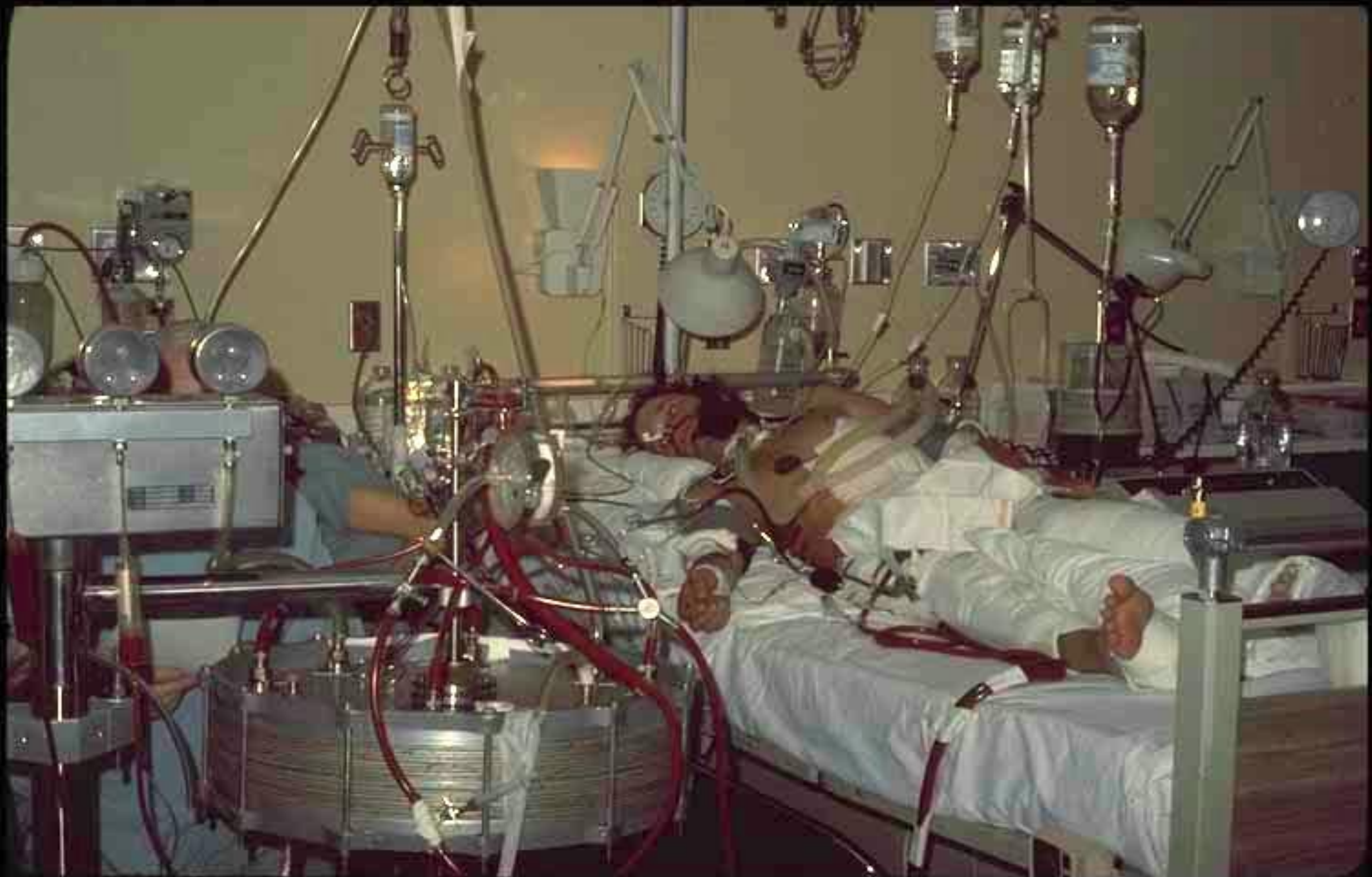
Answered: 15   Skipped: 3



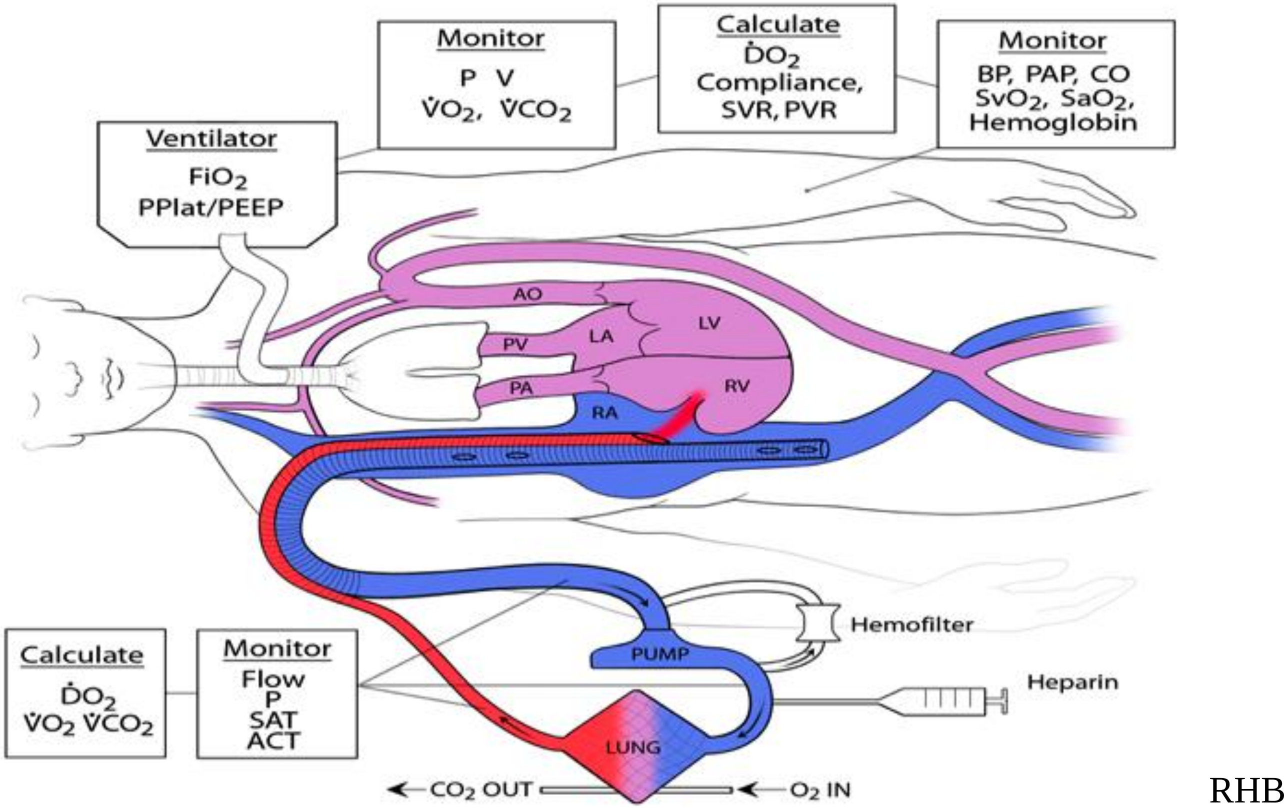
? Extracorporeal Membrance Oxygenation (ECMO)

- Resurgent interest with more compact systems, favorable results in influenza H1N1
- Continuous life support, resource and labor-intensive, conclusive trials contraversial
- Some evidence for regionalization

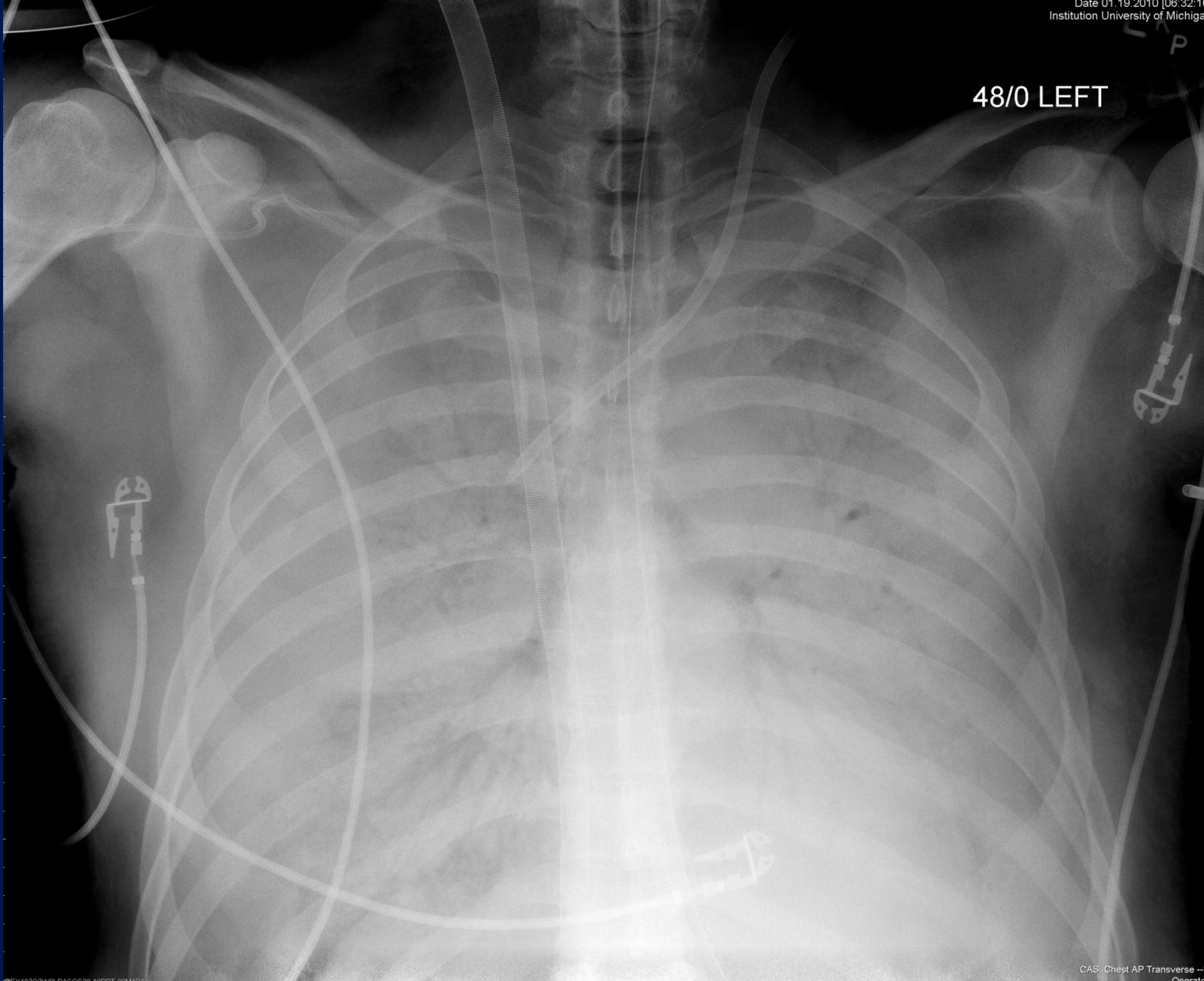
Bartlett



First successful ECLS Patient; ARDS/ trauma
Santa Barbara, Ca, 1971.
J Donald Hill MD and Maury Bramson BME



Veno-venous ECLS with a double lumen cannula


Date 01.19.2010 [06:32:10]
Institution University of Michigan
48/0 LEFT
CAS: Chest AP Transverse --%
Operator:

Photos by Seth Robbins/Stars and Stripes

Dr. Matthias Amann, left, and Dr. Alois Philipp make preparations to transport a 22-year-old soldier to the university hospital in Regensburg, Germany. Philipp helped develop the ECMO machine that was used on the wounded soldier during an evacuation.

Afghanistan to Regensburg ECMO transport

Lifesaving INNOVATION

Portable heart-lung machine used in combat evacuation

By Seth Robbins
Stars and Stripes

LANDSTUHL, Germany

A U.S. team for the first time in a combat evacuation has used an innovative and portable heart-lung machine, saving a 22-year-old soldier wounded in Afghanistan.

the most serious lung injuries and evacuate them to Germany.

Within hours, Wanek and her team were bound for Kandahar.

When they got there Wednesday, they operated on him for five hours and tried several different ventilators, but all of them failed.

"I just could not improve his oxygenation

The ECMO machine

STARS AND STRIPES

October, 2010

Severe Thoracic Trauma

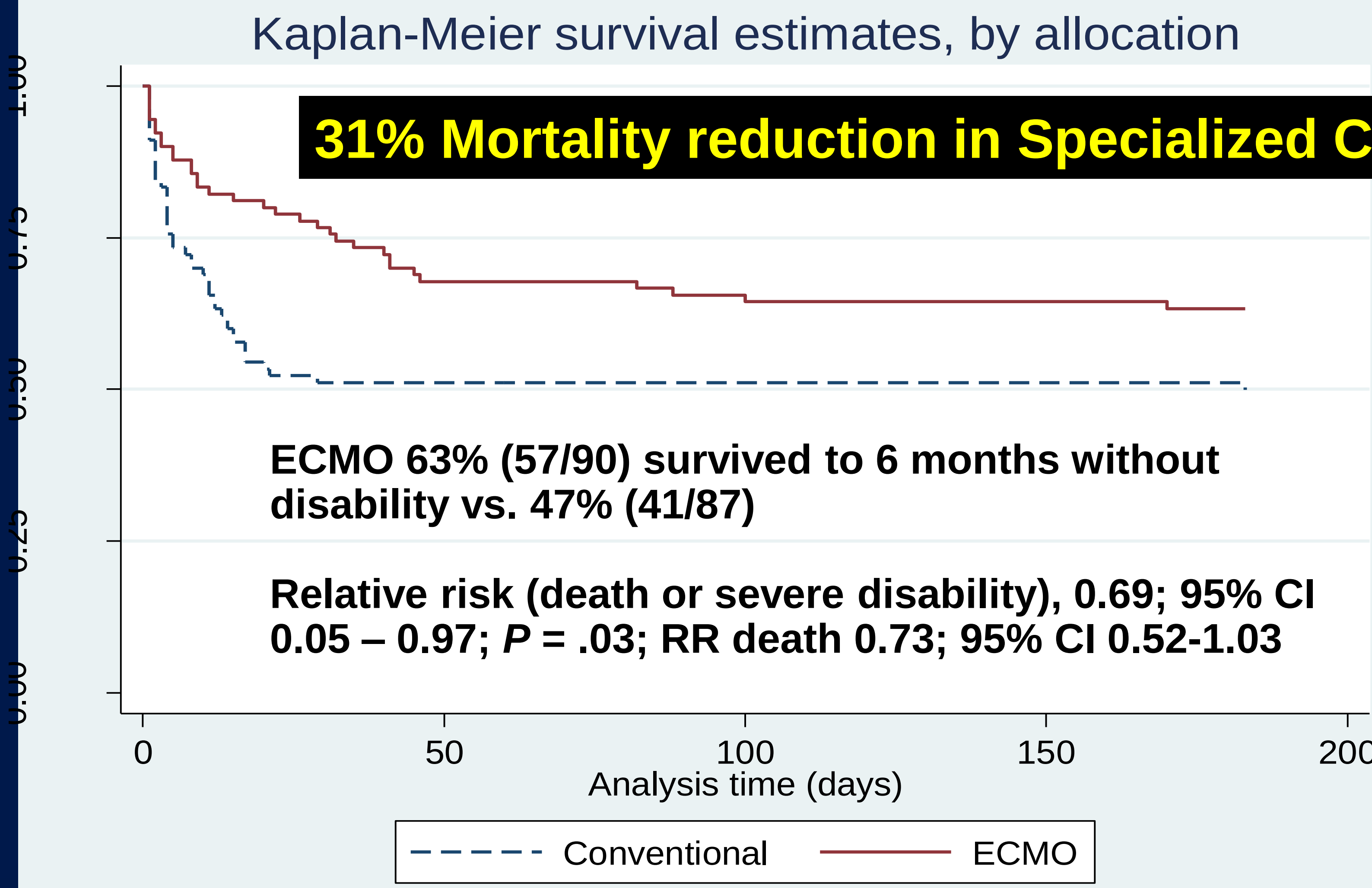
- Transmediastinal Gunshot Wound
- Combat Casualty
- Damage Control Thoracic Surgery
- Hilar Clamp for initial control

- Right pneumonectomy
- Severe ARDS
- ECMO Support initiated at a Level III Hospital in Afghanistan
- Continued by ALRT in-flight to Landstuhl Germany

Complete recovery, empyema complication

Conventional Ventilation or ECMO for Severe Adult Respiratory Failure

31% Mortality reduction in Specialized Center



ECMO 63% (57/90) survived to 6 months without disability vs. 47% (41/87)

Relative risk (death or severe disability), 0.69; 95% CI 0.05 – 0.97; *P* = .03; RR death 0.73; 95% CI 0.52-1.03

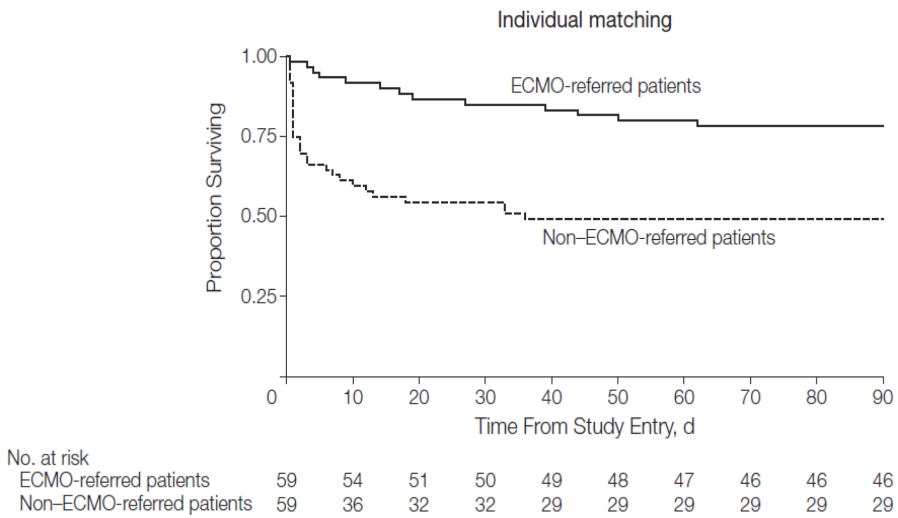
Giles Peek
CESAR 2007

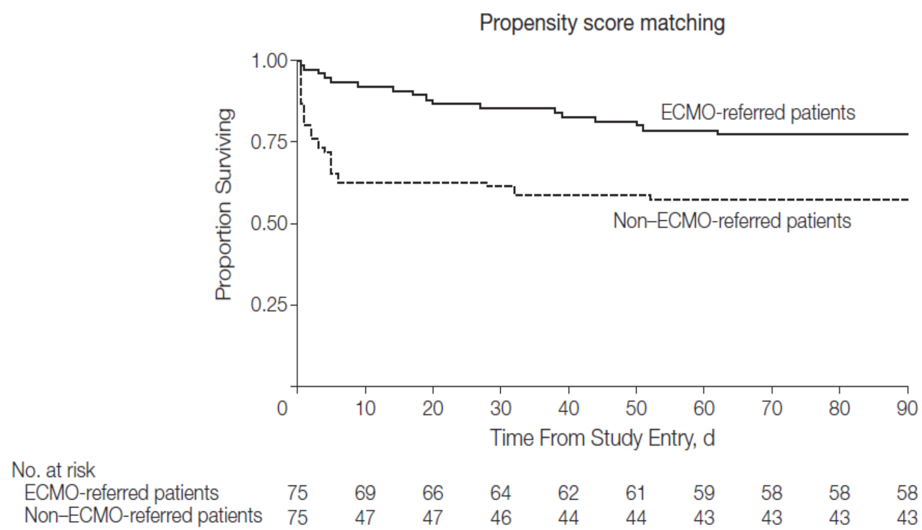
Table 2. Deaths Analyzed by Matching Methods

	No. of Deaths/ Total No. of Patients (%)			
	ECMO-Referred	Non–ECMO-Referred	RR (95% CI)	*P* Value
Matching method				
Propensity score	18/75 (24.0)	35/75 (46.7)	0.51 (0.31-0.84)	.008
GenMatch	18/75 (24.0)	38/75 (50.7)	0.47 (0.31-0.72)	.001
Individual	14/59 (23.7)	31/59 (52.5)	0.45 (0.26-0.79)	.006

Abbreviations: ECMO, extracorporeal membrane oxygenation; RR, relative risk.

80 referred for ECMO; 69 received (86.3%); hospital mortality 27.5%





Noah MA, et al. JAMA 2011;306(15):1659-1668.

Extracorporeal Membrane Oxygenation for Pandemic Influenza A(H1N1)–induced Acute Respiratory Distress Syndrome

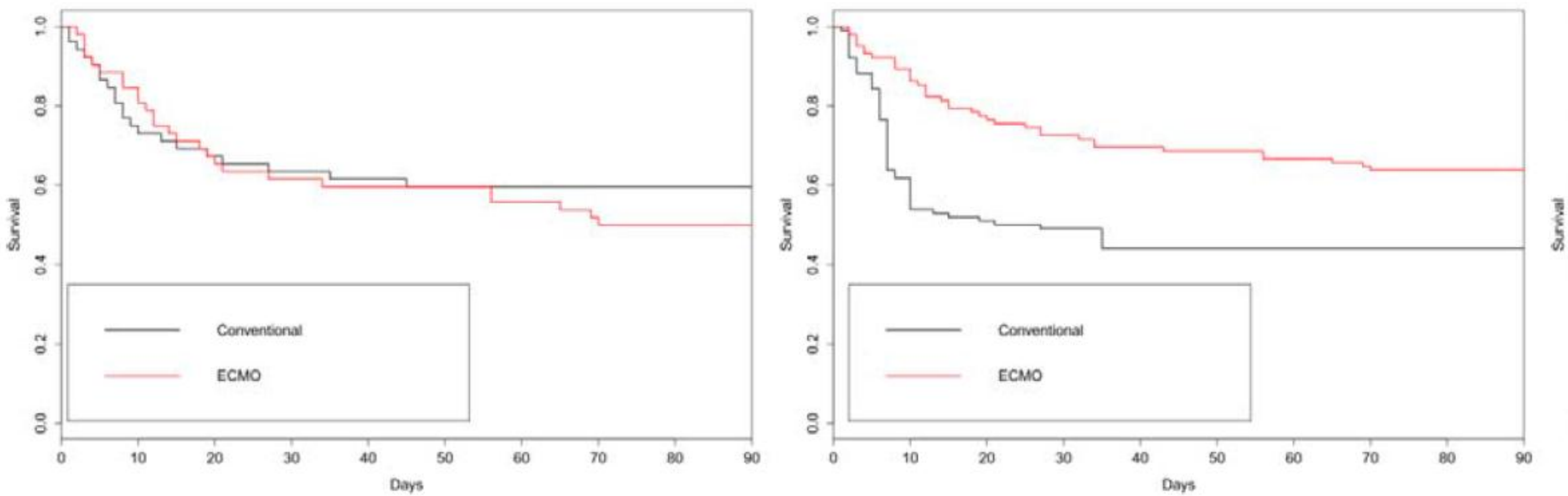
A Cohort Study and Propensity-matched Analysis

Tài Pham[1,2], Alain Combes[3,4], Hadrien Rozé[5], Sylvie Chevret[2,6], Alain Mercat[7,8], Antoine Roch[9,10], Bruno Mourvillier[11,12], Claire Ara-Somohano[13,14], Olivier Bastien[15,16], Elie Zogheib[17], Marc Clavel[18,19], Adrien Constan[1], Jean-Christophe Marie Richard[20,21,22], Christian Brun-Buisson[1,23,24], and Laurent Brochard[20,21,24]; for the REVA Research Network*

Matched 52/123 pts receiving ECMO; mortality varies with replacement

REVA main analysis
(matched sample without replacement)

REVA matched sample with replacement



Pham T, et al. AJRCCM 187 (3): 276-85 2013

EOLIA ECMO Trial

- **E**CMO to rescue **L**ung **I**njury in severe **A**RDS
- Multicenter ECMO trial

Enrolling in France, Australia, ~~US~~

157 patients as of January, 2015

- Control cohort with modern ARDS ventilator management, and rescue strategies allowed

Inclusion criteria

1. Severe ARDS defined according to usual criteria, and
2. Meeting 1 of the 3 following criteria of severity:
   a. PaO_2/FiO_2 ratio <50 mm Hg with FiO_2 ≥80% for >3 hours, despite optimization of mechanical ventilation and despite possible recourse to usual adjunctive therapies (NO, recruitment maneuvers, prone position, HFO ventilation, almitrine infusion) **OR**
   b. PaO_2/FiO_2 ratio <80 mm Hg with FiO_2 ≥80% for >6 hours, despite optimization of mechanical ventilation and despite possible recourse to usual adjunctive therapies (NO, recruitment maneuvers, prone position, HFO ventilation, almitrine infusion) **OR**
   c. pH <7.25 for >6 hours (RR increased to 35 /min) resulting from MV settings adjusted to keep Pplat ≤32 cm H2O (first, Vt reduction by steps of 1 mL/kg to 4 mL/kg then PEEP reduction to a minimum of 8 cm H2O
3. Obtain patient's consent or emergency consent

Randomization

for >6 hours, despite mandatory use of recruitment maneuvers, and inhaled NO/prostacyclin and if technically possible a test of prone position.

Judgement criteria

Primary endpoint: all-cause mortality at D60

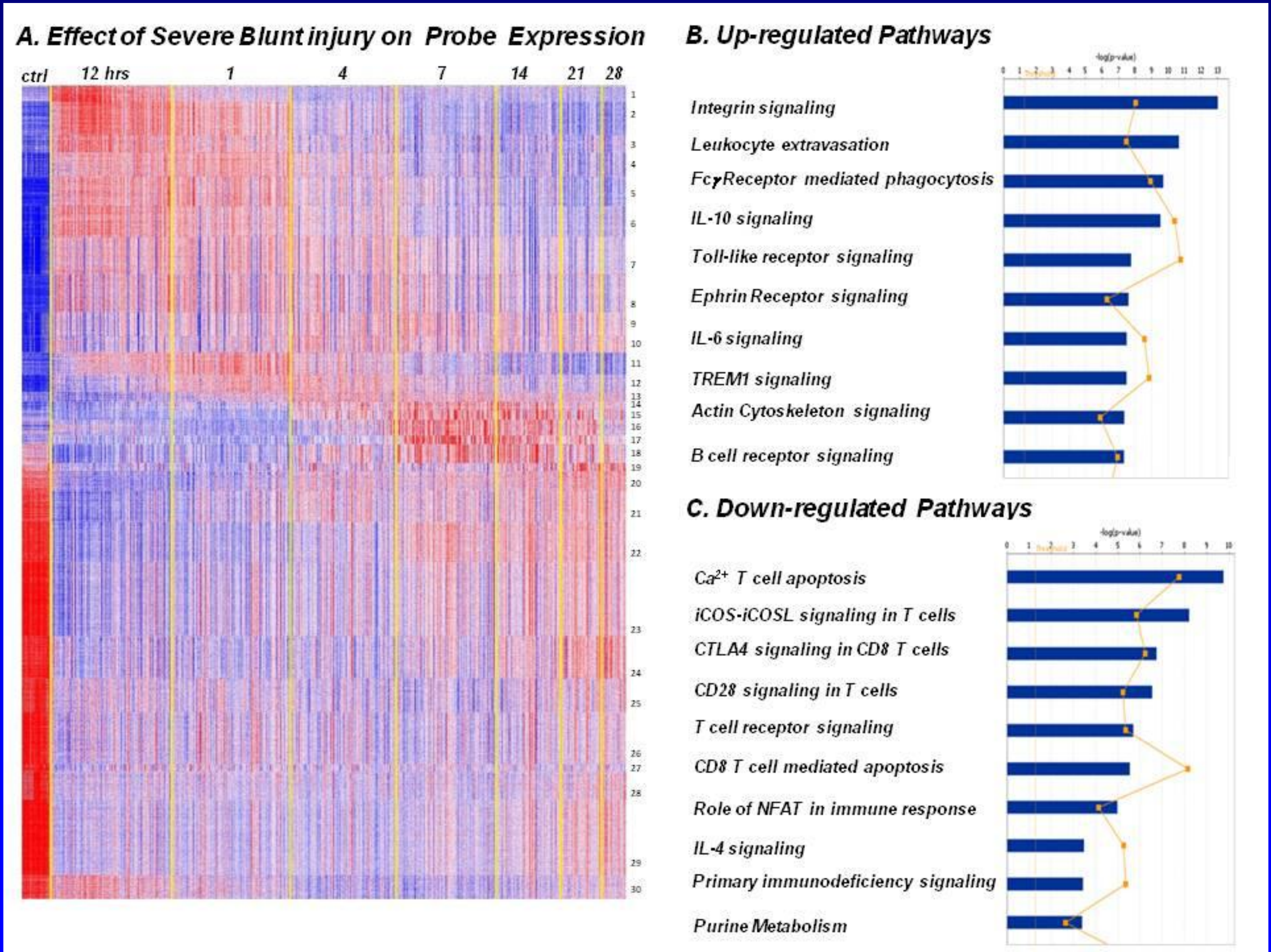
Secondary outcomes:

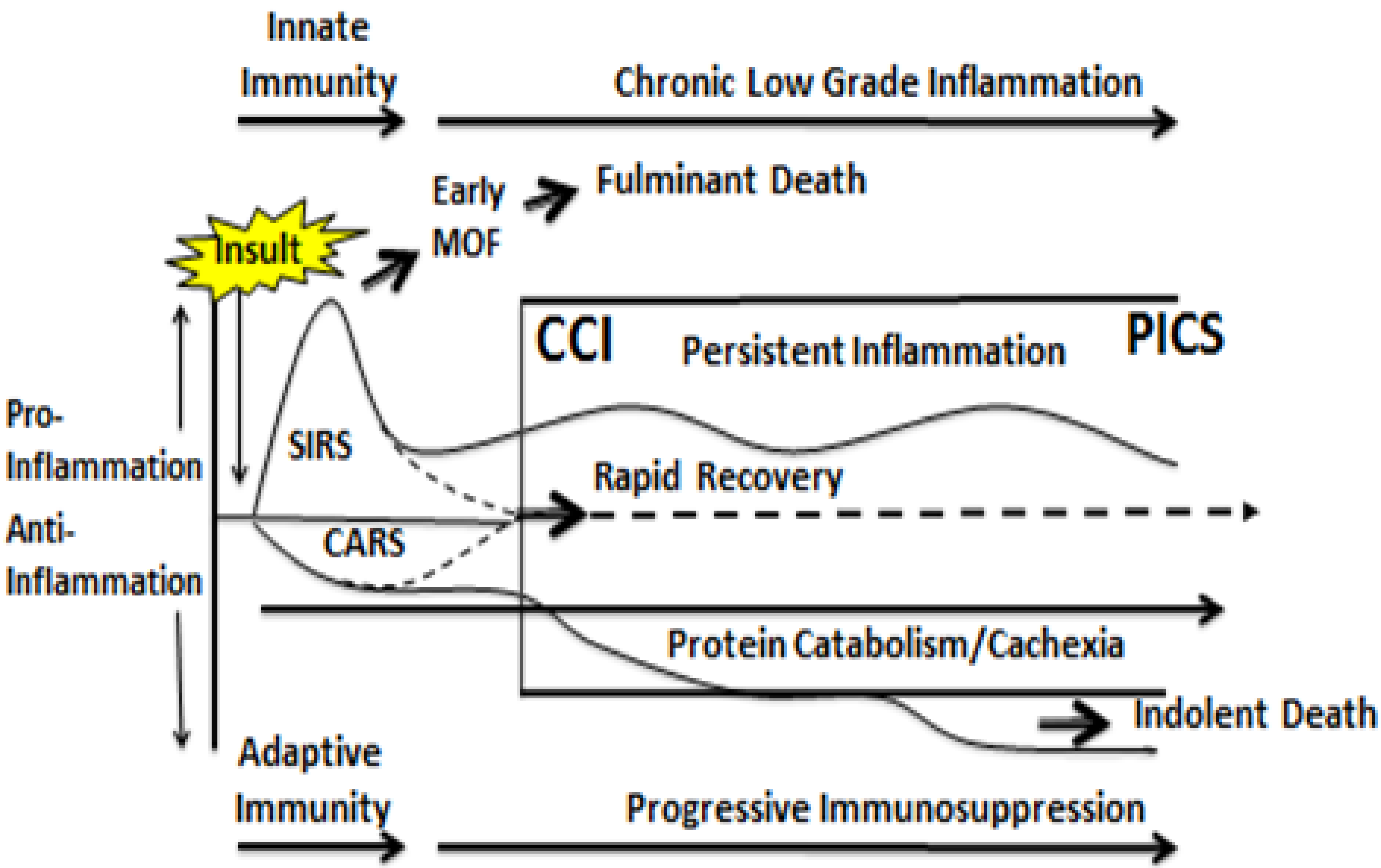
– Mortality at D30 and D90, in the ICU and in-hospital
– Number of days, between inclusion and D60, alive without mechanical ventilation, without hemodynamic support and without organ failure
– Number of patients developing pneumothorax between D1 and D60
– Number of infectious, neurological and hemorrhagic complications
– Duration of mechanical ventilation, and ICU and hospital stays

❖ Long Term Outcomes

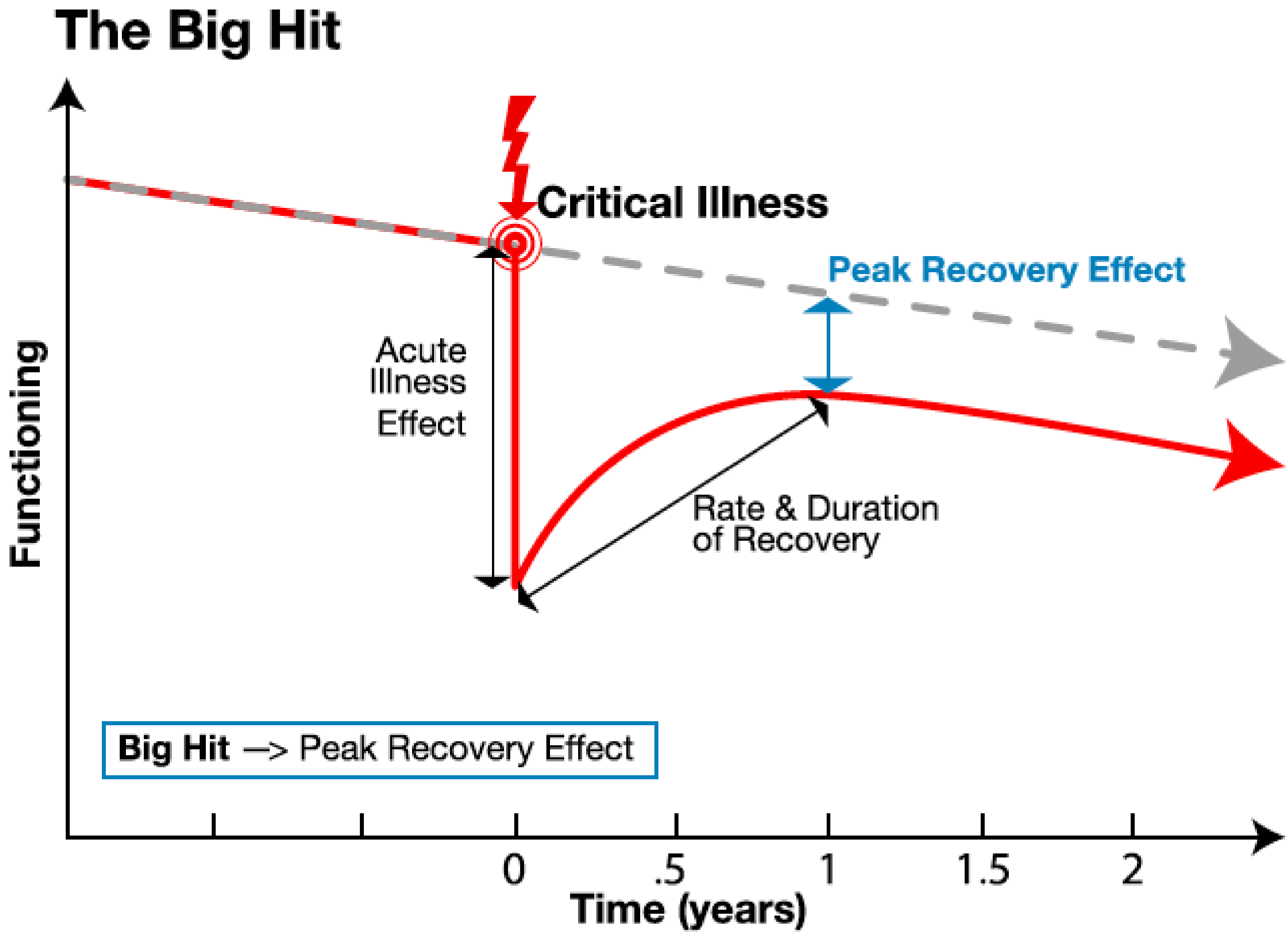
- Increased awareness of critical care myopathy, persistent inflammation, immunosuppression and catabolism syndrome
- Just discharging the patient from the ICU is not sufficient any more

A "Genomic Storm" induced by severe blunt trauma



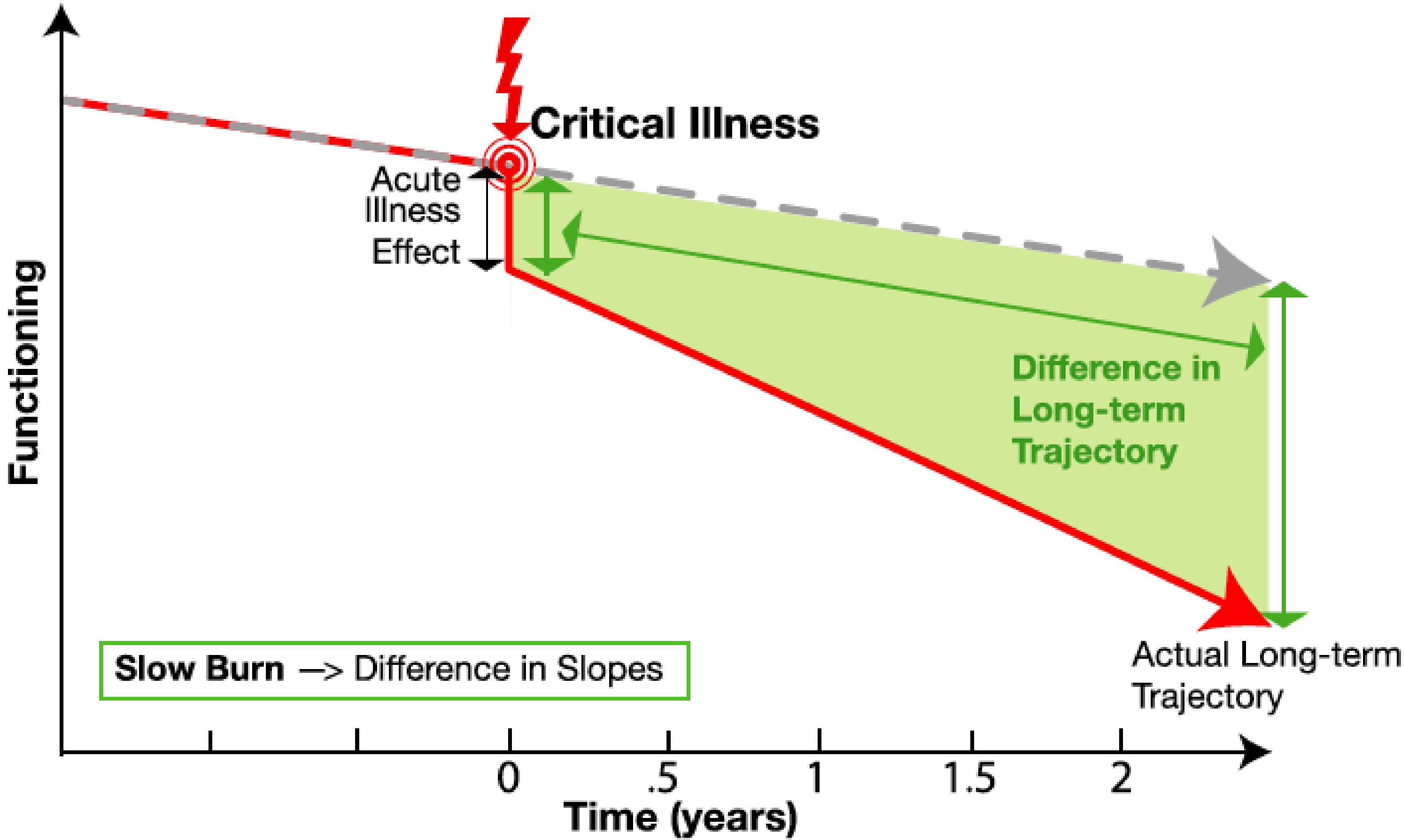


UFHealth
UNIVERSITY OF FLORIDA HEALTH



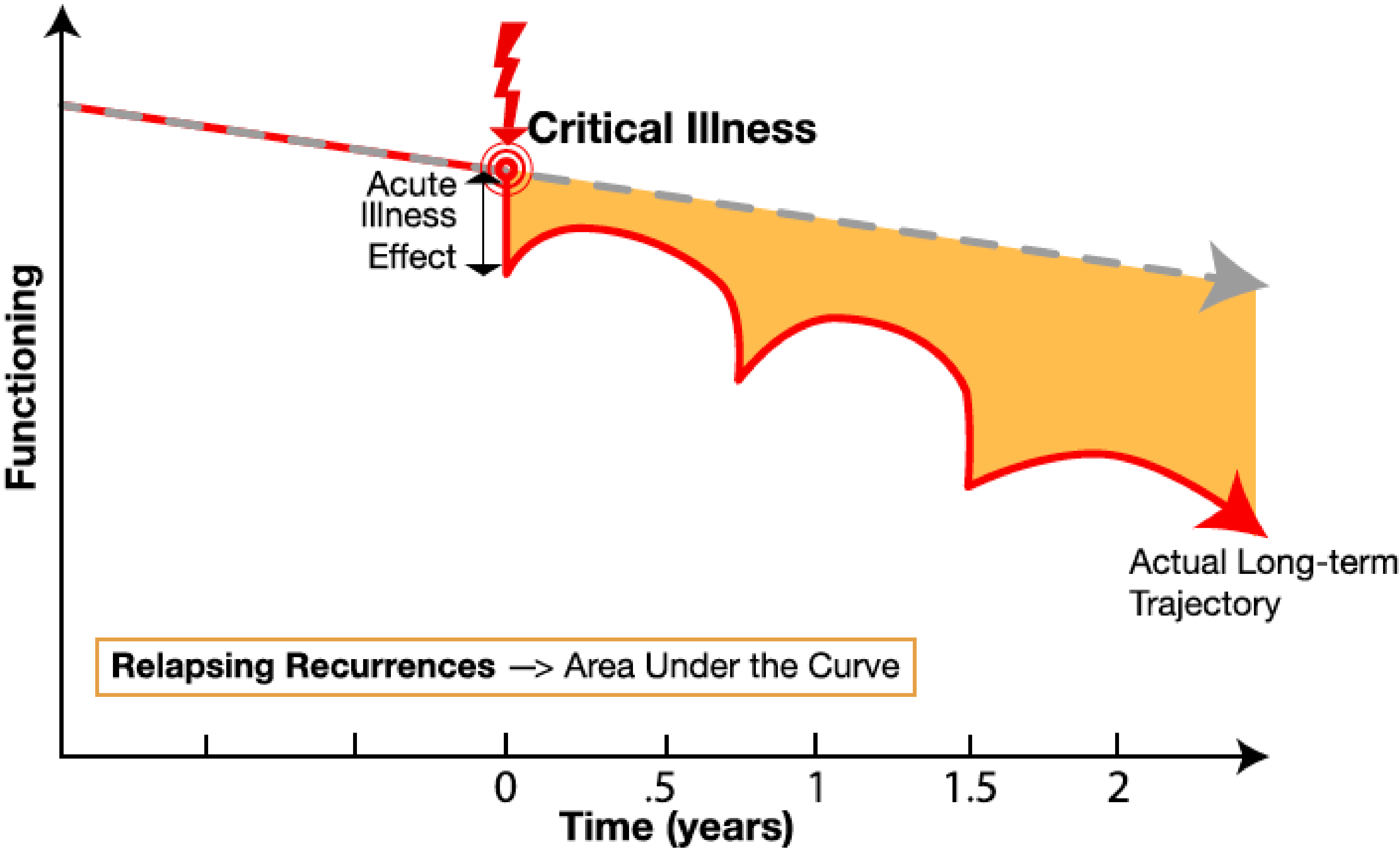
Iwashyna AJRCCM 186 2012 303-4

The Slow Burn



Iwashyna AJRCCM 186 2012 303-4

Relapsing Recurrences

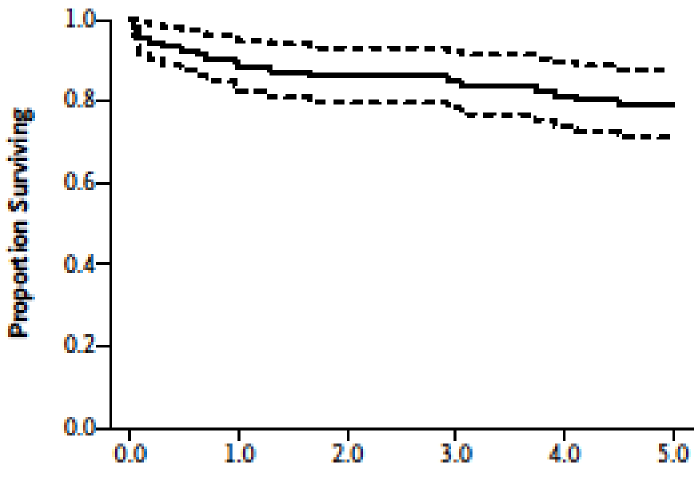


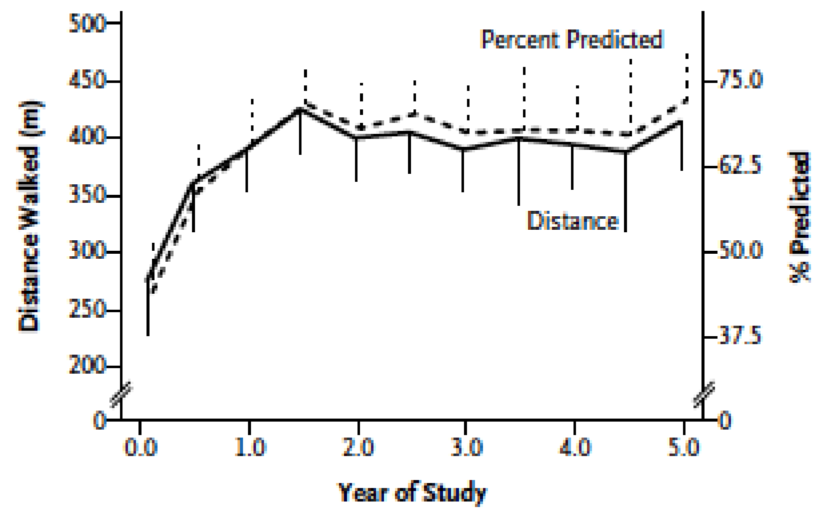
Iwashyna AJRCCM 186 2012 303-4

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 APRIL 7, 2011 VOL. 364 NO. 14

Functional Disability 5 Years after Acute Respiratory Distress Syndrome





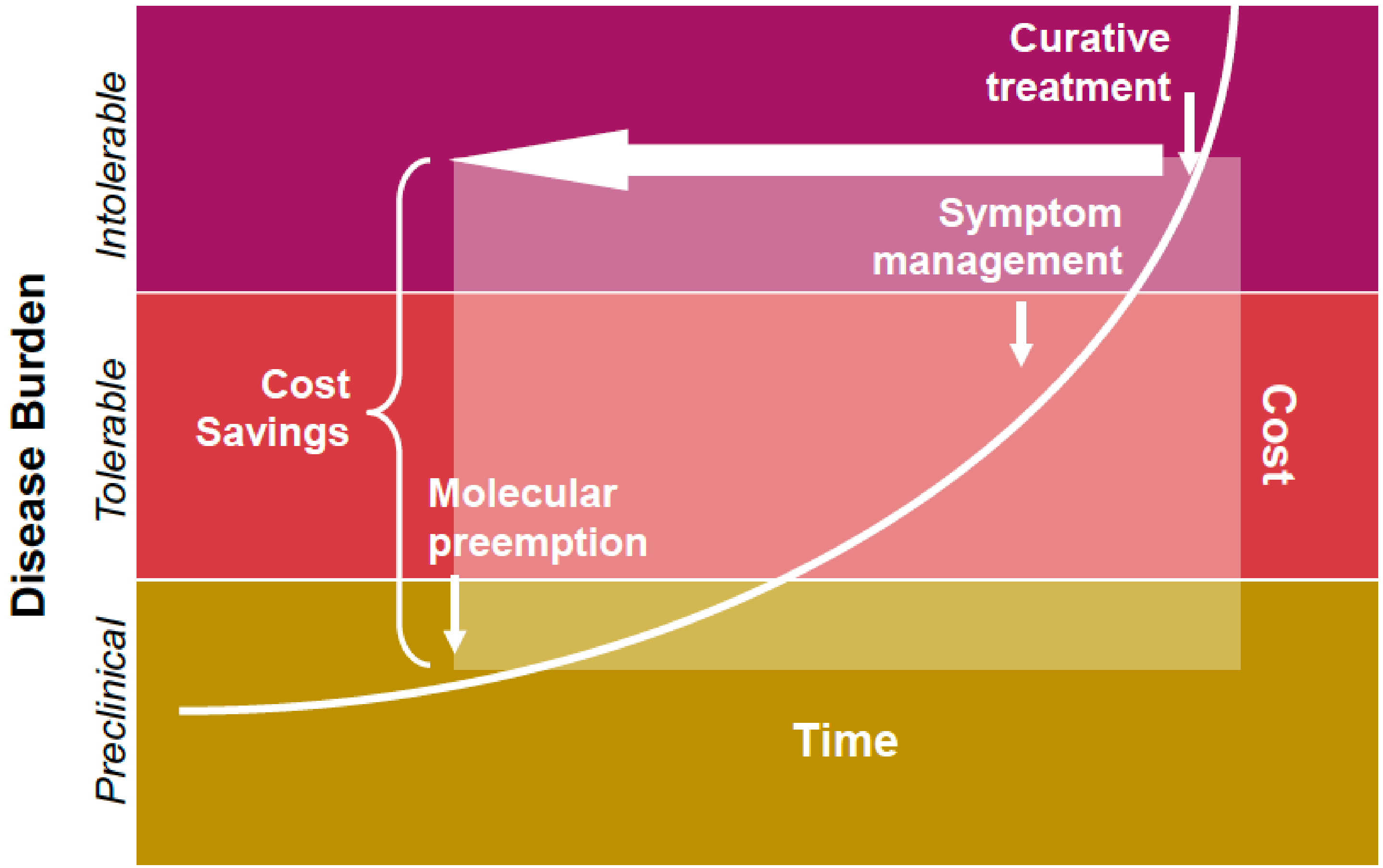
- ARDS survivors had substantial recovery at one year, but persistent deficits at 5 years for exercise tolerance, quality of life

- Focus on early intervention to prevent or reduce the severity of acute lung injury

Need to Transform Medical Research in the 21st Century

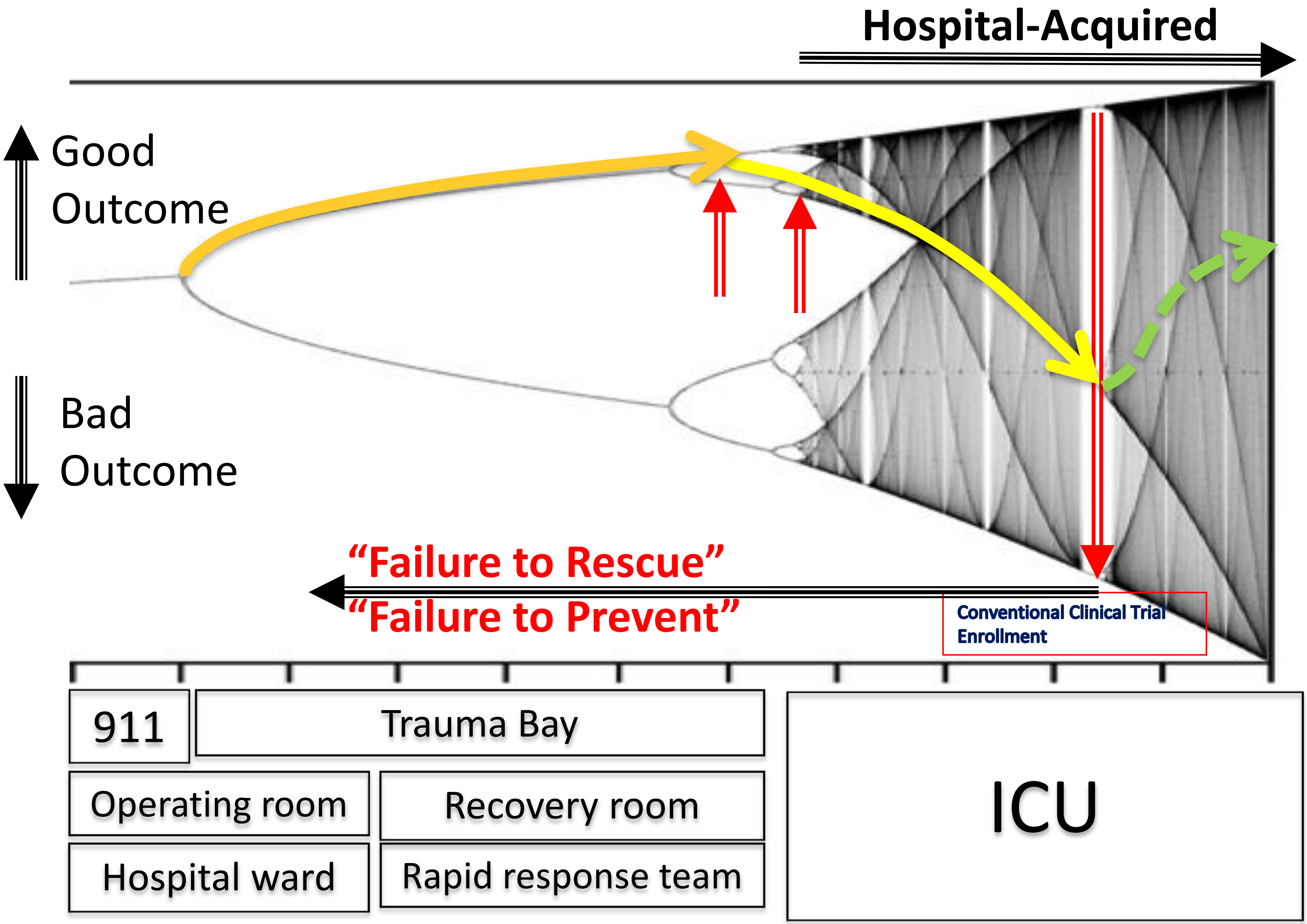
20th Century	21st Century
•Treat disease when symptoms appear and normal function is lost	•Intervene before symptoms appear and preserve normal function for as long as possible
•Did not understand the molecular and cellular events that lead to disease	•Understanding preclinical molecular events and ability to detect patients at risk
•Expensive in financial and disability costs	•Orders of magnitude more effective

The Future Paradigm: Preempt Disease



National Heart Lung and Blood Institute

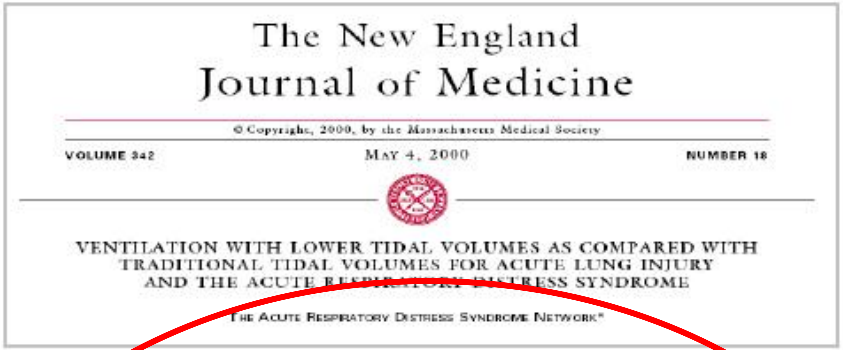
"Chaos" of Critical Illness



❖ Prevention

- Never as exciting……
- But *always* makes more sense

Prevention and Personalized Medicine for ARDS



The New England Journal of Medicine

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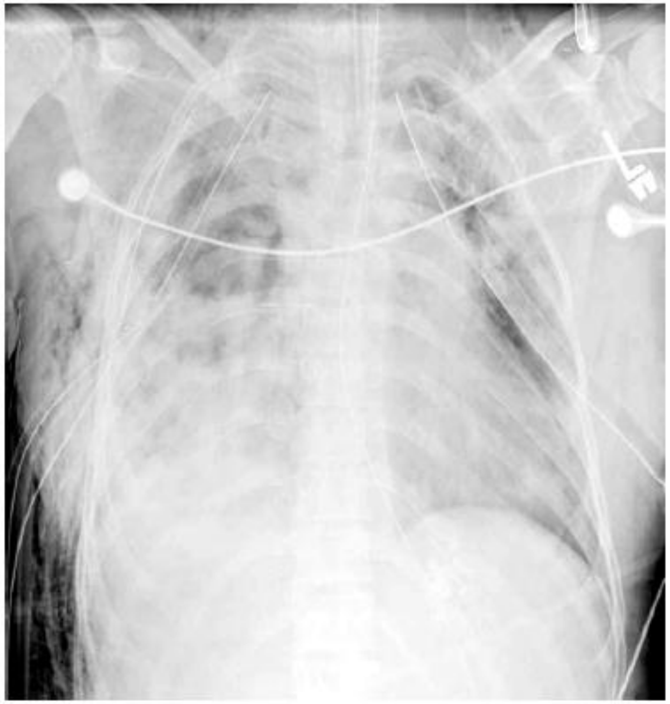
VOLUME 342 | MAY 4, 2000 | NUMBER 18

VENTILATION WITH LOWER TIDAL VOLUMES AS COMPARED WITH TRADITIONAL TIDAL VOLUMES FOR ACUTE LUNG INJURY AND THE ACUTE RESPIRATORY DISTRESS SYNDROME

THE ACUTE RESPIRATORY DISTRESS SYNDROME NETWORK*

•Will earlier alterations in ventilation *prevent* ARDS?

Gajic and colleagues



•Can ventilation settings be *personalized*?

Marini and others

National Heart Lung and Blood Institute

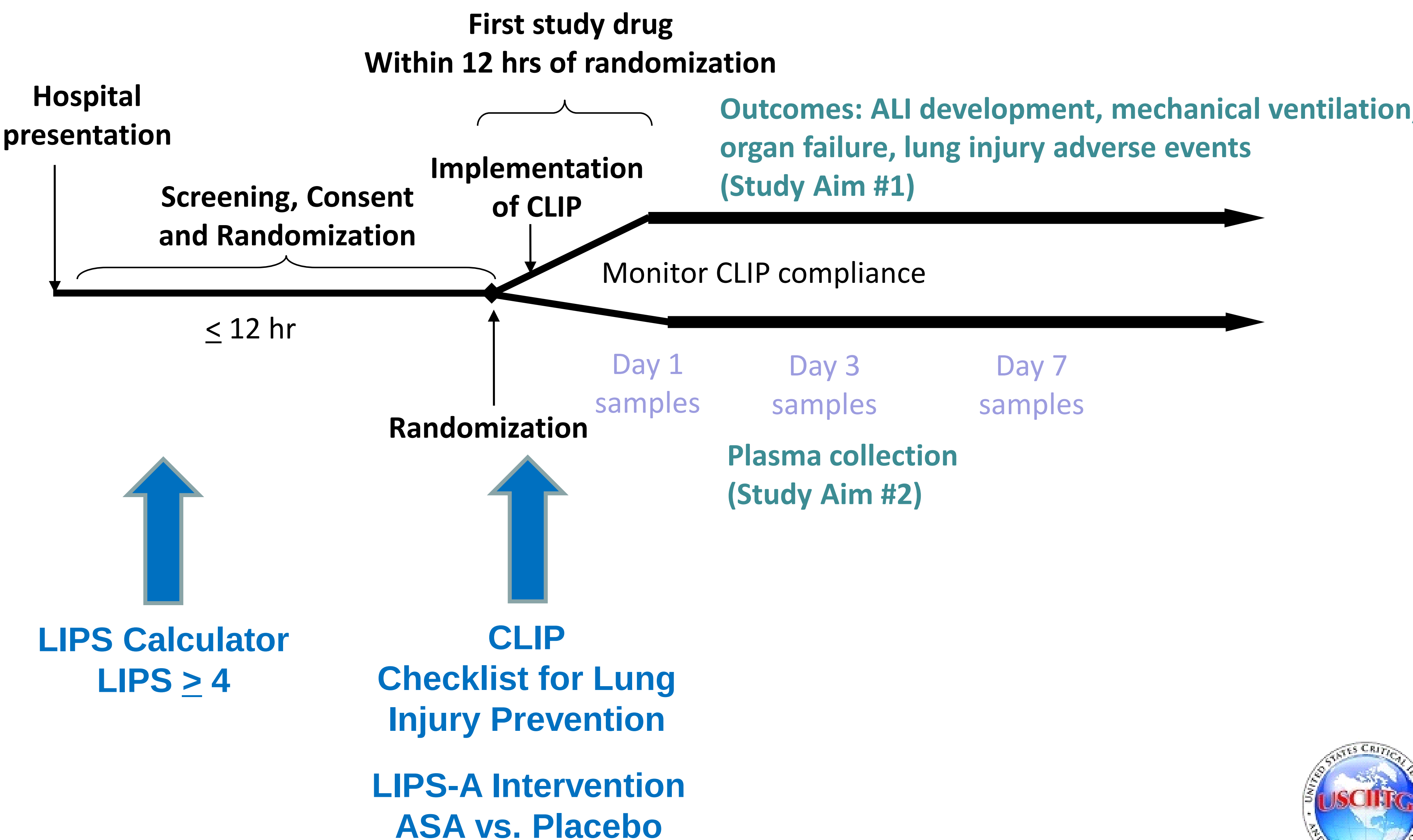
Lung Injury Prevention Study with Aspirin

LIPS-A Kick-off Meeting

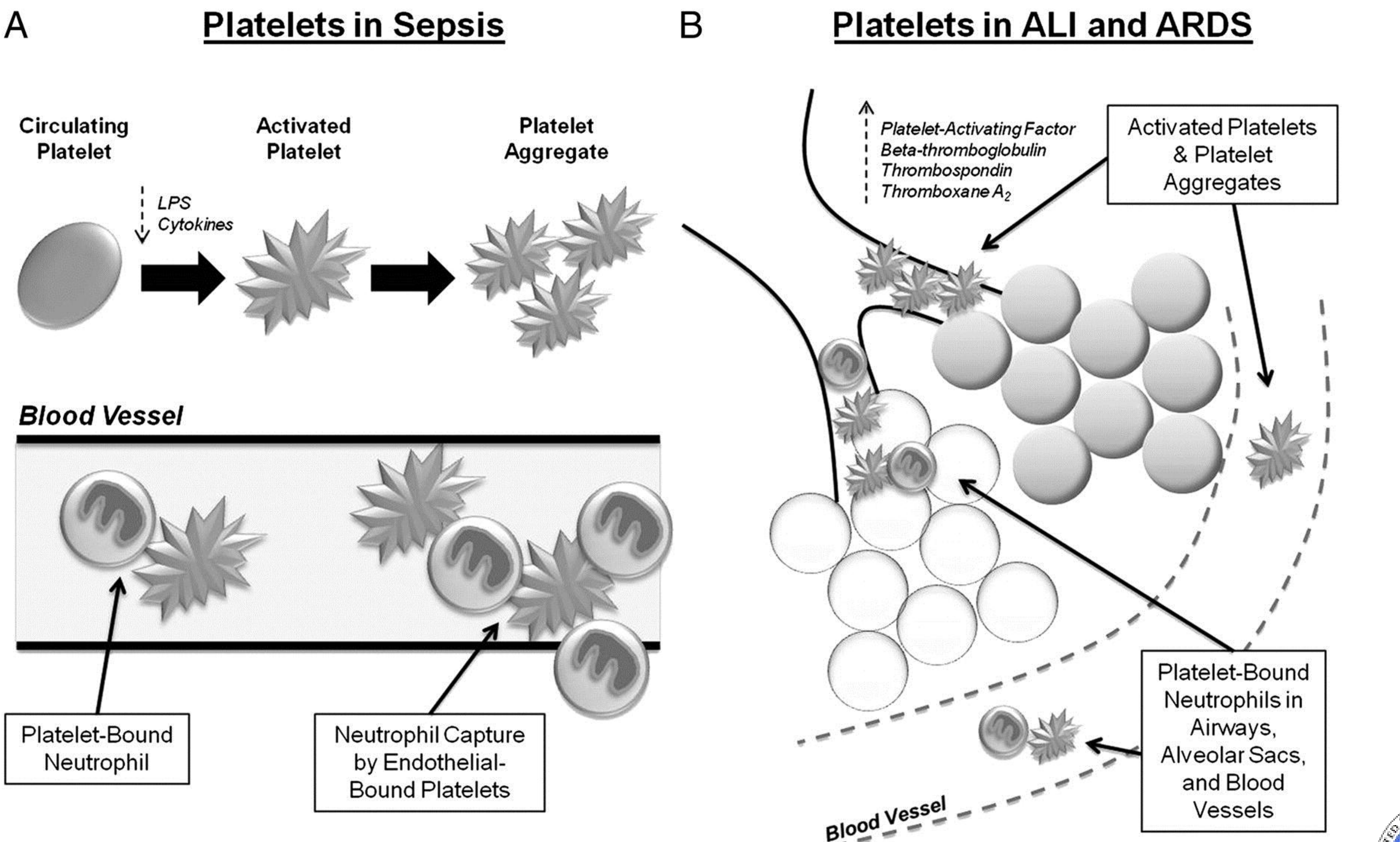
NIH, Bethesda, MD

Nov. 8, 2011

LIPS-A Study Schematic

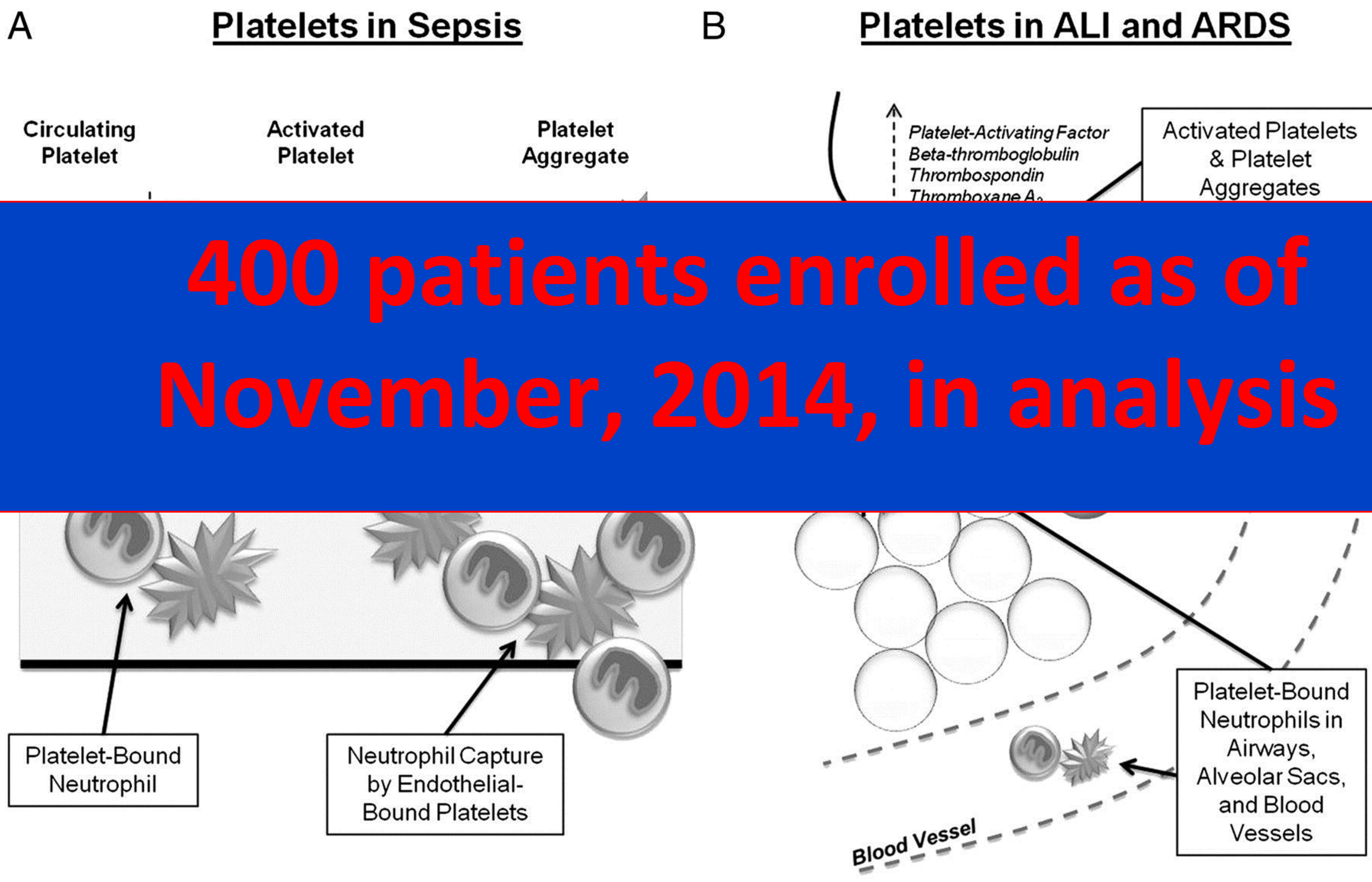


Platelets and platelet-neutrophil interactions in sepsis and ALI



Katz J N et al. Chest 2011;139:658-668

Platelets and platelet-neutrophil interactions in sepsis and ALI

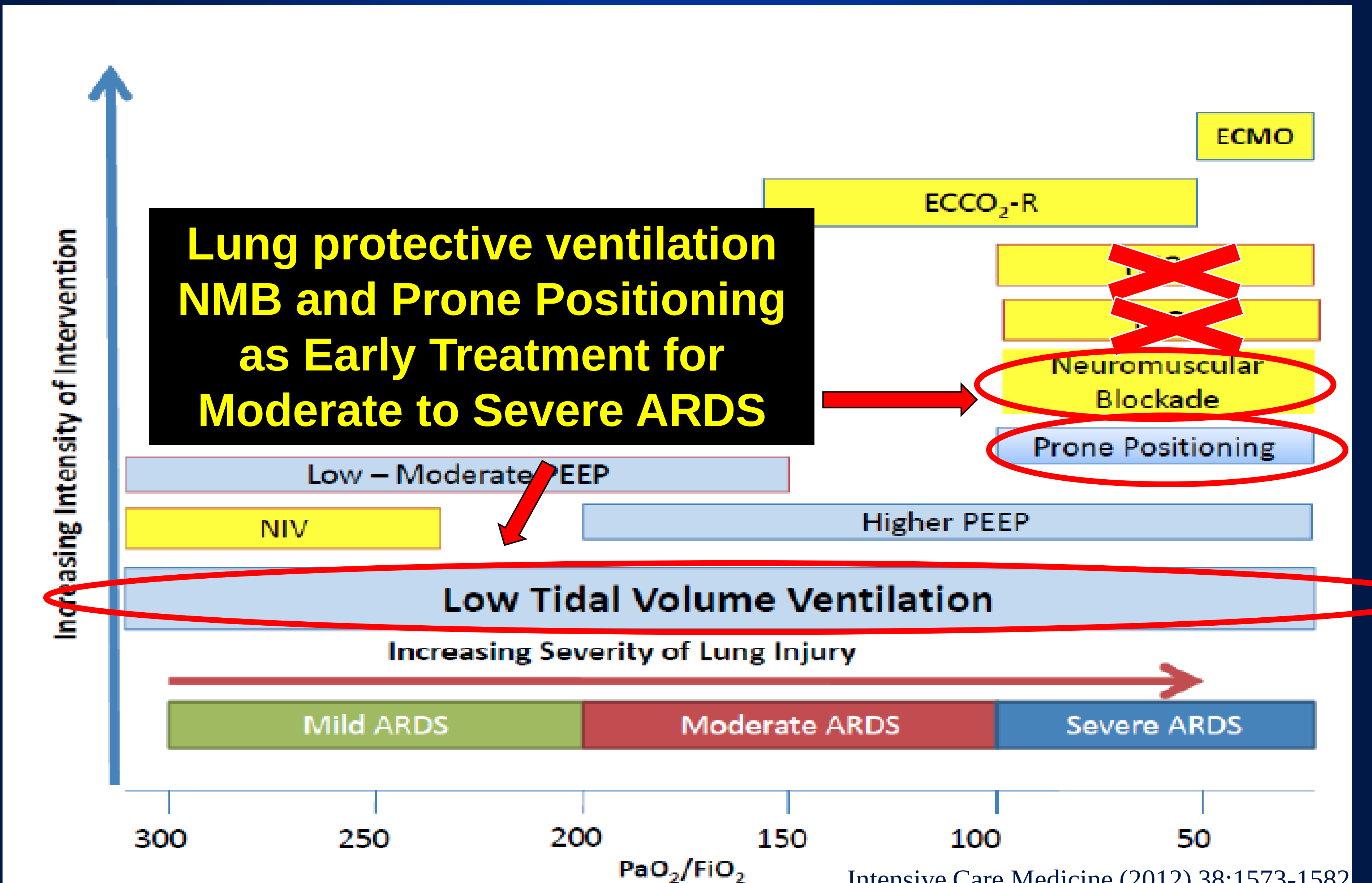


400 patients enrolled as of November, 2014, in analysis

Katz J N et al. Chest 2011;139:658-668

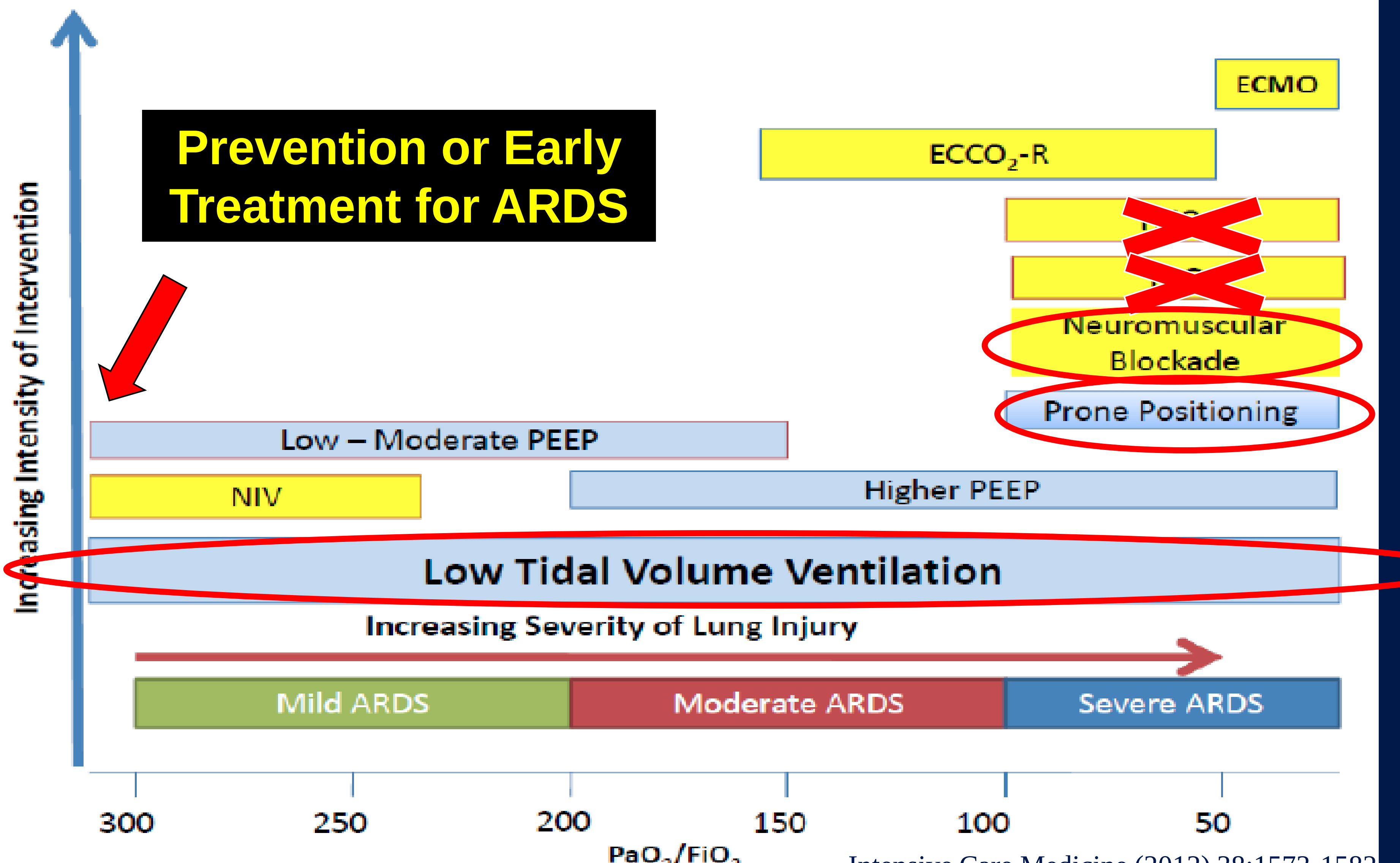
- 12 Clinical Centers, 1 Coordinating Center (Michigan Center – UMich and Henry Ford)
- Focus on trials of prevention and early intervention in lung injury
- Multidisciplinary focus: Pulmonary, ED, Surgery to address continuum of care

Treatment paradigm in ARDS



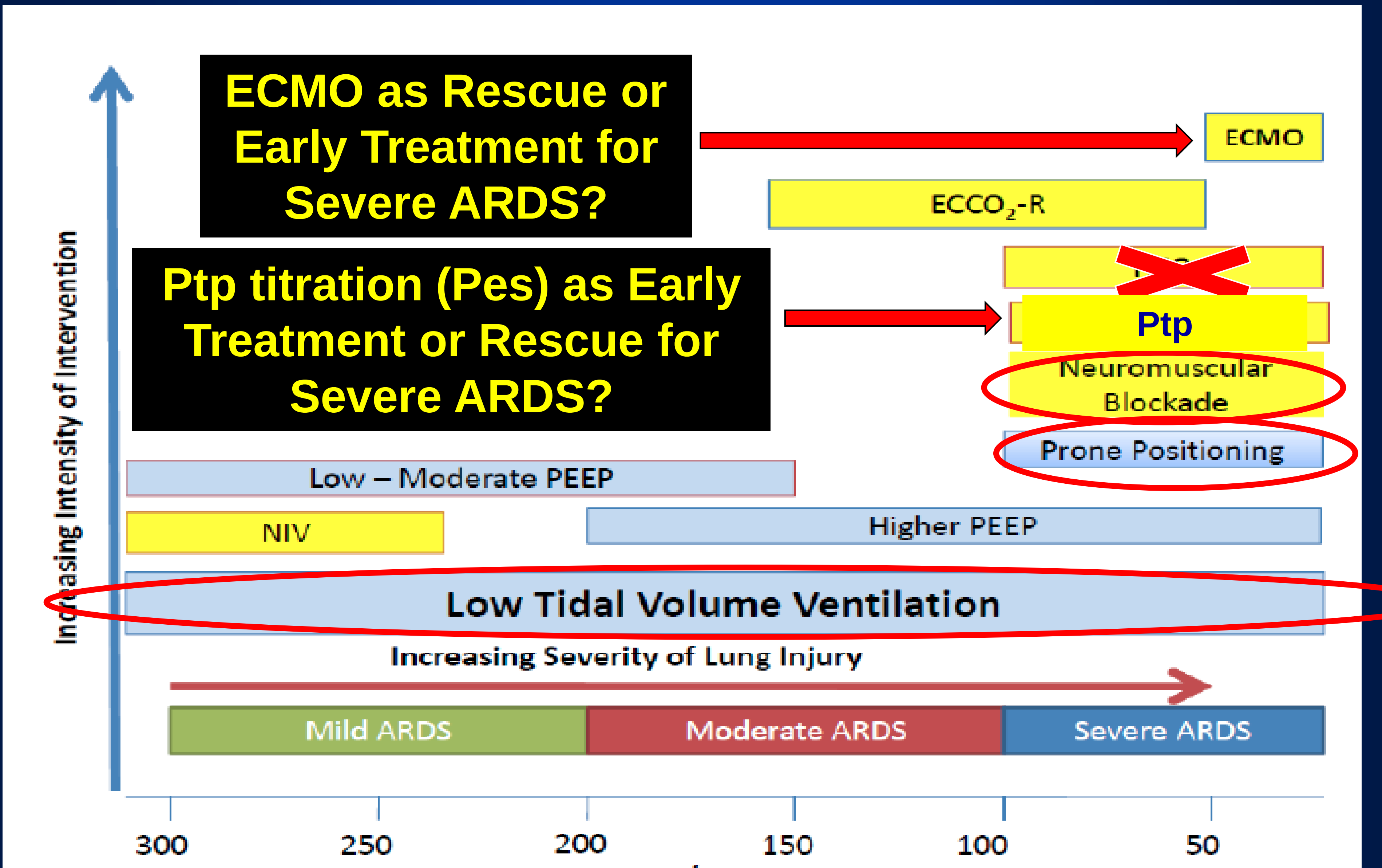
Intensive Care Medicine (2012) 38:1573-1582

Treatment paradigm in ARDS



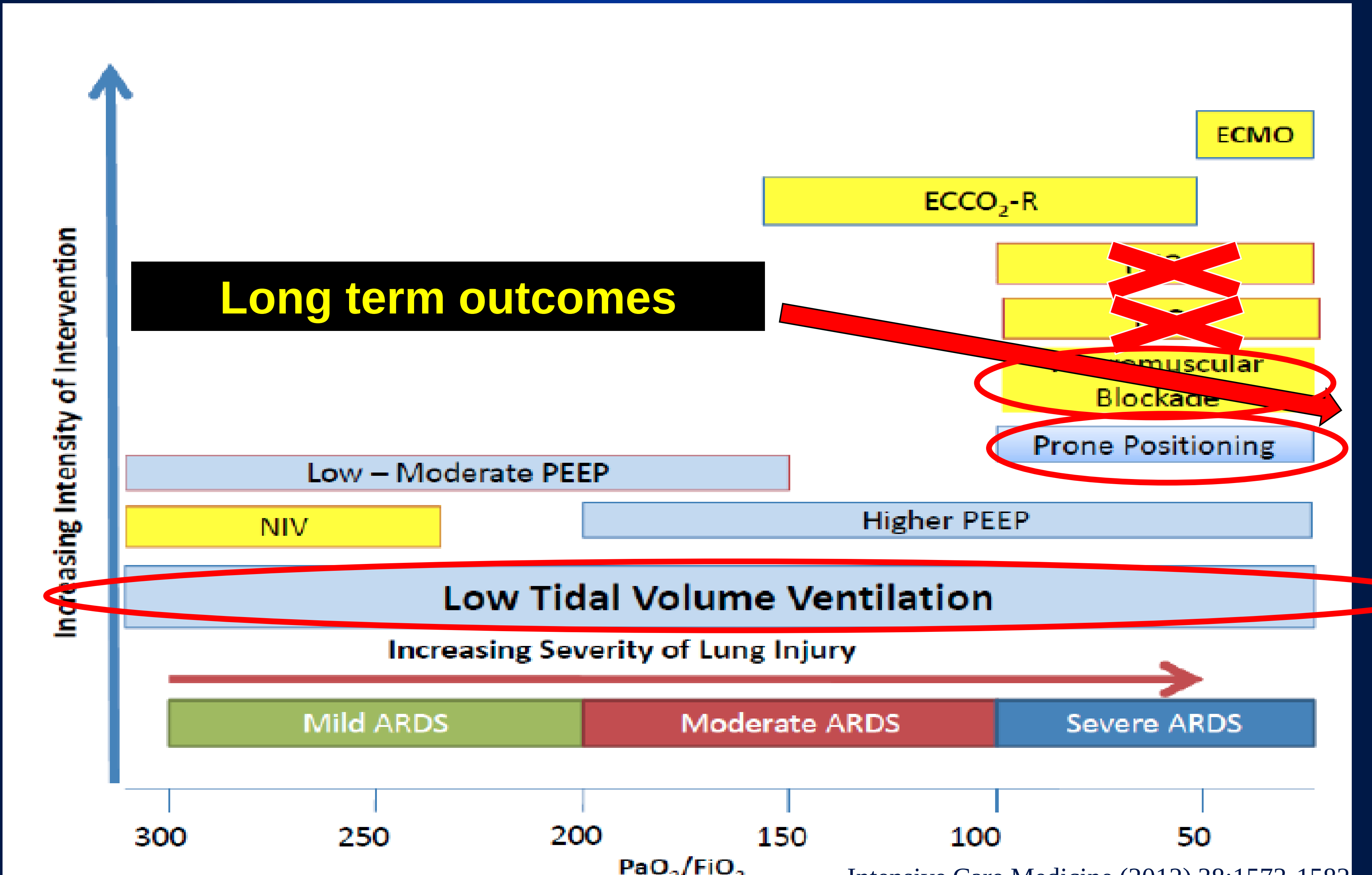
Intensive Care Medicine (2012) 38:1573-1582

Treatment paradigm in ARDS



Intensive Care Medicine (2012) 38:1573-1582

Treatment paradigm in ARDS



Intensive Care Medicine (2012) 38:1573-1582

The Surgeon of the Future
Innovation | Science | Moral Values
CLINICAL CONGRESS 2014

parkpk@umich.edu

Pauline K. Park MD, FACS, FCCM
University of Michigan School of Medicine
Ann Arbor, MI

Lunch

Site Specific PI Reports
Under and Over Triage

Judy Mikhail, MSN MBA

M·TQIP

Under and Over Triage

Figure 2 The Matrix Method for the Calculation of Triage Rates

	Not Major Trauma	Major Trauma	Total	Overtriage
Highest Level TTA	A	B	C	A/C x 100
Midlevel TTA	D	E	F	Undertriage =
No TTA	G	H	I	(E+H) / (F+I) x 100

Under and Over Triage

- William Beaumont Hospital
  - Holly Bair, MSN, NP
  - Randy Janczyk, MD
- Borgess Hospital
  - Mican Deboer, MSN
  - Tom Rohs, MD
- Bronson Methodist Hospital
  - Rita Cox, BSN
  - Scott Davidson, MD

The Topic

Beaumont Health System

Randy Janczyk, MD

Holly Bair, MSN, NP

The Problem/The Barriers

- Triage system based on mechanism of injury as well as physiologic criteria
- Trauma volume, Level I & Level II activations, have increased every year → appropriate mobilization of resources by mobilizing full trauma team only when needed
- Level II activations admitted to higher level care areas (i.e. ICU) → question of under triage?
- ACSCOT visits 2011 and 2014 identified under triage as a weakness

Actions Taken

- Reviewed all trauma patients admitted to Trauma Service
- Evaluated using Beaumont Health Level I & Level II activation guidelines for appropriateness of activation
- Reviewed in Trauma PI all under triage charts
- Reviewed activation guidelines with EC staff and charge RN

Outcomes (Results)

- Acceptable rate per ACSCOT guidelines of 5% under triage rate
- Under triage rate at 11% initially
- Rate decreased to 4% - 3% - 3% for the three quarters of the audit

Sustaining The Change

- Continued review of guidelines
- Review cases of under and over triage at Trauma QI
- Share results with Emergency Center and Trauma Service staff

Future Directions

Continue to Monitor Under Triage Rates

Review of MTQIP Site Project 2014

Elderly Ground Level Falls

Thomas Rohs, Jr., MD and Mican DeBoer BSN, RN, CEN

BORGESS

Problem

- Undertriage of elderly patients presenting with ground-level fall (GLF) as the MOI
- **Performance indicator**: Patients ≥ 65years with ISS ≥15 that were not a Tier I or Tier II trauma activation
- **Baseline data**:
  - April-Sept, 2014, 21 patients undertriaged
  - 11/21 GLF
  - 8/11 had isolated head injuries, all over 80 YO
  - None of these pts met activation criteria

Actions Taken

- Introduced proposal to modify Tier II activations to include pts $\geq$ 65 on anticoags/antiplatelets who have GLF
- Partnered with ED and inpatient services admission group to increase buy-in to involve trauma early
- Case reviews/presentations on geriatric trauma: WMAC annual conference, EMS con’t ed event; Regional Emergency Summit

Outcomes

- Trauma physician group turned down proposal to include GLF in Tier II activation criteria
- Instead, TMD worked with ED medical director to build pathway to expedite these patients through the system
- Currently in the education phase

Geriatric (≥65) Ground Level Fall/Head Trauma Pathway

No Symptoms and
No
Anticoagulants

Routine Care Plan

>65 years and any of the below:

1) Multiple comorbidities
2) >1 anatomic area
and
anti-platelets **or** anticoagulants

>75 *and* anti-platelets or anticoagulants

Symptomatic

Initiate Rapid Geriatric Head Injury Protocol

Expedited Evaluation by ED Physician

STAT Orders:

- Head CT
- PT/INR
- CBC
- Type & Screen

If CT Positive:

- **Initiate** rapid consultation to trauma surgeon
- **Initiate** anti-platelet, anticoagulation correction

If head CT is negative, consider delayed follow-up head CT.

Goals of care: [1] ED MD eval ≤20 min after arrival [2] CT ≤30 min [3] Trauma eval and product/med administration ≤60 min

Implementing/Sustaining Change

- Education among ED providers and nurses
- Tracking performance indicators through registry
- Reporting compliance at monthly multidisciplinary trauma peer review meetings
- Reporting at monthly ED quality meetings
- Modify pathway as necessary to meet needs of this population

Future Directions

- Measure compliance with meeting performance indicators instead of relying on Cribrari matrix to calculate undertriage rates

Questions

BORGESS

TRAUMA OVER/UNDER TRIAGE

2014 MTQIP Performance Improvement Project

Bronson Methodist Hospital
Scott Davidson, MD, FACS
Rita Cox, BSN, RN

BRONSON

Problem/Barriers

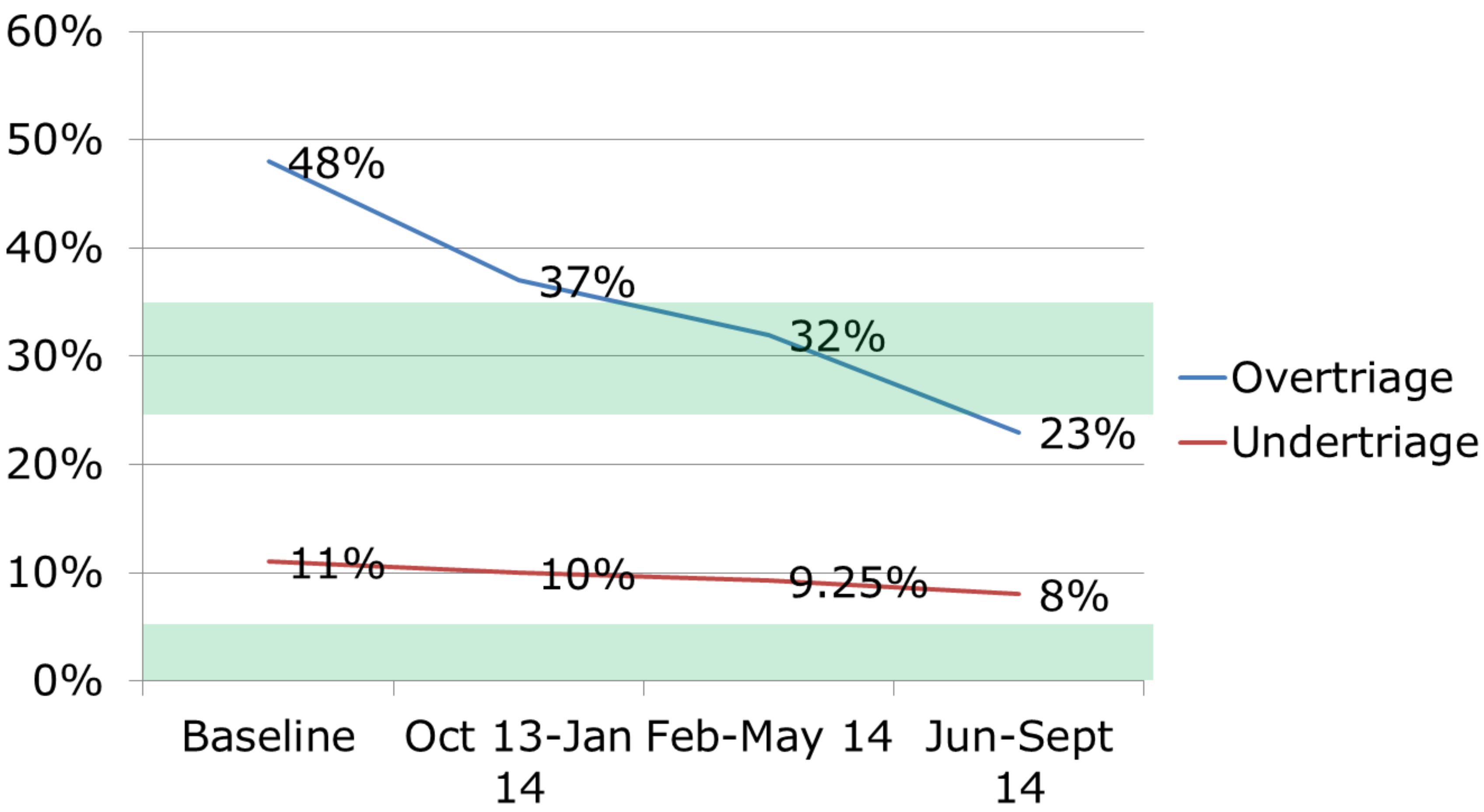
- Orange book suggests acceptable undertriage rate of 5% or less
- Orange book suggests acceptable overtriage rate 25-35%
- Identified BMH rates higher than acceptable range

Actions Taken

- Goal: To improve trauma triage rates through education and promotion of adherence to trauma team activation criteria

- Monthly tracking on Trauma Scorecard
- Chart reviews
- MTQIP PI Project

Outcomes



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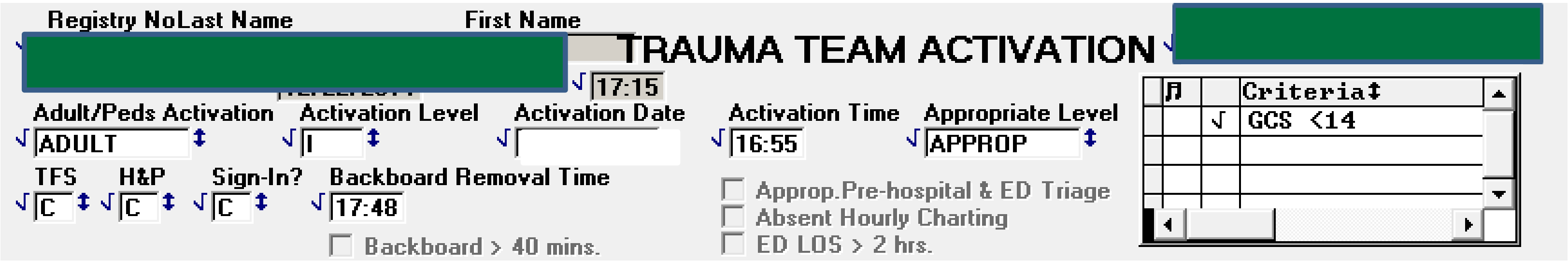
Process

- Daily review for over/under triage
- Once issue identified, referred to ED Liaison for review
- ED Liaison reviews with provider
- Case discussed at Peer Review and summarized for PIPS committee
- Monitored on Trauma Scorecard

Process



Registry No Last Name First Name

[redacted] 17:15

TRAUMA TEAM ACTIVATION [redacted]

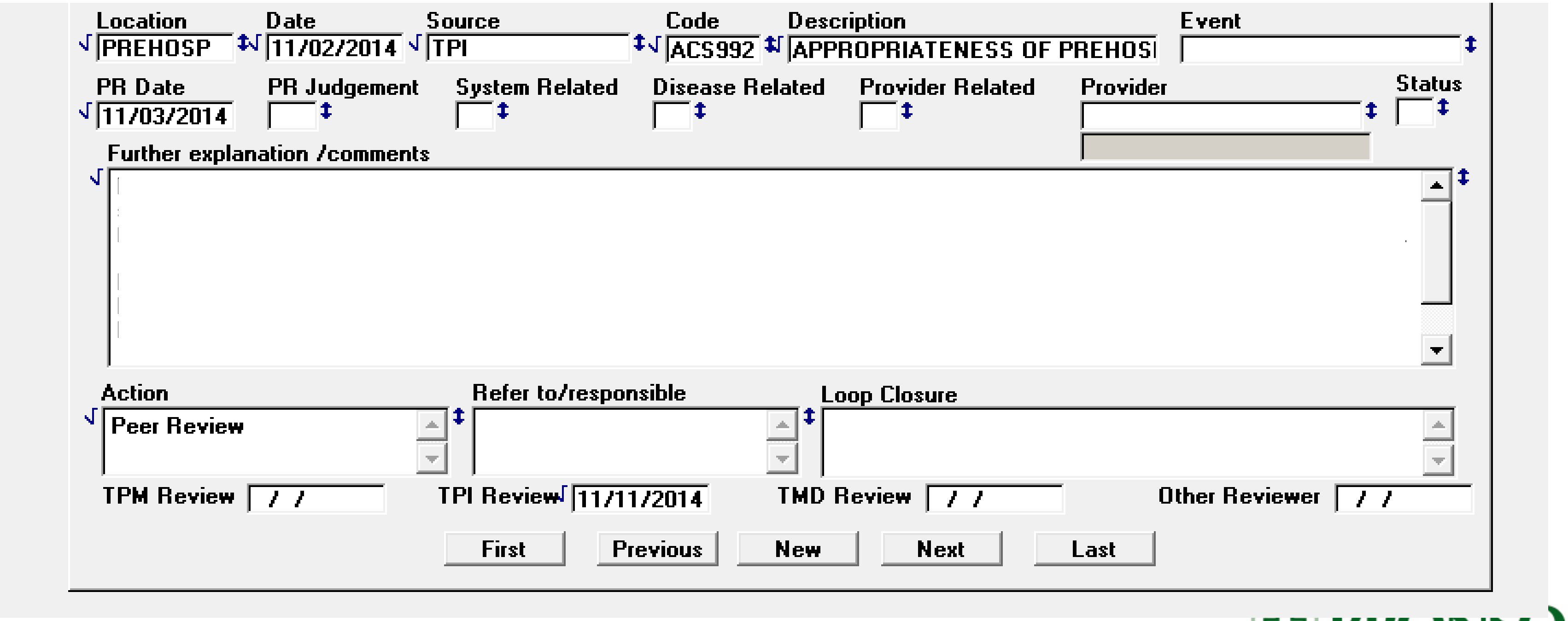
Adult/Peds Activation: ADULT
Activation Level: I
Activation Date:
Activation Time: 16:55
Appropriate Level: APPROP

		Criteria
	√	GCS <14

TFS: C
H&P: C
Sign-In?: C
Backboard Removal Time: 17:48

☐ Backboard > 40 mins.

☐ Approp.Pre-hospital & ED Triage
☐ Absent Hourly Charting
☐ ED LOS > 2 hrs.



Location: PREHOSP
Date: 11/02/2014
Source: TPI
Code: ACS992
Description: APPROPRIATENESS OF PREHOSI
Event:

PR Date: 11/03/2014
PR Judgement:
System Related:
Disease Related:
Provider Related:
Provider:
Status:

Further explanation /comments

Action: Peer Review
Refer to/responsible:
Loop Closure:

TPM Review: / /
TPI Review: 11/11/2014
TMD Review: / /
Other Reviewer: / /

First | Previous | New | Next | Last

Sustaining the Change

- Continue to monitor through PI process
- Partnering with Emergency Medicine and Prehospital providers
- Chart reviews

BRONSON

Future Directions

- Protocol development to decrease undertriage
- Monitor through PIPS
- Fallout review with EM Liaison

BRONSON

Thank you!

bronsonhealth.com

BRONSON

Learning from peer collaboratives Michigan Urology Surgery Improvement Collaborative (MUSIC)

James Montie, MD

Susan Linsell, MHSA

M·TQIP

Michigan Urological Surgery Improvement Collaborative

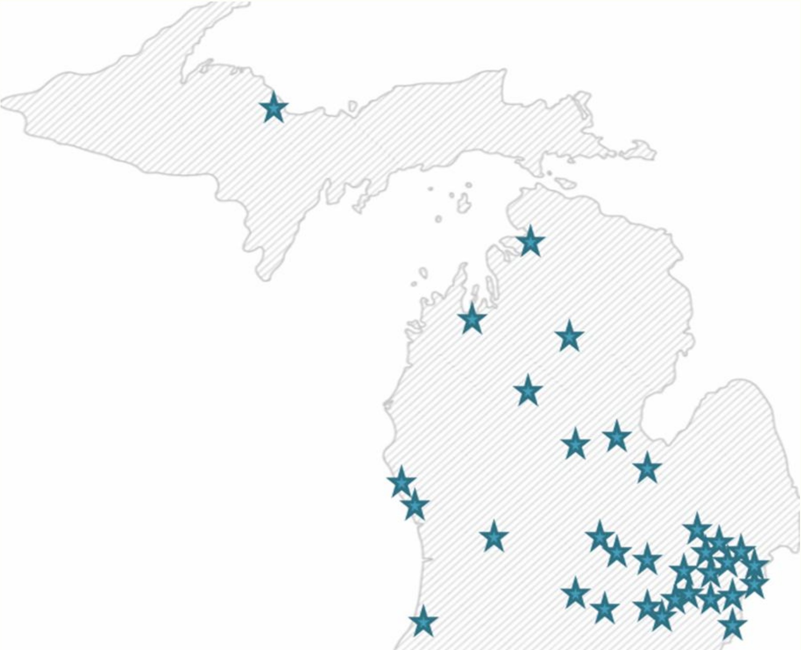
Making Michigan #1 in Prostate Cancer Care

Jim Montie, MD
Susan Linsell, MHSA

February 10, 2015

Vital statistics

- **MUSIC Participants:**
  - **42 practices**
  - **235 urologists (~90% of urologists in state)**
  - **4 patient advocates**



- **Data Collection:**
  - **36 practices**
  - **More than 15,000 cases in the registry**
    - **> 13,500 biopsies and 2,800 radical prostatectomies**

Current QI Activities

1. Appropriate imaging

1. Safer prostate biopsy

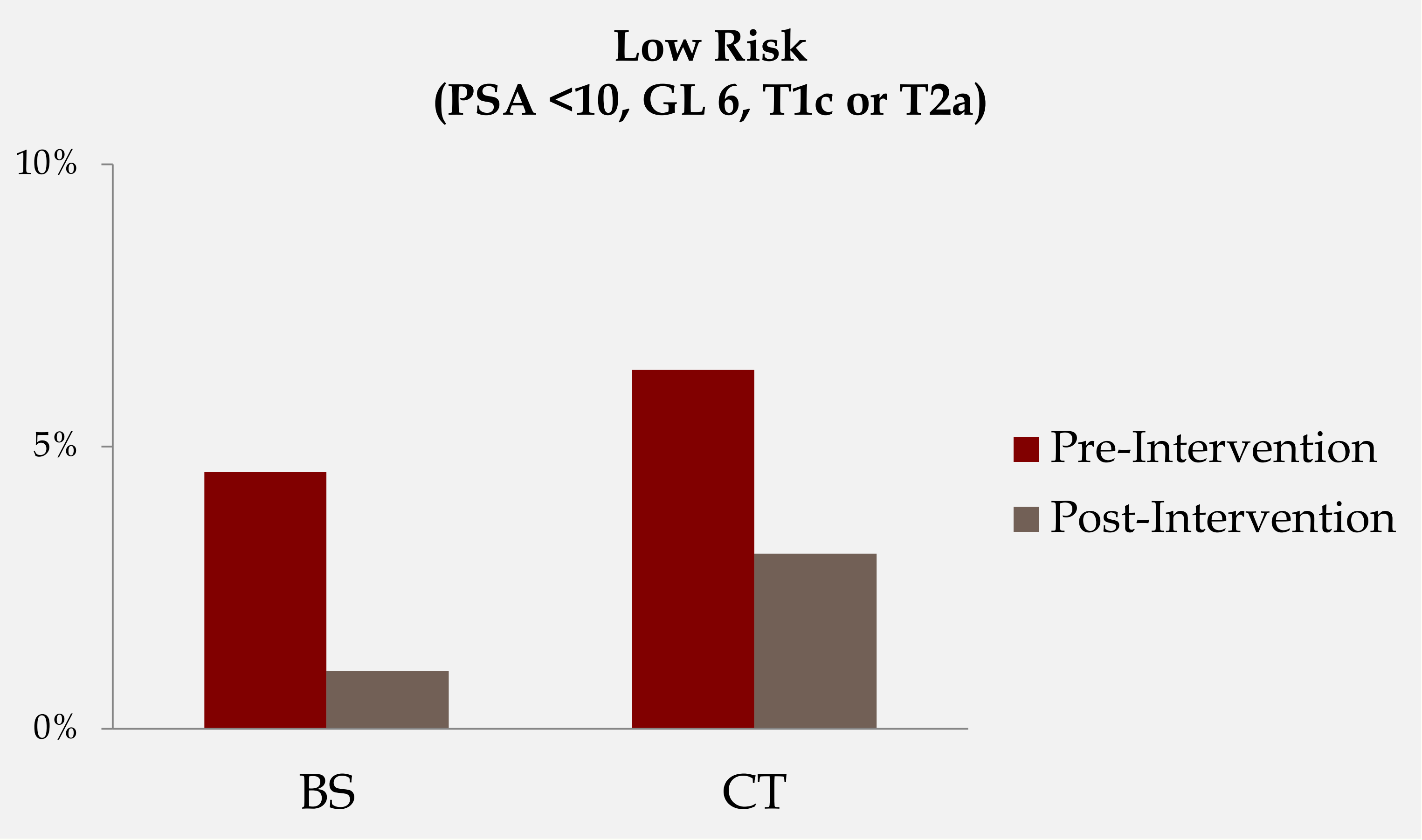
2. Improve radical prostatectomy perioperative and functional outcomes

3. Appropriate treatment

1. Appropriate Imaging

Rationale: Focus of AUA Choosing Wisely Campaign

Imaging


Low Risk
(PSA <10, GL 6, T1c or T2a)
10%
5%
0%
BS
CT
Pre-Intervention
Post-Intervention

Imaging

- **MUSIC data demonstrated a + Bone Scan or CT Scan for intermediate risk patients was *rare* (<1%)**
- **Developed imaging *appropriateness criteria* based on literature review, guidelines, and MUSIC data with collaborators from UM Industrial Engineering**

MUSIC Imaging Appropriateness Criteria

- **Order a Bone Scan if:**
  - Gleason Score ≥ 8
    <u>or</u>
  - PSA >20

- **Order a CT Scan if:**
  - Gleason Score ≥ 8
    <u>or</u>
  - PSA >20
    <u>or</u>
  - Clinical T Stage ≥ T3

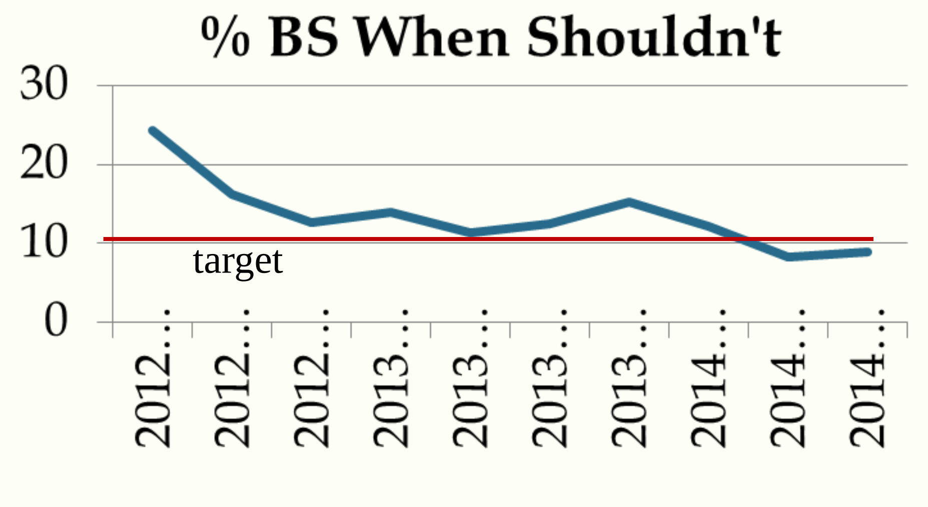
"Do when you should,
don't when you shouldn't"

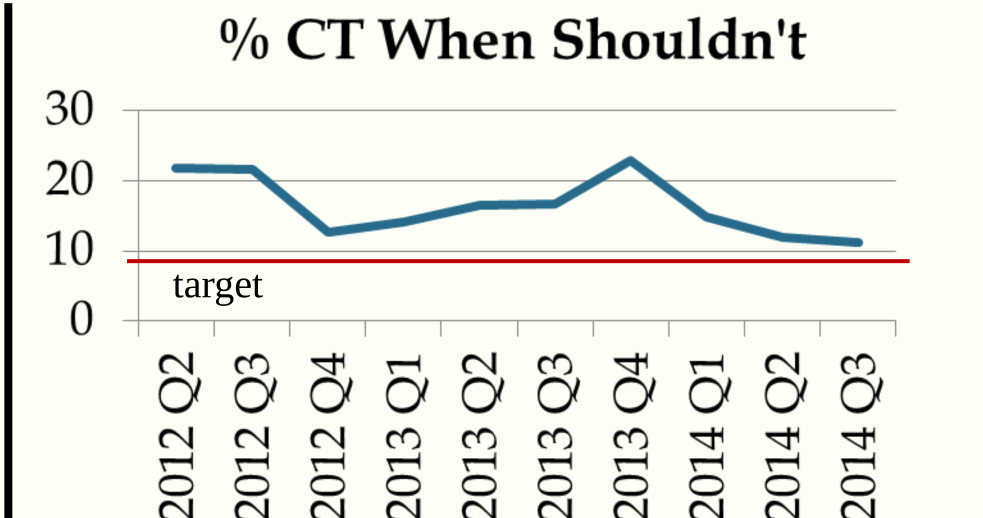
MUSIC Imaging Appropriateness Criteria

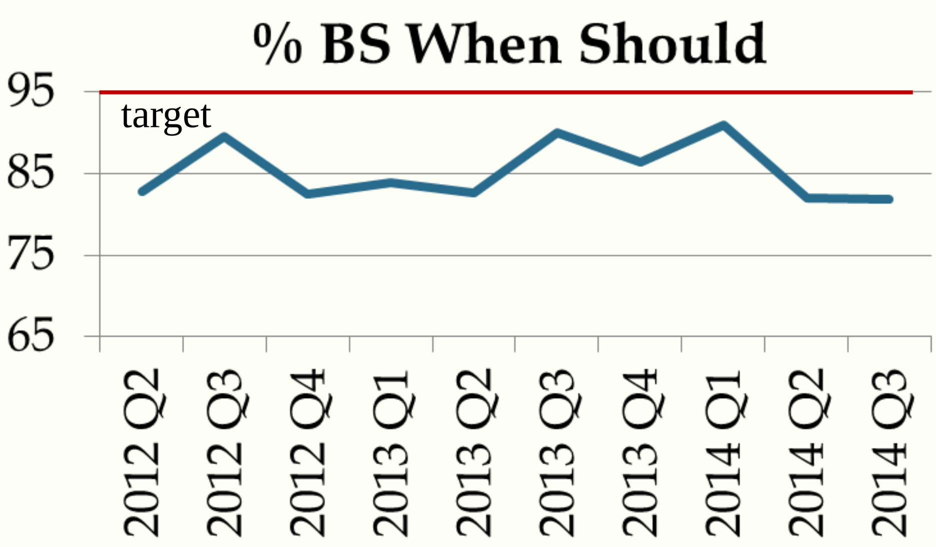
Imaging Goals	
Perform Imaging in ≥95% of patients meeting criteria	Perform imaging in <10% of patients NOT meeting criteria

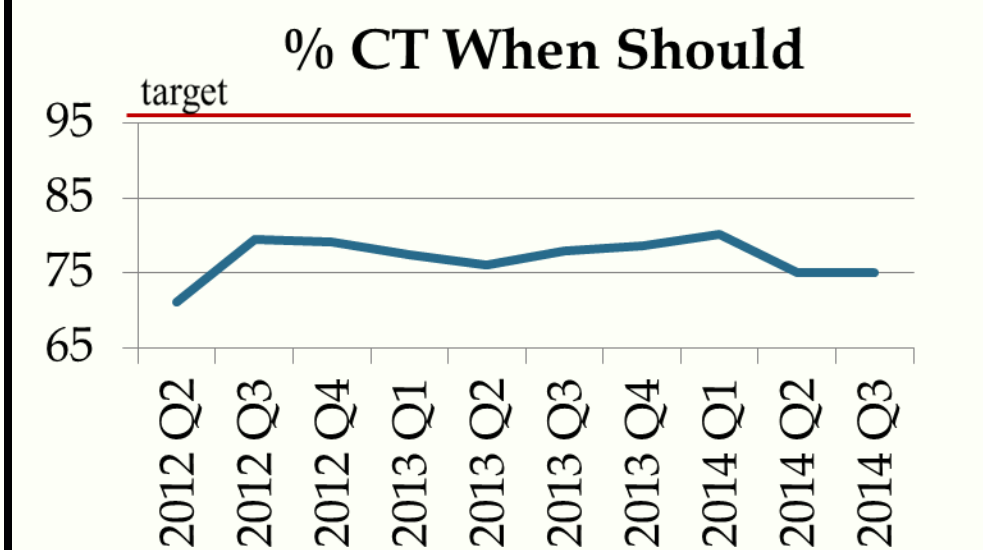
"Do when you should, don't when you shouldn't"

Imaging Appropriateness: Collaborative Wide









2. Making Prostate Biopsy Safer

Rationale: Increasing sepsis rate nationally to 2-4 % of biopsies

Reducing prostate biopsy-related hospitalizations

- Baseline prostate biopsy-related hospitalization rate of 1.26%
- 92% of hospitalizations due to infection
- 79% of cultures identified a fluoroquinolone resistant organism

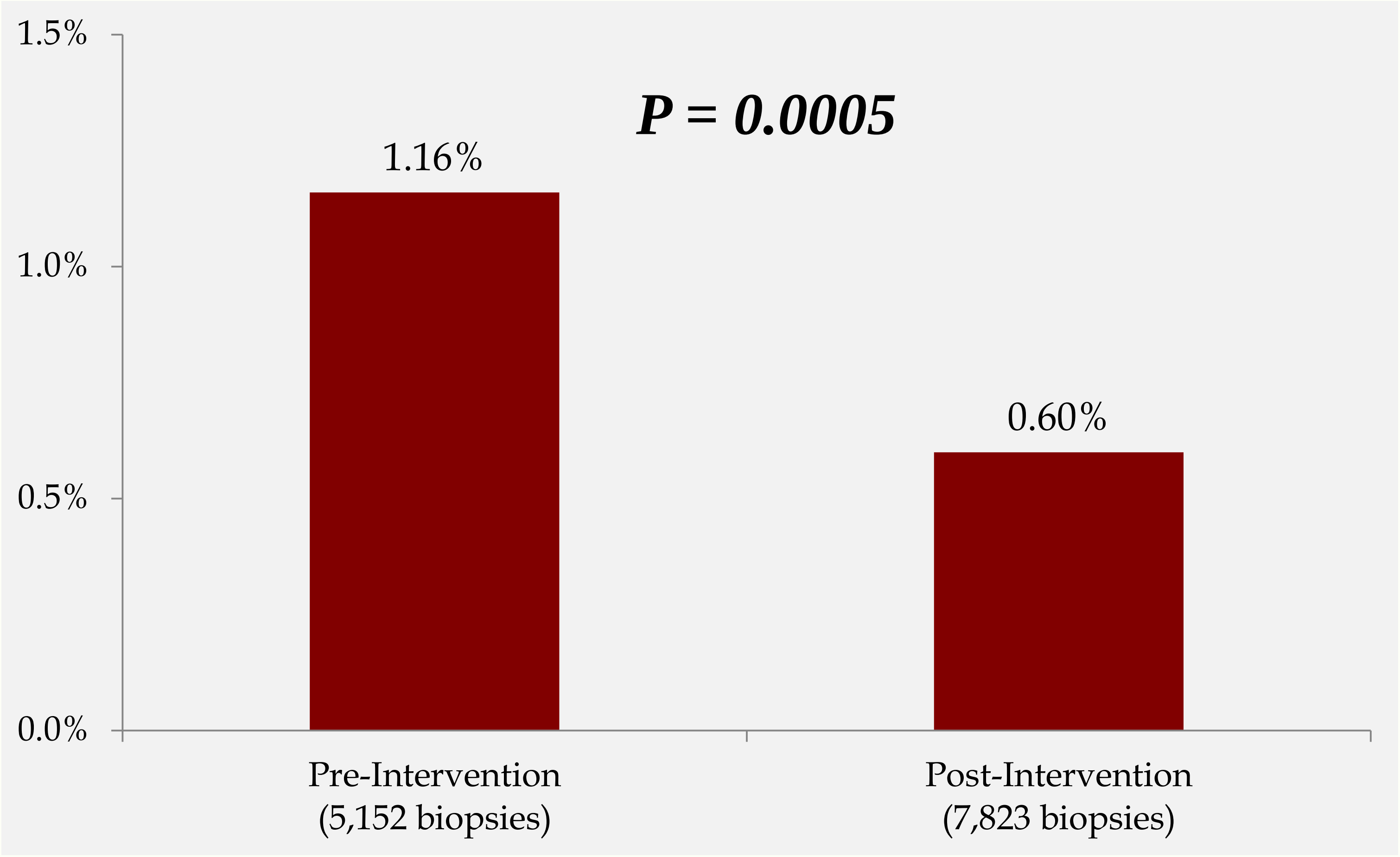
The challenge is addressing fluoroquinolone resistance

MUSIC
Michigan Urological Surgery Improvement Collaborative

Pathways for addressing Fluoroquinolone resistance

Culture-Specific Antibiotics (Rectal Swab Culture) * *(See IV for High-Risk patients)*		
Culture Sensitive to Ciprofloxacin:	*Culture Resistant to Ciprofloxacin but sensitive to TMP/SMX or Cephalosporins:*	*Culture Resistant to Ciprofloxacin, Cephalosporins, TMP/SMX:*
Ciprofloxacin PO	Culture directed antibiotics: (e.g., TMP/SMX PO, Cefazolin IM, Ceftriaxone IM)	Gentamicin IM + / – Clindamycin IM
Augmented Antibiotics (No Culture Available)		
Antimicrobial of Choice:	*Alternate Antimicrobials:*	*Allergic to Penicillins, Fluoroquinolones, and Cephalosporins:*
Fluoroquinolone (Cipro) PO + Gentamicin IM	Fluoroquinolone (Cipro) PO + Cefazolin IM or Alternative based on local antibiogram (e.g., Cefuroxime, Zosyn)	Gentamicin IM + / – Clindamycin IM

Collaborative-wide hospitalization rates



3. Improving perioperative and functional outcomes after radical prostatectomy

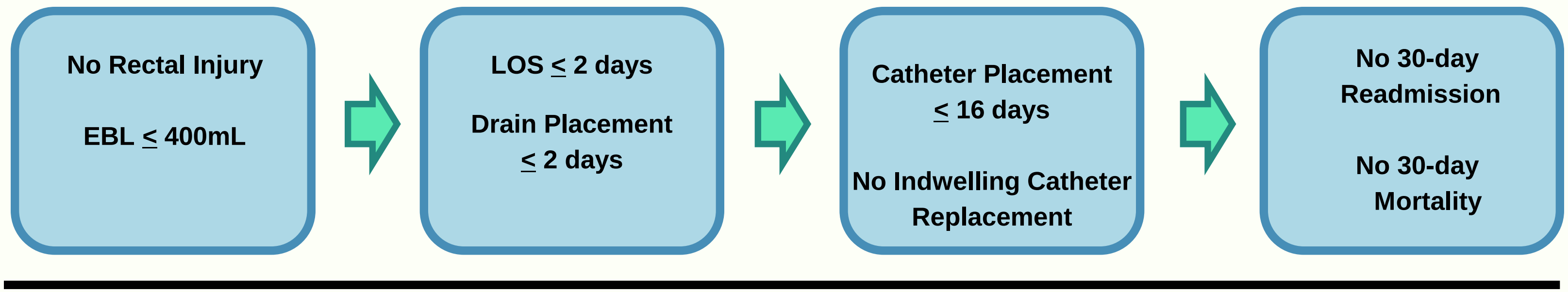
Rationale: Morbidity of RP major driver in early detection debate

Post Prostatectomy Perioperative Care

- At Jan 2014 MUSIC meeting, we presented data that showed our initial method of tracking complications was not reliable or actionable
- Thus, on March 20, 2014, we changed to tracking how cases followed an *"uncomplicated"* pathway of post-op recovery

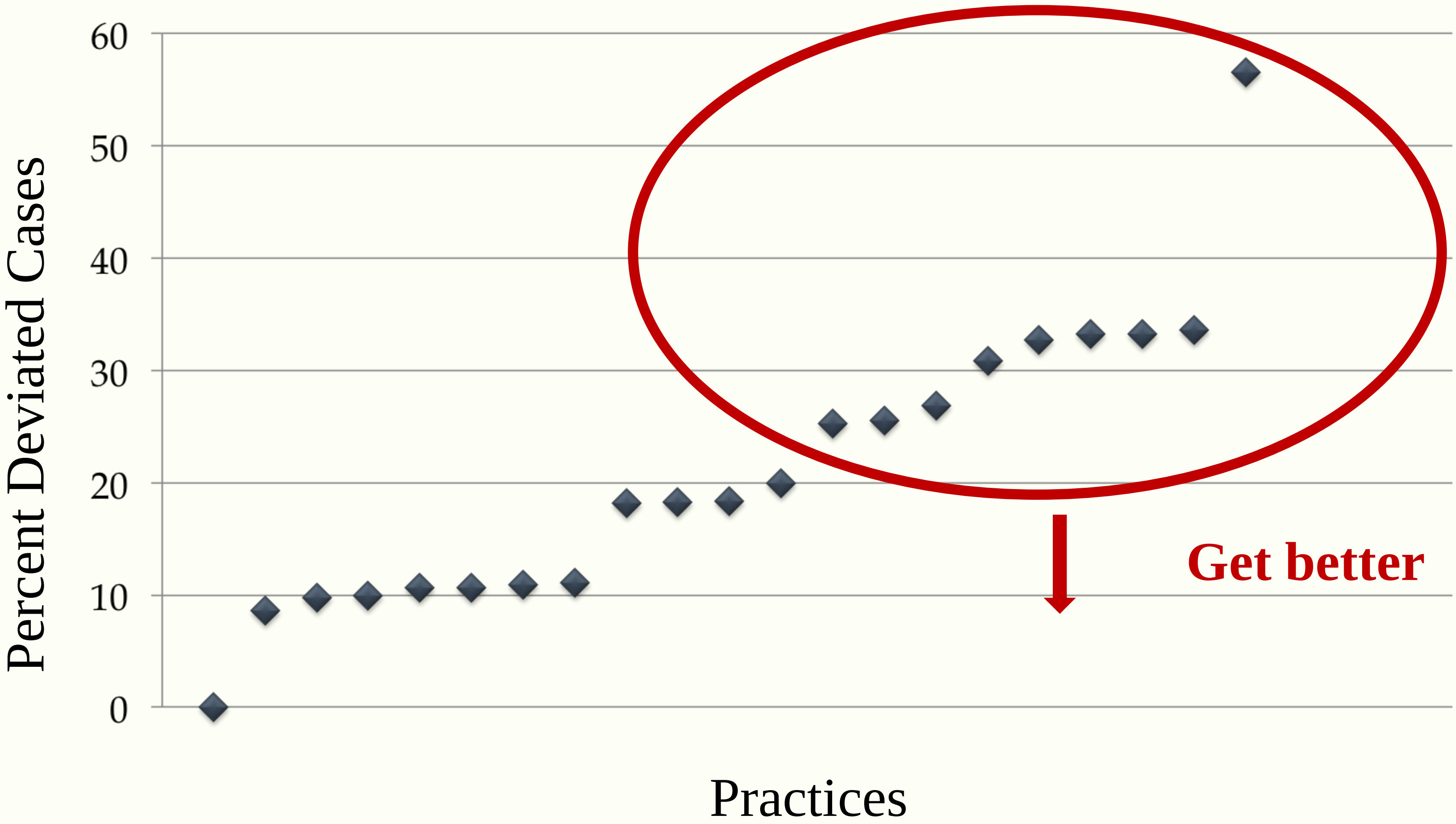
MUSIC-Notable Outcomes and Trackable Events after Surgery (NOTES)

Uncomplicated Recovery Pathway



This pathway allows us to collect objective data that can show a surgeon how perioperative care varies and represents unanticipated events (complication) that can negatively impact patient short-term recovery

Overall Case Deviation (at least one deviation)



NOTES report

MUSIC NOTES

NOTABLE OUTCOMES and TRACKABLE EVENTS after SURGERY

Surgeon ######

Data from 4/1/2014 to 6/30/2014

Uncomplicated Recovery Pathway

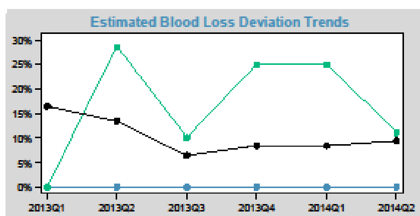
No Rectal Injury
EBL ≤ 400mL
→
LOS < 2 days
Drain Placement ≤ 2 days
→
Catheter Placement ≤ 16 days
→
No 30-day Readmission
No 30-day Mortality

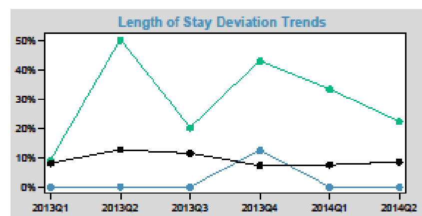
Cases Deviated from Pathway:

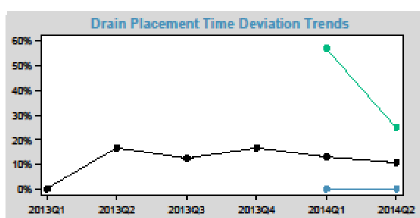
Surgeon ####	2.9%
Practice ###	33.3%
Full Collaborative*	19.8%

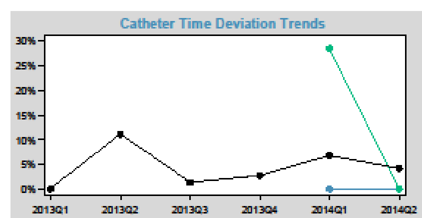
* excluding this practice
Bold Red indicates values significantly worse than Collaborative
Bold Green indicates values significantly better than Collaborative

Deviations from Pathway	Percentage Deviated Cases Surgeon (n=35)	Practice (n=69)	Collaborative (n=2093)
Rectal Injury	0.0%	0.0%	0.1%
EBL > 400mL	**0.0%**	18.2%	11.3%
LOS > 2 days	2.9%	**29.0%**	9.6%
Drain Placement > 2 days	0.0%	**36.8%**	11.6%
Catheter Placement > 16 days	0.0%	10.0%	5.0%
30-day Readmission	0.0%	0.0%	1.2%
30-day Mortality	0.0%	0.0%	0.1%









BLUE represents this Surgeon's data - GREEN represents this Practice's data - BLACK represents the Collaborative-wide data (excluding this practice)

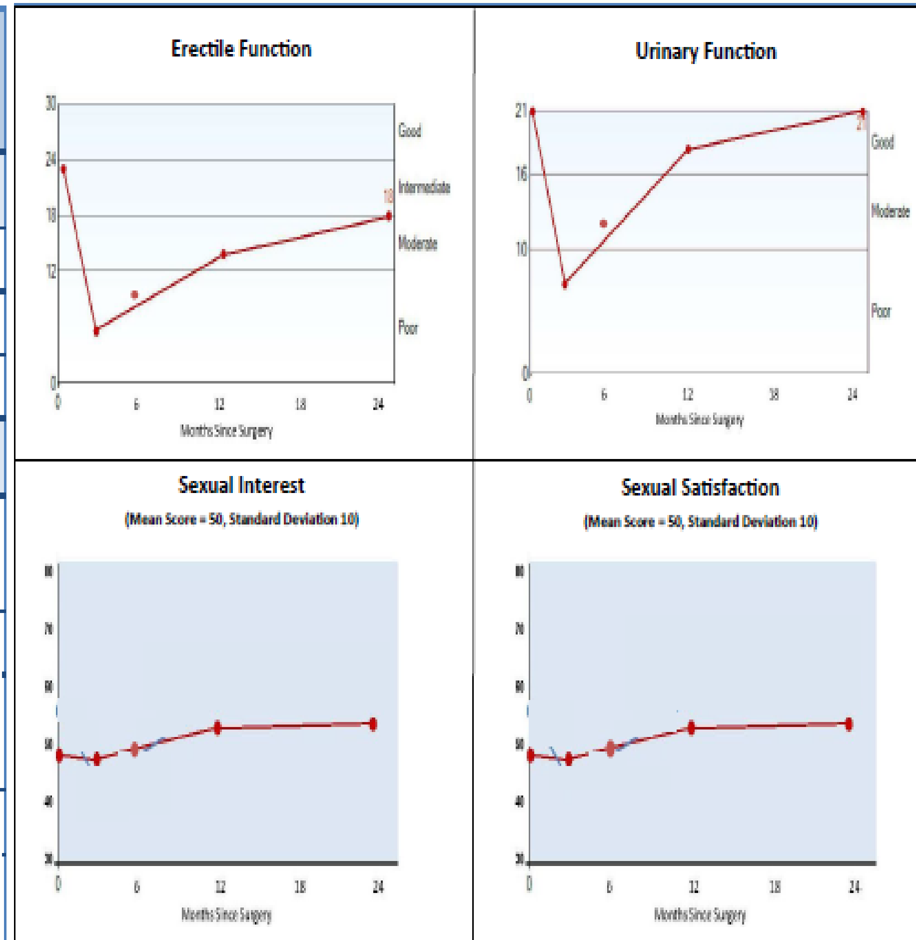
MUSIC Patient Reported Outcomes: so far…

	MUSIC Goals	Baseline	3 month	6 month
Patients Enrolled	99%	86%	97%	100%
Questionnaire Completed	75%	94%	89%	97%
Paper Questionnaires	<20%	31%	29%	30%
Patient Requiring Phone Calls	TBD	24%	20%	9%

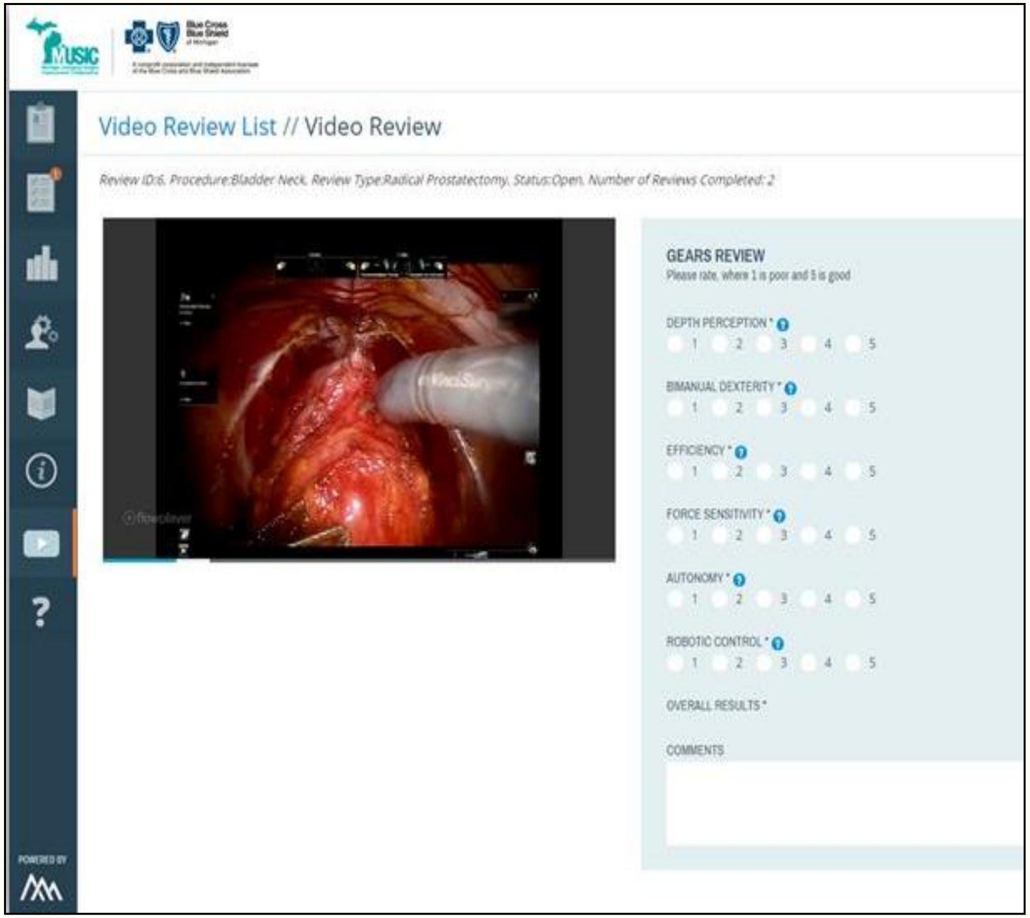
Table Legend: ●: >10% of MUSIC Goals ●: <10% of MUSIC Goals ●: Goal Met

Patient Reported Outcomes: Trend Report

JOHN DOE		Prostatectomy
DOB: 01/01/1901	Today's Date: 12/10/2013	Surgery date: 08/05/2010
	Demographic, Lab and Pathology Data	
Age: 66	Months since surgery: 30	
Current PSA: <.01	Current PSA date: 07/10/2010	Pre-op PSA: 5.5 ng/ml
Pathology Stage: T2b N0 M0	Pathology Gleason Score: 3 + 4	Margin status: Negative
	Survey Data	
Survey completed: 01/15/2013	Quality of Life (current): 8/10	Bowel Function: No bowel symptoms
	Erectile Function	
Baseline: 24/30	Current: 18/30	Current Erectile Aids Used: Viagra—use it sometimes
	Urinary Function	
Baseline: 21/21	Current: 21/21	Current Pad Use: None



The opportunity in Michigan: 12 case pilot video review assessment



- Is video assessment by peers or "crowd" feasible?---YES
- Are measurable differences evident between surgeons?---YES
- Does technique/skill correlate with outcomes?---?
- Can coaching improve performance?---?

4. Appropriate Treatment

Rationale: great concern regarding overtreatment

Active Surveillance: favorable practice patterns in Michigan

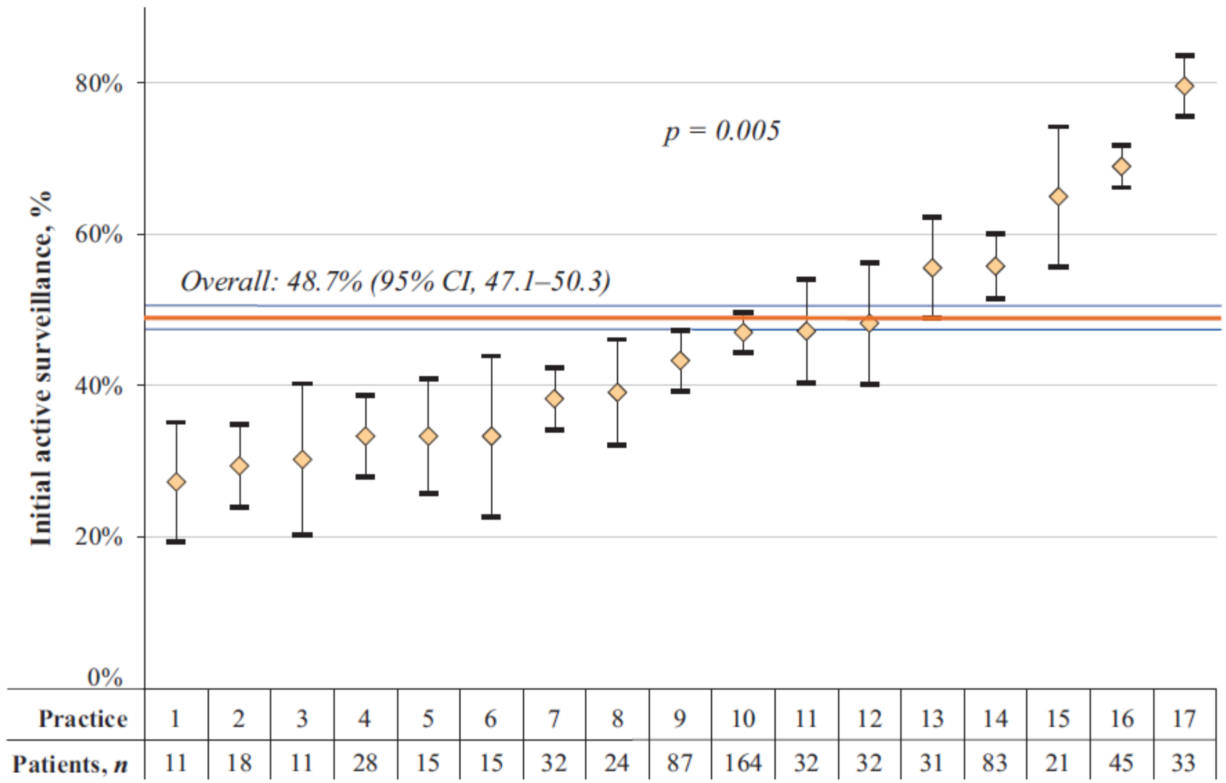
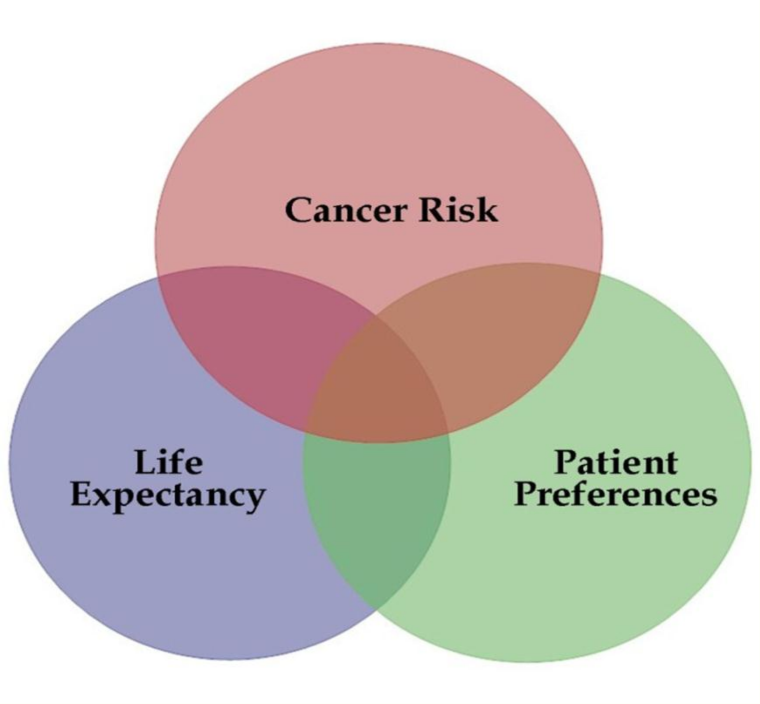


Fig. 3 – Adjusted likelihood of active surveillance for men with low-risk prostate cancer, stratified by Michigan Urological Surgery Improvement Collaborative practices. Model adjusts for age, Charlson Comorbidity Index score, number of positive cores, and primary payer. CI = confidence interval.

Womble et al, *Eur Urol*, 2014

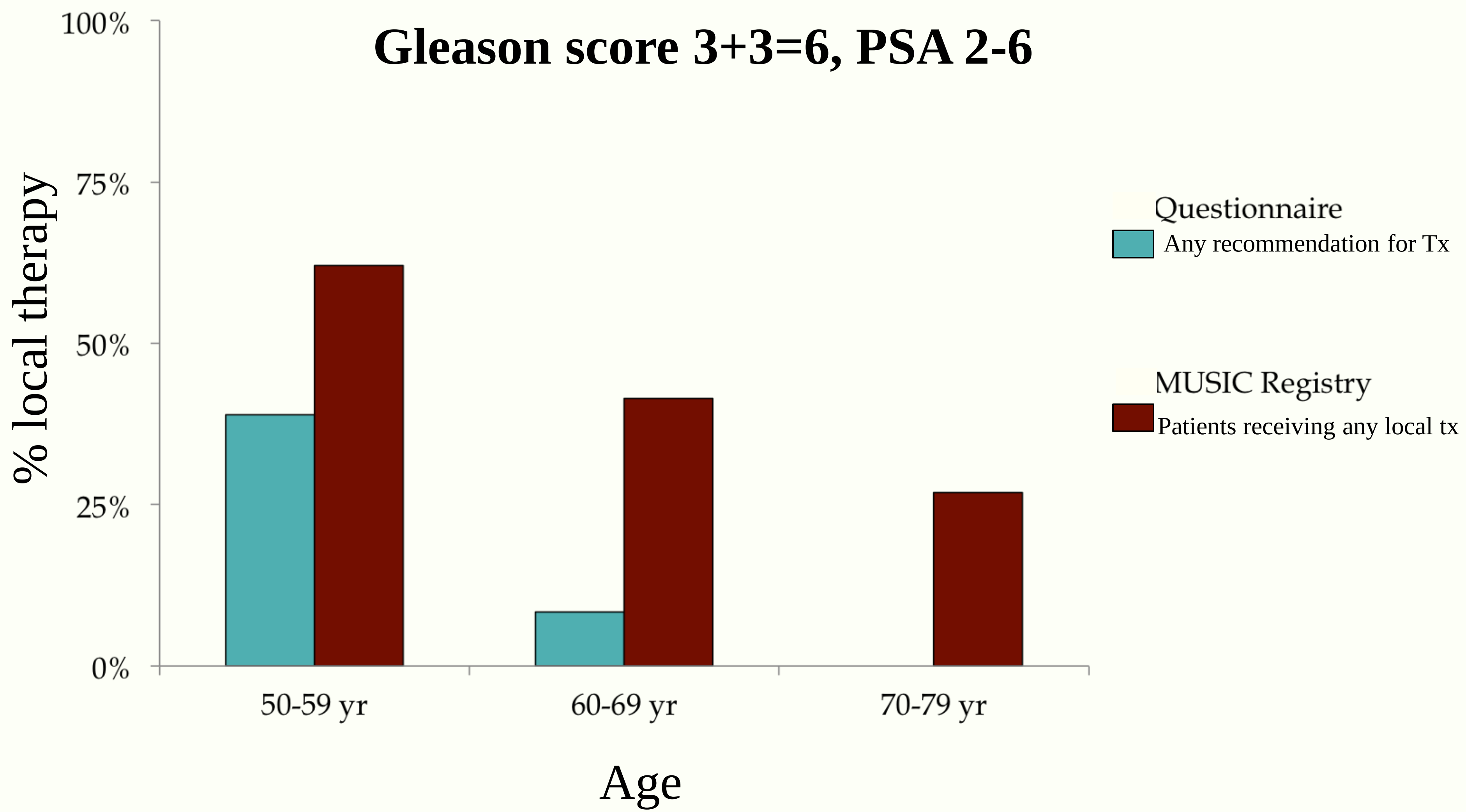
Variation and Appropriate Treatment

- **Variation is appropriate when it can be explained by factors that are considered relevant in treatment decisions**



Variation is *inappropriate* when explained by insurance status, ethnicity, ancillary profit, etc.

Treatment and Life Expectancy



MUSIC development of Appropriate Use Criteria

- Well-developed RAND/UCLA Method
- Panel of physicians create a series of detailed clinical scenarios based on a list of parameters
- A defined process is used to score specific clinical scenarios as "Appropriate", "Uncertain", "Inappropriate"
- The measures must recognize that patient preferences will trump the criteria in some cases

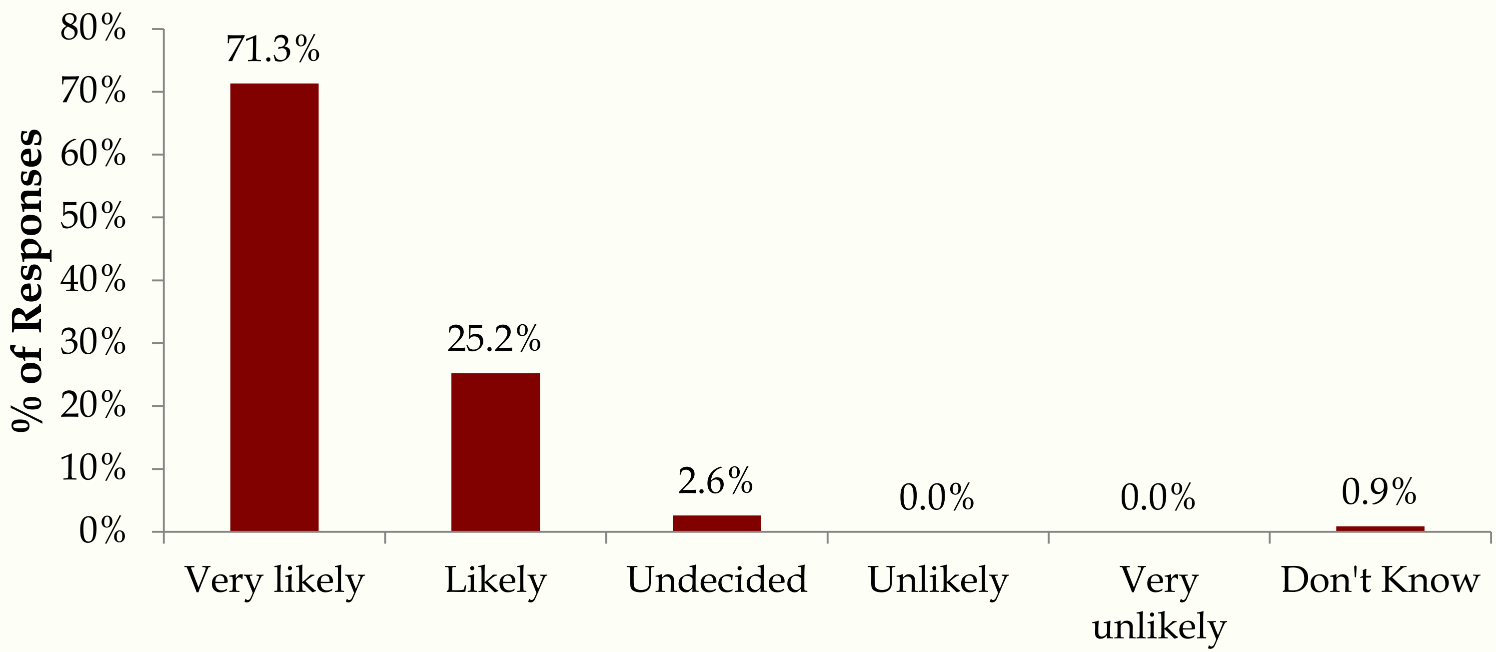
Demonstrating the Value of MUSIC

Participant Engagement

- Recruitment trips and site visits
- Regular provider interaction through emails and phone calls
- Commitment to excellent customer service
- Working groups (3 – 6 members) focused on each QI priority
- Health Policy/Administrative Benefits:
  - » PQRS Qualified Clinical Data Registry
  - » CME

Value to clinicians

How likely would you be to recommend MUSIC to other urologists who are not members of the collaborative?



Value expressed by a MUSIC patient advocate

"I just wanted to give you my two cents worth about the subject conference call. My thought is that a video is an excellent way for all to improve. An individual may be doing something a specific way and may not realize that a minor change could have a significant impact on the result. It is a great challenge and a very noble effort to make outcomes for patients better.

Thanks for having me part of this interesting process."

Shameless Promotion of MUSIC

"Perhaps equally important to the data collected are the model and methods themselves. It is remarkable that the MUSIC voluntary effort includes nearly 90 per cent of the urologists in Michigan. This type of clear headed and proactive cooperative thinking and pooling of data which combines best patient guidelines/recommendations with health system financial considerations for medical practice patterns should serve as a model for emulation across the whole span of clinical practice issues."

Sagalowsky (UTSW), Editorial in *Urology*

"Value" framework

$$*\text{Value} = \text{Appropriateness}\left(\frac{\text{Outcomes}}{\text{Cost}}\right)$$

Appropriateness = appropriateness score + patient preference

Outcomes = peri-op score + PRO score + cancer control

For the first time, I think we can actually tackle *value* because we can <u>quantify appropriateness, outcomes, and cost</u>

*Adapted from D. Spahlinger

MUSIC
Michigan Urological Surgery Improvement Collaborative

Thank you

Program Manager Updates

Judy Mikhail, MSN MBA

M·TQIP

MTQIP Program Manager Update 2/10/15

Judy Mikhail, MSN, MBA, RN

1. 2015 Site Specific Projects
2. 2016 Performance Index
3. Taxonomy Opportunity

2015 MTQIP Site Specific Topics

Complications	Utilization	Practices
• Single complication • Number of Complications: 1,2,3,4,5+ • Grade of Complications: I, II, III • Serious complications • Any complications	• Hospital LOS • Extended LOS • ICU LOS • Patients admitted to ICU • Unplanned intubation • Unplanned return to OR • Unplanned return to ICU	• VTE prophylaxis type • IVC filter use • Ventilator days • Patients on ventilator • ICP monitor use • ICP monitor timing

Data Source:
- MTQIP Reporting Website
- Paper reports at meetings

Deadlines:
- Revolve around MTQIP mtg dates
- Cycle runs Feb 2015 to Feb 2016
- Many projects may take 2 years to "move the needle"

Dates: (up to 7 days post MTQIP meeting)
1) Baseline: 2/10-2/17
2) Progress: 5/13-5/20
3) Progress: 10/13-10/20
4) Yr End Final: 2/10/-2/17 2016

Grading:
10 points = Evidence of improvement
5 points = No evidence of improvement
0 points = Not done

Site Specific Template Example *(Version 3)*

Due 2/10/15-2/17/15

Hospital	Hospital x	**Measure**	Vent Days
TMD	name	**Baseline**	8.83
TPM	name	**Goal Direction (↑ or ↓)**	Decrease
PI Staff	name(s)	**Cohort**	Cohort 2
		Dead: All	Exclude DOA
Registrars	name(s)	**ISS**	All
		Age	All
		Most recent 12 or 24 mo?	24 months

Due 5/13/15-5/2/15

Results 8.33

List of Actions/Barriers/Progress to Date:

1. Weaning protocol developed
2. Inservice to RT and nursing
3. Review at PIPS and Systems meetings

2016 Performance Index

- New addition of one "**<u>Global</u>**" Metric

  - Combined average 27 centers results
  - Working as a Group
  - Graded as a Group
  - Team Sport

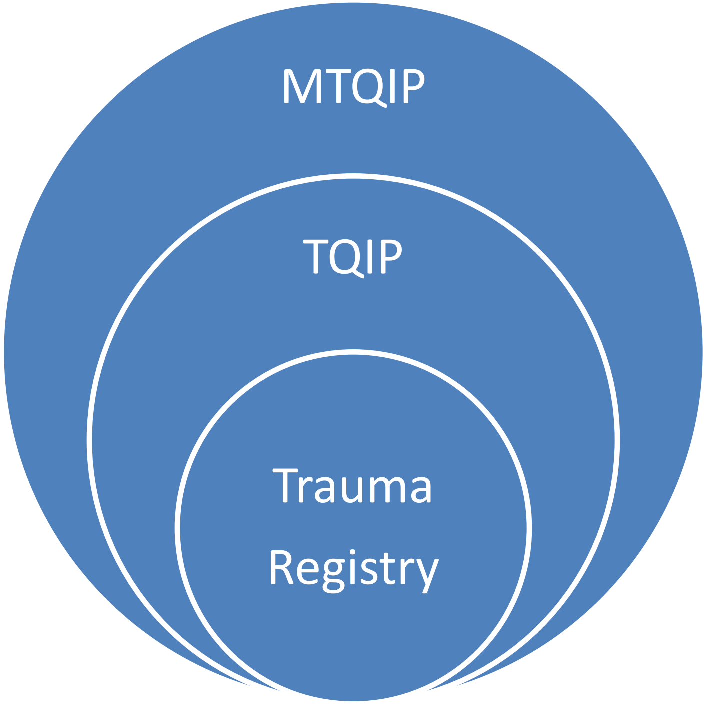
2016 Global Measure

- <u>Established problem</u> in trauma
- <u>Meaningful</u> to all centers
- <u>Feasible</u>   Do we collect it? Accurately?
- <u>Helpful</u> to centers
  - Kill 2 birds with one stone?
  - Meet a requirement for ACS Reverification?

2016 Global Measure Selection Process

- **Timeline**
  - Feb 2015: Introduce concept at Feb meeting
  - Apr 2015: Solicit ideas from membership/survey
  - May 2015: Present ideas list May meeting/discuss
    Resurvey for final ranking of ideas
  - Jun 2015: Ensure Registrars Understanding/Training
  - Oct 2015: Finalized Oct MTQIP meeting
  - Jan 2016: Begin

BCBSM Abstractor Model



- Increased volume and complexity of MTQIP data
- Increased financial Support from BCBSM
- Starting 2015 increased support from 30% to 80% abstractor position

MTQIP Clinical Reviewer (MCR)

Draft Job Description

- RN or equivalent
- Must work on site
- Under the direction of TPM/TMD
- Hiring at the discretion of the TPM/TMD
- Separate position from the trauma registrar
- Does not replace current trauma registry staff
- Performs work required <u>in addition</u> to what current staff are performing

MTQIP Clinical Reviewer (MCR)

- One FTE is required for every 513 cases
- Up to a maximum of 2 FTE's per center
- **<u>Based on volume of submitted cases (1:513)</u>**

- **<u>Additional Support:</u>**
  - $2,600 annual registry license
  - $9,000 TQIP membership <u>now</u> paid by MTQIP

2015 Implementation Timeline

- Feb:
  - BCBSM letter: ***estimated payment*** *based* **volume**
- Mar-June
  - Find the best person possible
- June:
  - Payment to hospital
- July:
  - Position in effect

Making it Work

- Evaluation of implementation
- Signed attestation annually
- If resources not obtained
  - MTQIP membership in jeopardy

MTQIP Clinical Reviewer (MCR)

Increased support

=

Increased expectations

The Culture of Safety Event Taxonomy: Overview

The Patient Safety Taxonomy

<u>Discloser:</u>

- This presentation is based on the work of Donald Jenkins, MD & Carol Immermann, RN
- Content from the TOPIC program is being utilized with permission.

The National Quality Forum Taxonomy

- Recommended as best practice
  - ACS COT PIPS committee
  - ACS VRC leadership
- Inclusion next Optimal Resource book.

The Problem (Analogy)

<u>Registry</u>

Data Quality → Poor interrater reliability

<u>PI Program</u>

Preventable → Poor interrater reliability

Pot preventable

Non preventable

Mikhail slide

Taxonomy is the Fix

- **Building blocks**
  - Common definitions
  - Clear terminology
- **Scope**
  - Comprehensive tool
  - Applicable to all settings
  - Includes multiple levels of patient harm
- **Addresses**:
  - Sentinel events
  - Adverse events
  - No harm events
  - Near misses
  - Close calls
  - Potential events

Taxonomy Implementation

- PI process like you normally do
- Examine the “bad case”
- Classify factors according to taxonomy
- Develop computerized application
  - NTDS complications as baseline sentinel events
  - Allow users to add additional sentinel event types

2008 Ivatury
764 deaths reviewed

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

Patient Safety in Trauma: Maximal Impact Management Errors at a Level I Trauma Center

Rao R. Ivatury, MD, FACS, Kelly Guilford, BS, RN, Ajai K. Malhotra, MD, FACS, Therese Duane, MD, FACS, Michel Aboutanos, MD, FACS, and Nancy Martin, MS, RN

Background: The Division of Research at JCAHO developed a taxonomy (common terminology and classification schema) to promote consistency in reporting and facilitate root cause analy... We undertook a review of trauma m... ment errors at our institution with... mal impact (death). The analys... based on the Joint Commission ... creditation of Healthcare Organi... (JCAHO) taxonomy.

Methods: Trauma deaths b... 2001 and 2006 at our Level I traum... peer-reviewed to identify errors in... agement. The errors are classified according to type, domain, and cause.

Results: Seventy-six (9.9%) of 764 deaths had management errors contribut... ...in the resuscitative phase. Human errors predominated.

Conclusions: Management errors in the basics of trauma care continue even in established trauma centers, despite guidelines, protocols, and continuous performance improvement. Standardized reporting such as the taxonomy may result in progressive collection of patient safety data and lead to innovations to minimize these errors.

Key Words: Preventable deaths, Patient safety, Adverse events.

J Trauma. 2008;64:265–272.

Errors:
ED
OR
Resuscitative Phase

The past 2 decades have witnessed significant accomplishments in the delivery of trauma care in the United

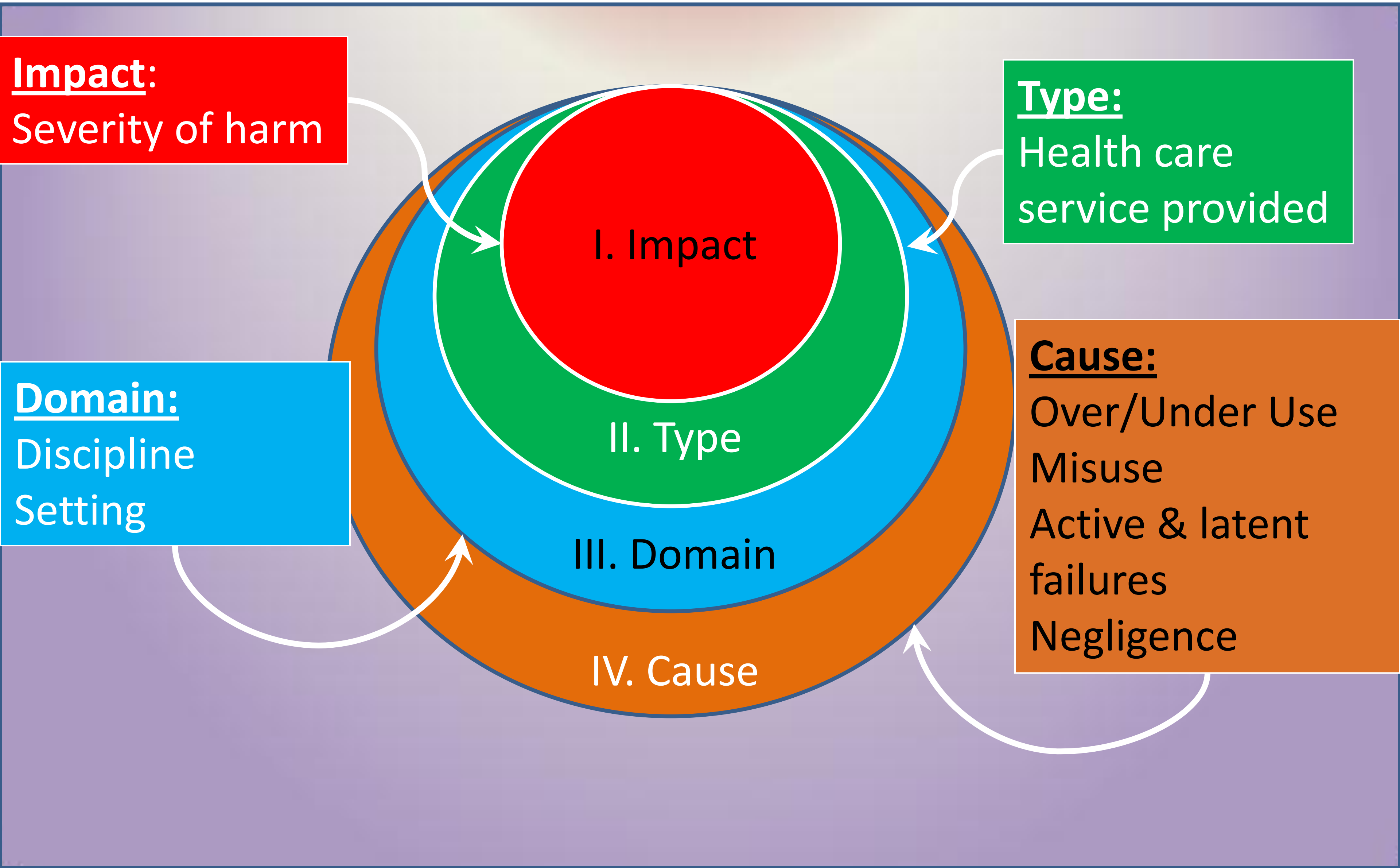
nology and classification schema) to promote consistency in reporting and to facilitate root cause analysis.[3] The National

Taxonomy

(Ivatury et al. JT, Feb 2008)

- **Impact:** Outcome or effect of event
- **Type:** Processes that were faulty
- **Domain:** Setting or phase of care
- **Cause/Factors:** Factors leading to incident
- **Prevention Mitigation:** Universal, selected, action plan

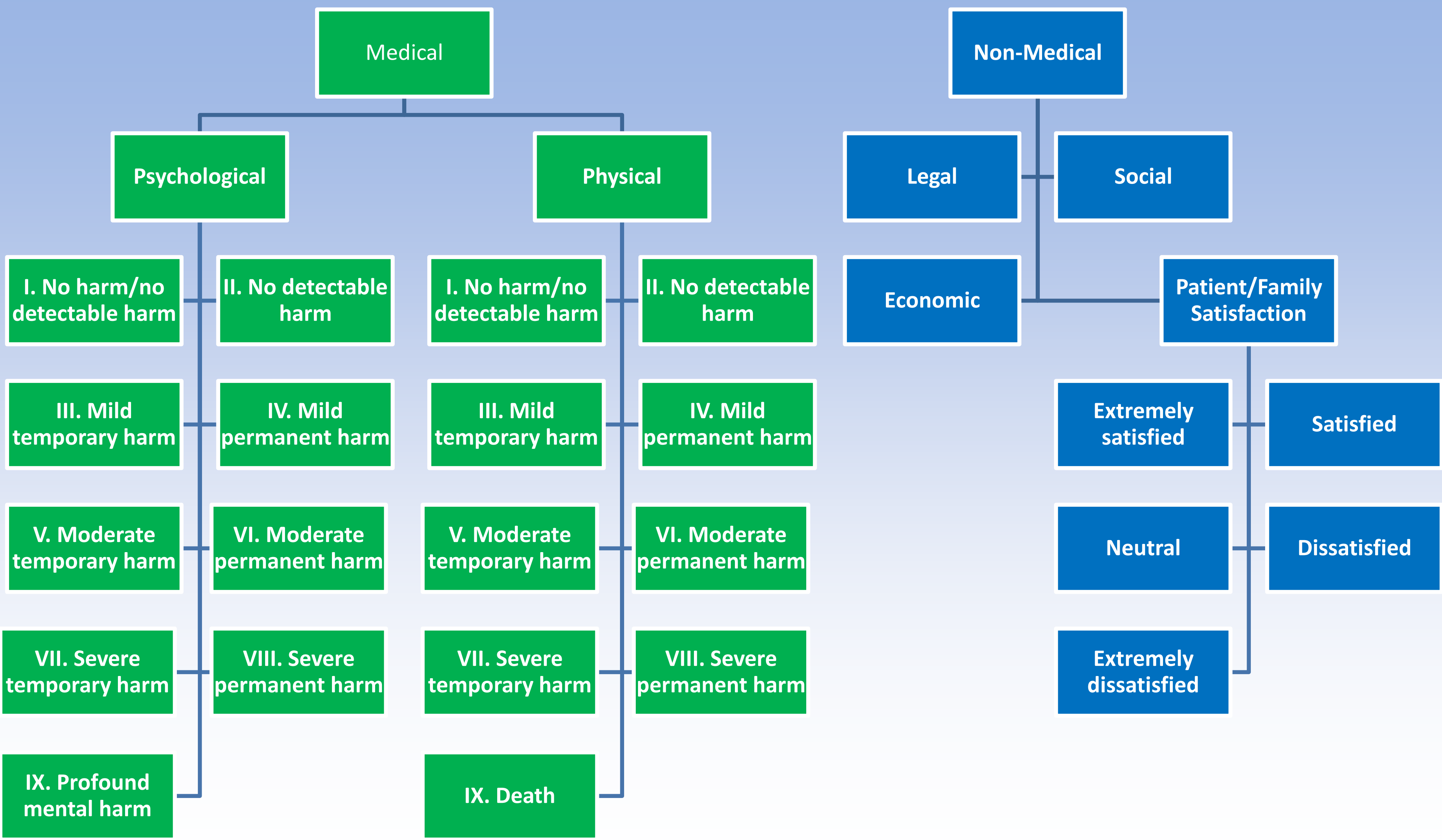
Framework of the Taxonomy



Primary Classifications Further Defined

1. **Impact**: the outcomes or effects of medical error and systems failure, commonly referred to as harm to the patient.
2. **Type**: the implied or visible processes that were faulty or failed.
3. **Domain**: the characteristics of the setting in which an incident occurred and the type of individuals involved.
4. **Cause**: the factors and agents that led to an incident.
5. **Prevention and Mitigation**: the measures taken or proposed to reduce the incidence and effects of adverse occurrences.

Classification: Impact



Differentiating Levels of Harm

- **<u>None</u>** – patient outcome is not symptomatic or no symptoms detected and no treatment is required (*I. & II. Impact*)

- **<u>Mild</u>** – patient outcome is symptomatic, symptoms are mild, loss of function or harm is minimal or intermediate but short term, and no or minimal intervention (e.g., extra observation, investigation, review or minor treatment) is required (*III. & IV. Impact)*

- **<u>Moderate</u>** – patient outcome is symptomatic, requiring intervention (e.g., additional operative procedure; additional therapeutic treatment), an increased length of stay, or causing permanent or long term harm or loss of function (*V. & VI. Impact)*

Differentiating Levels of Harm

- **<u>Severe</u>** – patient outcome is symptomatic, requiring life-saving intervention or major surgical/medical intervention, shortening life expectancy or causing major permanent or long term harm or loss of function (*VII. & VIII. Impact*)

- **<u>Death</u>** – on balance of probabilities, death was caused or brought forward in the short term by the incident (*IX. Impact*)

IMPACT
Level of Harm to Patient

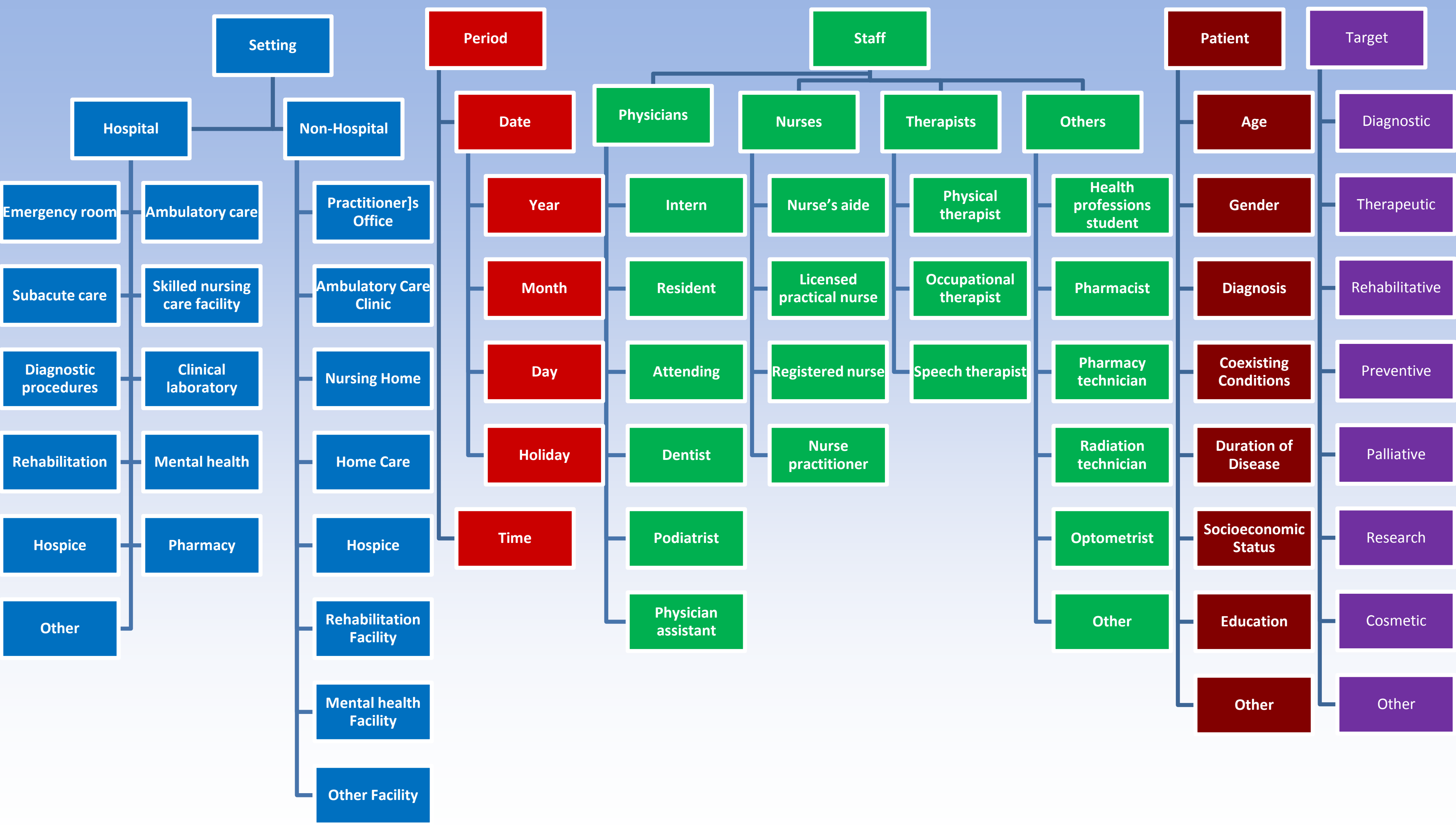
Physical

1. No Harm & No Undetectable Harm-Sufficient information determines no harm occurred
2. No Detectable Harm-Insufficient information or unable to determine any harm
3. Minimal-Temporary Harm- Requires little or no intervention
4. Minimal Permanent Harm-Requires initial but not prolonged intervention
5. Moderate-Temporary Harm- Requires initial but not prolonged hospitalization
6. Moderate-Permanent-Harm-Requires intensive but not prolonged hospitalization
7. Severe-Temporary Harm-Requires tx to sustain life but not prolonged hospitalization
8. Severe-Permanent Harm- Requires tx to sustain life and prolonged hospitalization, long-term care, or hospice
9. Death

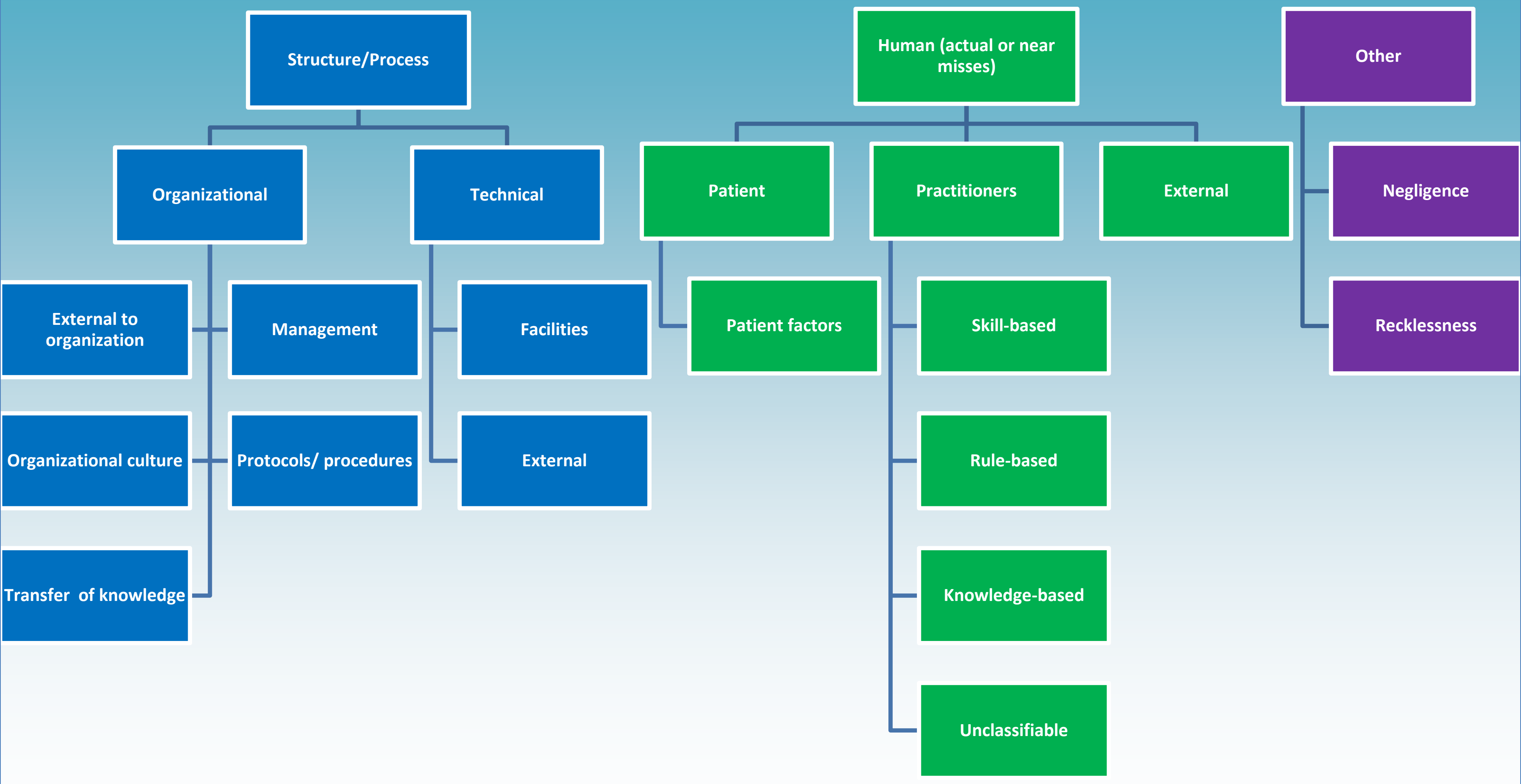
Classification: Type

- Communication
  - Inaccurate & incomplete information
  - Questionable advice or interpretation
  - Questionable consent process
  - Questionable disclosure process
  - Questionable documentation
- Patient Management
  - Questionable delegation
  - Questionable tracking or follow-up
  - Questionable referral or consultation
  - Questionable use of resources
- Clinical Management
  - Pre-Intervention
    - I. Correct diagnosis, questionable intervention
    - II. Inaccurate diagnosis
    - III. Incomplete diagnosis
    - IV. Questionable diagnosis
  - Intervention
    - I. Correct procedure with complication
    - II. Correct procedure incorrectly performed
    - III. Correct procedure but untimely
    - IV. Omission of essential procedure
    - V. Procedure contraindicated
    - VI. Procedure not indicated
    - VII. Questionable procedure
    - VIII. Wrong patient
  - Post-Intervention
    - I. Correct prognosis
    - II. Incorrect prognosis
    - III. Incomplete prognosis
    - IV. Questionable prognosis

Classification: Domain



Classification: Cause



Classification:
Prevention (P) & Mitigation (M) [Action Plan}

- Universal
  - Improve the accuracy of patient identification (P)
  - Improve the effectiveness of communication among caregivers (P)
  - Improve the effectiveness of clinical alarm systems (P)
  - Reduce the risk of healthcare-acquired infections (M)
- Selective
  - Eliminate wrong-side, wrong-site, wrong-procedure surgery (M)
- Indicated
  - Improve the safety of using high-alert medications (P)
  - Improve the safety of using infusion pumps (P)

Case Study

- 24 y/o male MVC Transfer
- Level III to Level I Center
- Transferred in the evening
- 10 hours post injury
- At request of family

Level III

- Initially hypotensive
- 5 units PRBCs
- 6 L crystalloid in first 8 hours
- Stable vital signs prior to transfer

Case Study cont.

Level I

- Arrives intubated with known pulmonary contusions, rib fractures, open tib/fib fracture, GCS 8, moving all 4 extremities
- Secondary survey & adjunctive studies negative except for suspicion of lower T-spine fracture on CT

Case Study cont.

- Ortho consult for open tib/fib fracture
  - Requests neuro clearance
- Neuro consult recommends MRI to evaluate T-spine
  - Goes for MRI at 2 am
- During MRI
  - Nurse notes patient cyanotic despite good rhythm on monitor
  - Patient pulled out of scanner- asystole on regular monitor
- CPR, Resuscitated- severe anoxic brain damage
- Support withdrawn 5 days later
- PI review of case found patient had severe base deficit on arrival and collapsed inferior vena cava

Example Case Taxonomy

- Impact:
  - Medical: Death
  - Non-Medical: Family dissatisfied
  - Non-Medical: Potential litigation
- Type:
  - Communication: Questionable advice
  - Patient Management: Questionable delegation
  - Clinical Management (Intervention): Correct procedure/untimely
- Domain:
  - Setting: Diagnostic procedures
  - Staff: Resident
  - Target: Diagnostic
- Cause:
  - Organizational: Organizational culture
  - Human: Practitioner knowledge

Figure 3. Sample Sentinel Event Tracking Form for Root Cause Analysis

Demographics			
Date of report:	Medical record No.:	Trauma registry No.:	Event date & time:
Nature of event:			
Patient Name:	Age:	Gender:	
Diagnoses:			
Duration of Disease:			
Coexisting Conditions:			
Socioeconomic Status:			
Education:			
Other Pertinent Information:		Report completed by:	

Source of information (✓)		
☐ Trauma nurse coordinator	☐ PIPS coordinator	☐ Conference
☐ Nurse management	☐ Patient Relations	☐ Registry
☐ Case manager	☐ Rounds	☐ Other:

Impact (✓)		
Physical ☐ No harm ☐ No detectable harm ☐ Mild temporary harm ☐ Mild permanent harm ☐ Moderate temporary harm ☐ Moderate permanent harm ☐ Severe temporary harm ☐ Severe permanent harm ☐ Death	Psychological ☐ No harm ☐ No detectable harm ☐ Mild temporary harm ☐ Mild permanent harm ☐ Moderate temporary harm ☐ Moderate permanent harm ☐ Severe temporary harm ☐ Severe permanent harm ☐ Profound mental harm	Legal ☐ Risk management contacted ☐ Complaint registered ☐ Suit filed ☐ Case dropped ☐ Case dismissed ☐ Settled ☐ Defense Verdict ☐ Plaintiff Verdict
Patient/family satisfaction. ☐ Extremely satisfied ☐ Satisfied ☐ Neutral ☐ Dissatisfied ☐ Extremely dissatisfied	Social ☐ Unable to socialize ☐ Homebound, able to socialize ☐ No social impediments, not socially active ☐ Socially active ☐ Economic	Employment ☐ Employed ☐ Seeking employment ☐ Part-time employment ☐ Unemployed ☐ Not employable

TJC Taxonomy Via Software

- **Advantages**
  - Ease of use
  - Improved data collection
  - Improved data collation
- **Disadvantages**
  - Development time
  - Distribution
  - Training

Why Do This?

- Will be able to PI our PI
- Benchmark our PI
- Incorporate into TQIP

ACSCOT Update

- Connect PIPS with NTDS, NTDB, VRC and TQIP
- Definitions of NQF taxonomy are being ‘traumafied’
- NTDB and TQIP input (worked on at EAST)
- Many NTDB and TQIP adverse events have elements that are not defined in the NQF taxonomy (Worked on at EAST)
- Evaluate best practices
- Advise low performing centers on these

Benchmark Comparison with NTDB

Compare your trauma hospital data with national data

Examples:
- Patient Demographics
- Hospital demographics
- Survivors vs. non-survivors:
  - LOS
  - mean ISS & ICU days
  - Age

Examples:
- Blunt vs. penetrating
- ISS by age group
- Mortality rates
- Mortality by ISS
- ED disposition
- Hospital disposition
- ISS and hospital charge
- Mechanism of injury and restraint usage
- ISS with LOS

Benchmarks and Measurements: Outcome Data

Report Examples:

- Functional status on discharge (FIM Scores)
- Results of patient satisfaction surveys
- Complication rates
- Compliance with practice management guidelines
- Mortality and morbidity
- Severity-adjusted mortality and morbidity
- Unplanned return to OR
- Unplanned upgrade to an intensive care unit
- Unplanned hospital readmission
- Surgical wound infections
- Organ donation activity

MTQIP: Proposal

- Request X centers to beta test the process for the COT
- Request COT to assist with costs for MTQIP analysis, software for pulling data over
- Assist registry vendors to providing electronic version
- Provide training to beta test sites

MTQIP

- Opportunity to be on the front end of what will become the standard
- Opportunity for input on refining definitions or categories for PI

Program Coordinator Updates

Jill Jakubus, PA-C

Website Updates
ArborMetrix Updates
Videos
Data Submission

Jill Jakubus, PA-C

M·TQIP

ID | Password | Reports

M·TQIP

HOME | MEMBERSHIP | CALENDAR | RESOURCES | LEADERSHIP | CONTACT US

jjakubus ▼ Data Submission | Reports

M·TQIP

HOME MEMBERSHIP CALENDAR RESOURCES LEADERSHIP CONTACT US

ID

Password

Reports

M·TQIP

HOME | MEMBERSHIP | CALENDAR | RESOURCES | LEADERSHIP | CONTACT US

- PROGRAM DESIGN
  - MEETINGS
  - REPORTS
  - FUNDING
  - REGISTRY
  - DATA VALIDATION
  - PI PROJECTS
  - SITE VISITS
- BECOME A MEMBER
  - MEMBERSHIP CRITERIA
  - GETTING STARTED
- PARTICIPANTS
  - RESPONSIBILITIES
  - ATTENDANCE REQUIREMENTS
  - MEMBER TRAUMA CENTERS
- SELECTED PUBLICATIONS
- FAQ

HOME > RESOURCES

Agreements

- Data Use Agreement
- Data Use Agreement Attachment A
- HIPPA Business Associate Agreement
- MTQIP Membership Application Form
- Remote Access Agreement

FTE Benchmarking

Data Elements

- 2015 MTQIP Custom Data Elements
- 2014 MTQIP Custom Data Elements

Education

- 2015 Collection Criteria Grid
- Antibiotic Reference
- Hypertension Medication Reference

Practices

VTE Prophylaxis Outcomes

VTE Prophylaxis Timing

VTE Prophylaxis Types

Hemorrhage

IVC Summary

IVC Trends

TBI Management

Timing of TBI Interventions

M·TQIP

ARBORMETRIX
the science of healthcare performance

Dashboard // Summary

Dashboard
- Summary
- Rankings
- Trends

Outcomes
- Summary
- Rankings
- Trends
- Complications Drill-down
- Mortality Drill-down

Utilization
- Summary
- Rankings
- Trends

Risk Factors
- Summary
- Rankings
- Trends
- Comorbidity Drill-down

Practices
- VTE Prophylaxis Outcomes
- VTE Prophylaxis Timing
- VTE Prophylaxis Types
- Hemorrhage
- IVC Summary
- IVC Trends
- TBI Management
- Timing of TBI Interventions

Details
- Details

Administrative
- By Hospital Outcomes
- By Hospital Process Measures

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ARBORMETRIX
the science of healthcare performance

Dashboard // Summary

Dashboard
- Summary
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- Trends

Outcomes
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- Hemorrhage
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- IVC Trends
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Details
- Details

Administrative
- By Hospital Outcomes
- By Hospital Process Measures

DEFAULT PERIODS

Program To Date

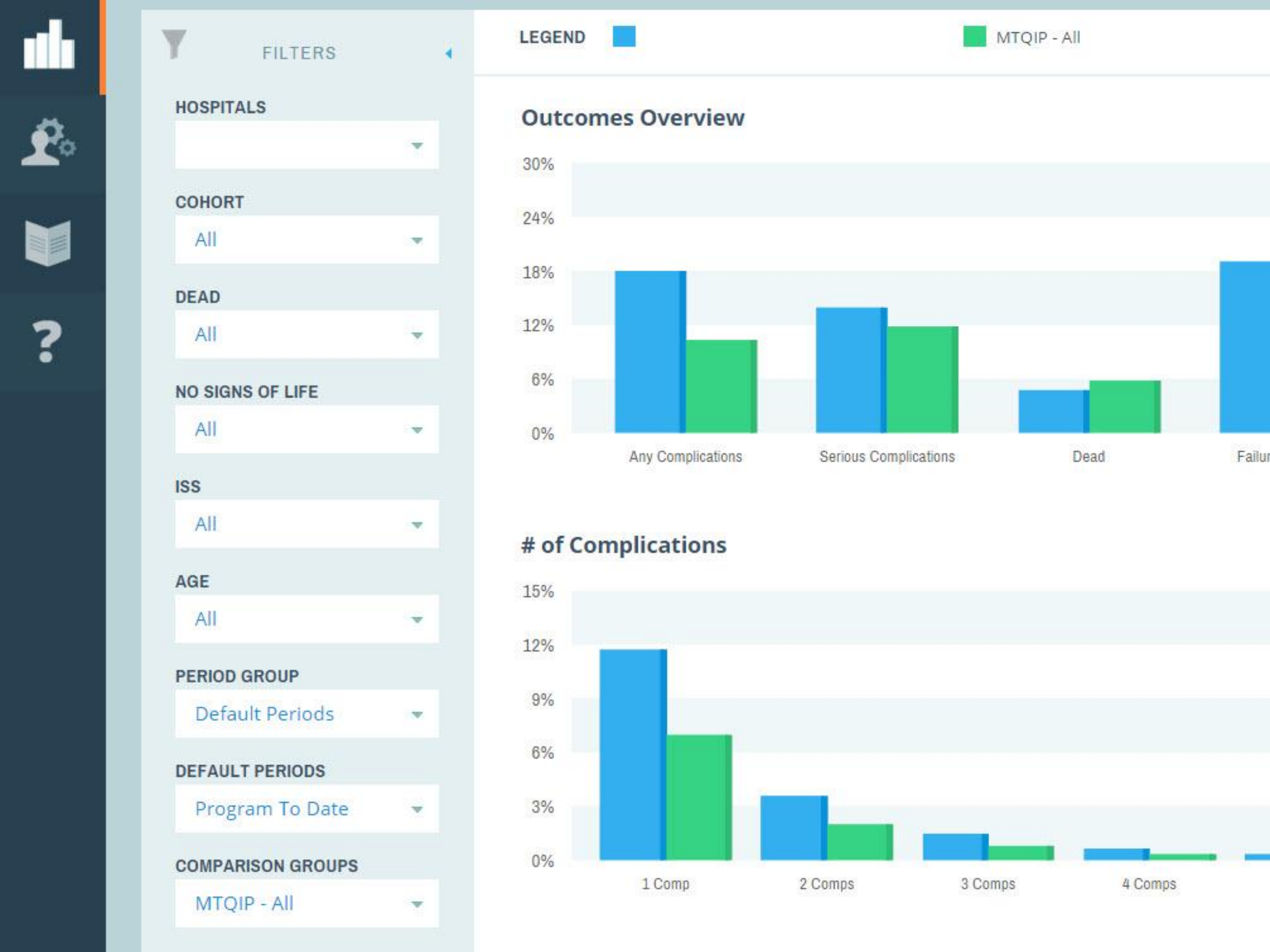
COMPARISON GROUPS

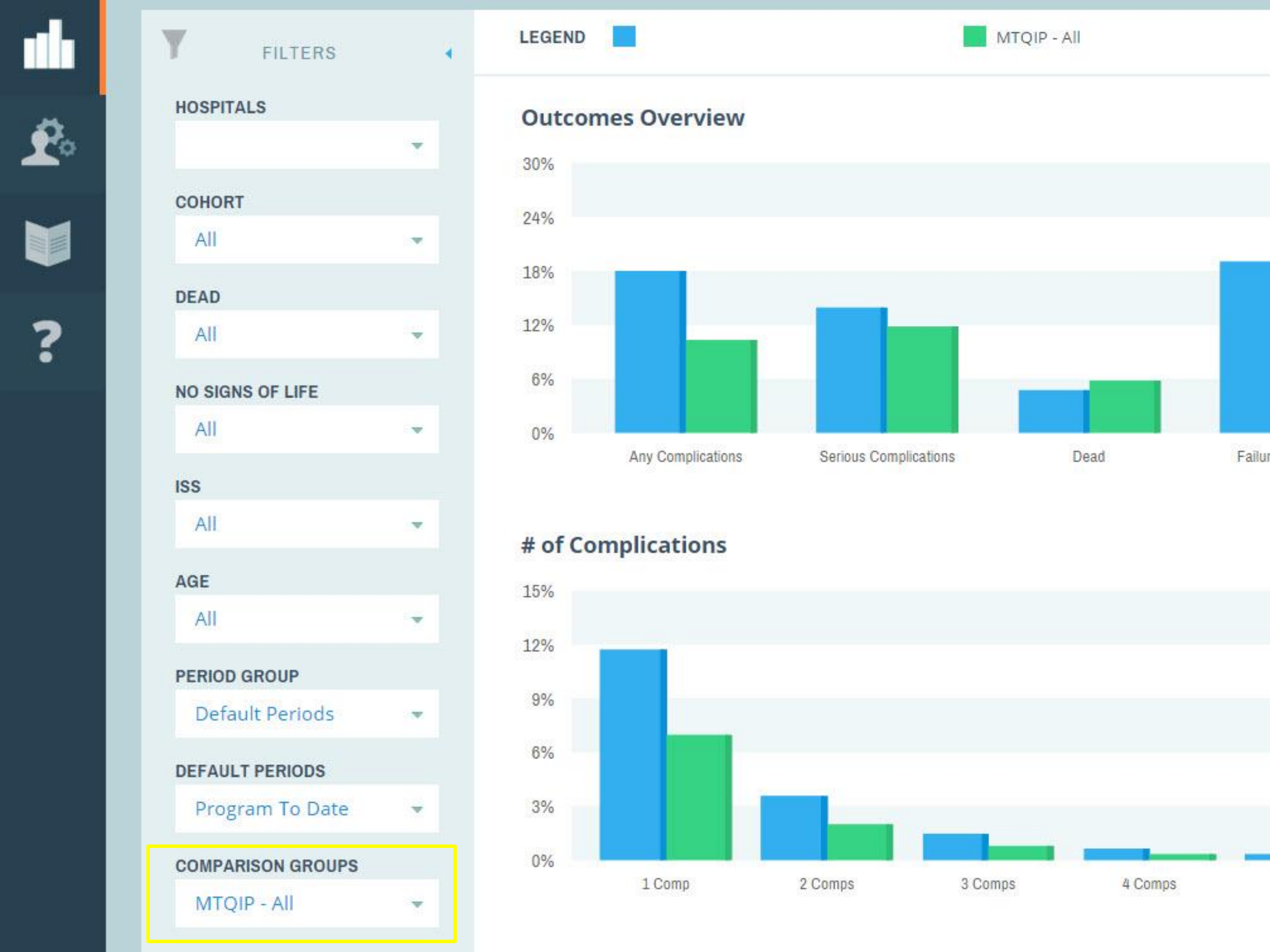
MTQIP - All

MTQIP - All

Trauma Center Level 1

WERED BY


FILTERS
HOSPITALS
COHORT
All
DEAD
All
NO SIGNS OF LIFE
All
ISS
All
AGE
All
PERIOD GROUP
Default Periods
DEFAULT PERIODS
Program To Date
COMPARISON GROUPS
MTQIP - All
LEGEND
MTQIP - All
Outcomes Overview
30%
24%
18%
12%
6%
0%
Any Complications
Serious Complications
Dead
# of Complications
15%
12%
9%
6%
3%
0%
1 Comp
2 Comps
3 Comps
4 Comps


FILTERS
HOSPITALS
COHORT
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All
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All
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PERIOD GROUP
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Outcomes Overview
30%
24%
18%
12%
6%
0%
Any Complications
Serious Complications
Dead
# of Complications
15%
12%
9%
6%
3%
0%
1 Comp
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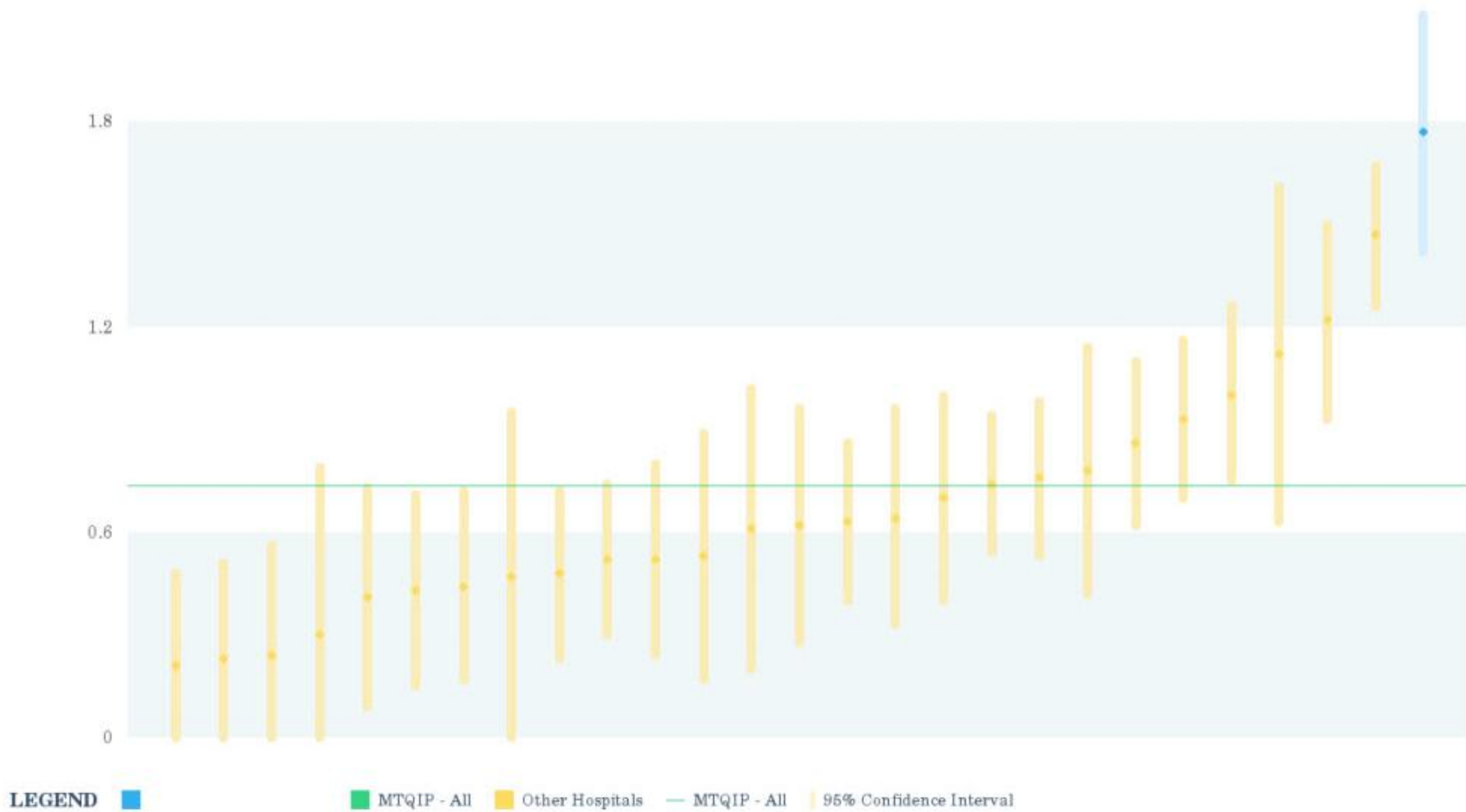
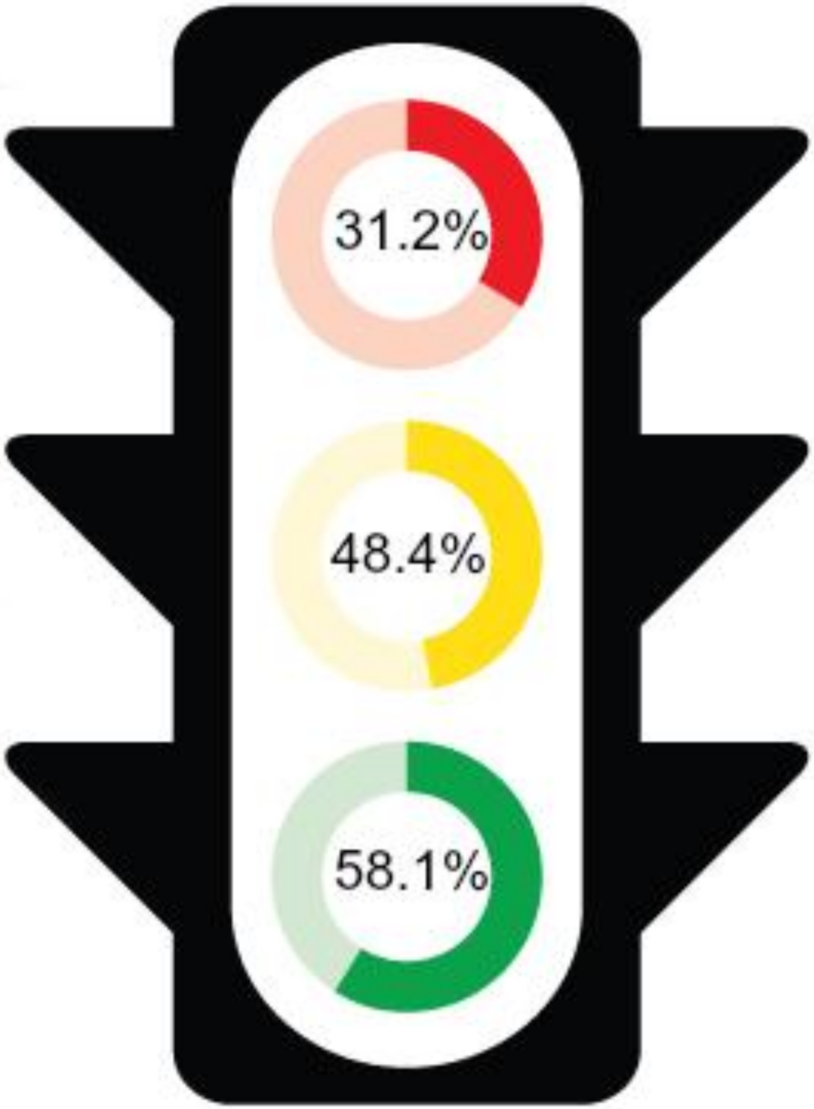
3 Comps
4 Comps



1.8
1.2
0.6
0
LEGEND
MTQIP - All
Other Hospitals
MTQIP - All
95% Confidence Interval

ArborMetrix
the science of healthcare performance

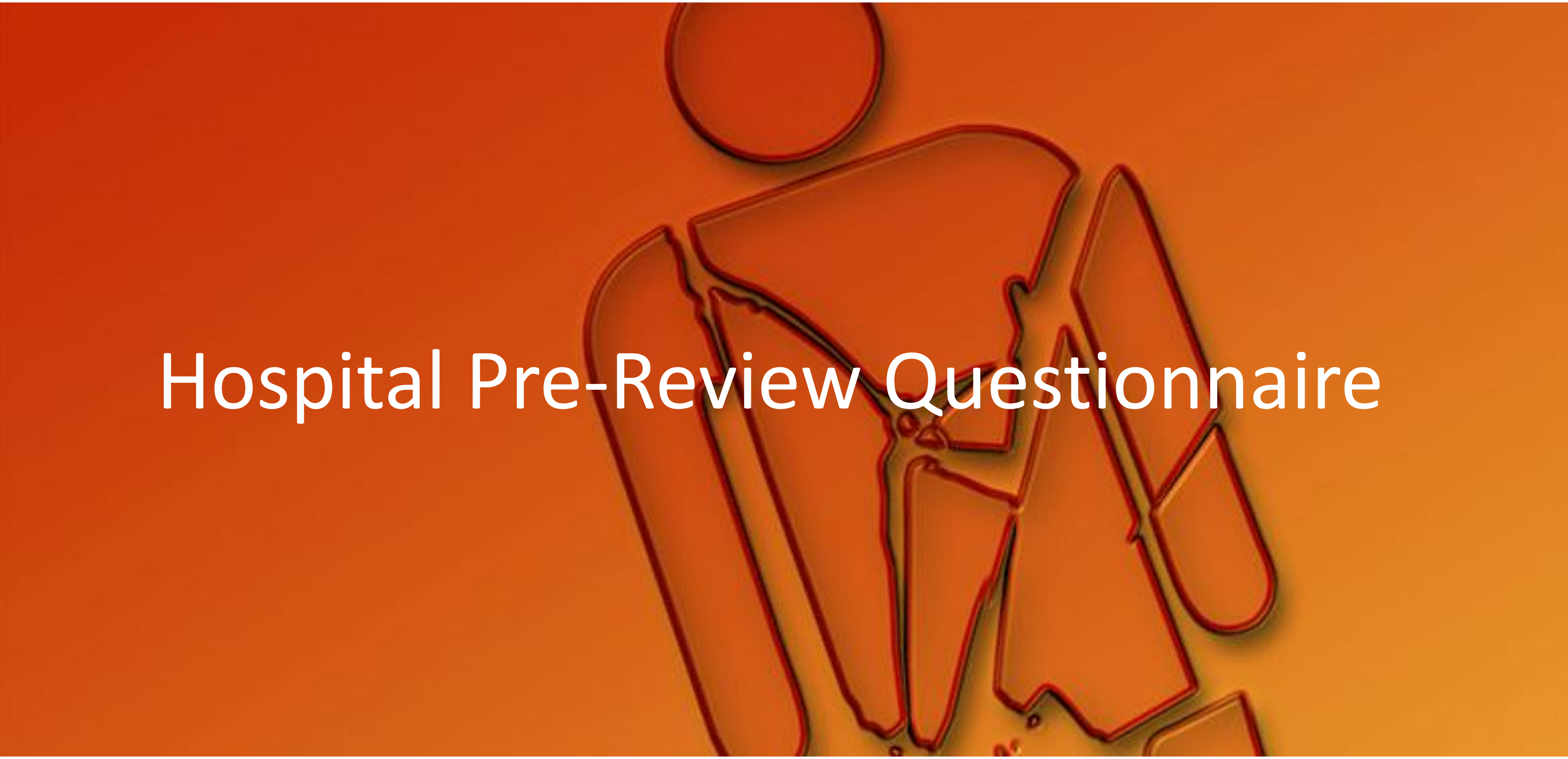


DVT

TBI MONITOR PLACEMENT ≤ 8 HOURS

VTE PROPHYLAXIS WITHIN 48 HOURS

the science of healthcare performance



Hospital Pre-Review Questionnaire

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PRQ Dashboard Advanced Search

Payer Mix

Payer	All Patients	Trauma Patients
Commercial	30	40
Medicare	32	22
Medicaid	10	20
HMO/PPO	10	5
Uncompensated/Indigent	11	7
Other including self-pay	7	6

Hospital Beds

Hospital Beds	Adult	Pediatric	Total
Licensed	600	200	800
Staffed	550	150	700
Average Census	575	175	750

Level of Response to Activations

Level	Number of Activations	Percent of Total Activations
Highest (Class I)	100	17
Intermediate (Class II)	200	33
Lowest (Class III)	300	50

YouTube

Michigan Trauma Quality Improvement Program

Home Videos Playlists Channels Discussion About

M·TQIP Share your thoughts

All activities

M·TQIP **Michigan Trauma Quality Improvement Program** uploaded a video

Orientation

M·TQIP

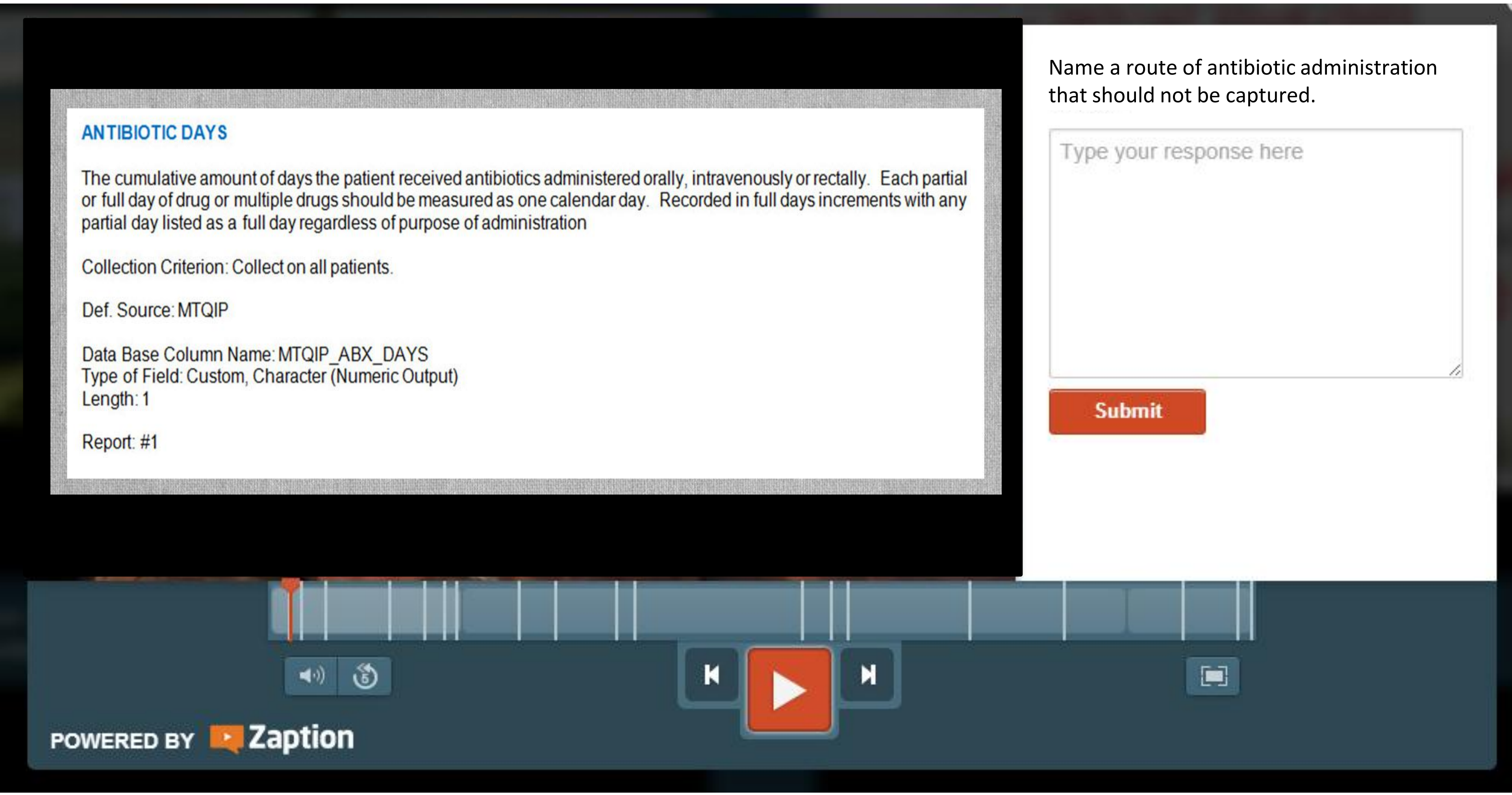
1:10:09

2015 Orientation
3 weeks ago • 30 views

M·TQIP **Michigan Trauma Quality Improvement Program** uploaded a video

2015 Data Dictionary Updates

2015 Definition Updates
2 months ago • 77 views


ANTIBIOTIC DAYS
The cumulative amount of days the patient received antibiotics administered orally, intravenously or rectally. Each partial or full day of drug or multiple drugs should be measured as one calendar day. Recorded in full days increments with any partial day listed as a full day regardless of purpose of administration
Collection Criterion: Collect on all patients.
Def. Source: MTQIP
Data Base Column Name: MTQIP_ABX_DAYS
Type of Field: Custom, Character (Numeric Output)
Length: 1
Report: #1
Name a route of antibiotic administration that should not be captured.
Type your response here
Submit
POWERED BY Zaption

digital innovation incorporated

MTQIP Central Site

Data Exchange

Data Submission

Submission Review

Submission Analyzer

Reporting

View Reports

Manage Reports

Thank you

Blue Cross
Blue Shield
Blue Care Network
of Michigan

Future Meetings

- Spring (MCOT)
  - Wednesday May 13, 2015
  - Grand Rapids, Amway Gran Plaza Hotel
- Spring (Registrars)
  - Wednesday June 2, 2015
  - Ann Arbor, NCRC
- Fall
  - Tuesday October 13, 2015
  - Ypsilanti, EMU Marriott Conference Center

Conclusion

- Vote
  - Survey Monkey
  - Three Questions
    - Region Reports
    - CME Change
    - Change to FTE support
- Evaluations
  - Fill out and turn in