

The Michigan Trauma Quality Improvement Program

**Ann Arbor, MI
May 16, 2012**



Agenda

- ◆ Mikhail
 - Summary of February Group Sessions
 - Mattox Conf. Highlights
 - MTQIP Survey Results
- ◆ Performance Improvement Projects
 - Munson – Anticoagulant Reversal
 - Hurley – UTI
 - Michigan – UTI

Agenda

- ◆ Hemmila
 - CDM
 - MTQIP and TQIP Data Elements
 - MSQC Emergent General Surgery
 - Reports
 - Final Announcements

Information – MTQIP Centers

◆ Trauma Centers

- 23 Total
- 10 Level 1
- 13 Level 2
- 21 with data in current report

Advisory Committee

- ◆ Support MTQIP Program Director
 - Direction
 - Advice
 - Interface with constituents
- ◆ Members
 - Jim Wagner (Hurley)
 - John Kepros (MSU, Sparrow)
 - Wendy Wahl (St. Joseph Mercy, Ann Arbor)

Information: ACS-TQIP

- ◆ Benchmark Reports
 - November 2011, Aggregate
 - February 2012, Elderly
 - May/June 2012, Shock
 - 2010 admissions
- ◆ ACS-TQIP Enrollment
 - Applications for 2012
 - www.facs.org/trauma/ntdb/tqip
- ◆ ACS-TQIP Meeting
 - Philadelphia, October 28-30, 2012

MTQIP Program Manager Updates

Judy Mikhail, BSN, MSN, MBA



Feb Meeting Breakouts

- I. Data Collection
- II. Use of MTQIP
- III. Sepsis
- IV. Resuscitation

I. Data Collection

Difficulties and Barriers

Most Difficult Area

- ✓ *Complications*
- ✓ *Complications*
- ✓ *Complications*

Barriers

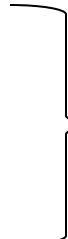
- ✓ *Insufficient staff*
- ✓ *Clinical knowledge & time required to determine complications*

Tips to Improve

Registrars/TPMs

- Keep current
- Complications education
- Abstractors - defined tasks
- Cheat sheets/pocket cards
- Tabs for data dictionary
- Attend trauma service mtgs
- Utilize electronic uploads
- Capitalize on Resident/
NP/PA sign out

Surgeons

- Emphasize
 - Educate
 - Document
- 
- complications
- Review complications @
trauma service meetings

II. Use of MTQIP

Name one problem MTQIP could solve for you?

Surgeons

Clinical Issues

- Identify best practices
- Use to influence NS
 - Timing of drugs/procedures in TBI
- Develop guidelines

Manpower Concerns

- Use data to show need for manpower - NP's/PA's
- Consider development of trauma center resource grid (*resource benchmarking*)

Example: Clinical Resource Benchmarking

Trauma Center	Admitted Trauma Volume	Residents	Trauma Fellows	Critical Care Fellows	NP/PA	Surgeons
Hurley	1700	0	1	0	22	7
U of M	1000	7	0	1	3	8

II. Use of MTQIP

Name one problem MTQIP could solve for you

Trauma Program Manager

- Want to contribute higher volume of patients
 - Can we lower the age criteria to 15?
- Can we develop a calculator for use in trauma patients, like the bariatric collaborative did?
- Can MTQIP help identify technology that will assist in data collection measures?
 - *Tabbed electronic dictionary?*
 - *Complication decision tree for non clinician?*

II. Use of MTQIP

Name one problem MTQIP could solve for you

Registrar

- More education for registrars
- Standardize registry practices
- Identify best practices for trauma registries

II. Use of MTQIP

How to utilize MTQIP feedback reports and online tools?

- Share at trauma meetings
- Present at surgeon PI meetings (liaisons)
- Share at hospital administrator meetings
- Share in presentations to the hospital board

II. Use of MTQIP

Barriers to using MTQIP?

- Lag time of data collection to report time
- Inadequate registry resources
- Inability to access BCBSM payment
- Opportunity to benchmark registry resources?

Admitted Volume	Data Abstractor	Data Entry	Data Cleaning	Prepare Reports	PI Person

II. Use of MTQIP

Skepticism *addressed by candor*

- Validity of the data
 - Inconsistent reporting of complications
- BCBSM motive
 - Only time will convince you
 - 12 years of experience supporting collaboratives prior to MTQIP with great success

What is the difference between
TQIP and MTQIP?

Trauma Center

National Collaboration



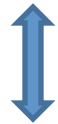
ACS TQIP



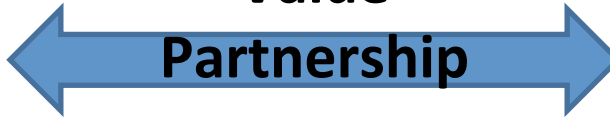
Regional Collaboration



MTQIP



**Value
Partnership**



BCBSM

III. Sepsis Breakout

Varying views on value of sepsis screening

- How:
 - Clinical judgment
 - Checklist
 - Paper
 - Electronic
- Frequency:
 - Daily
 - At rounds
 - Q 6 hr
- Response:
 - Rapid response team
 - Variable team composition
 - Who makes call?
 - RN/NP
 - Who starts treatment?
 - PA/MD
 - Treatment endpoints
 - Variable

IV. Resuscitation

- ATLS guidelines
- 2 L' s fluid
- Earlier RBC' s
- Pressors: NO
- Time to CT } Little
- Time to OR } PI
- Endpoints: no standard
- Massive Transfusion Protocol
 - All use
 - Varies 4-6 PRBC before FFP
 - Variable ratios 1:1, 1:2
 - Few centers give Platelets
 - Roughly 75% do PI on MTP
 - No one is using TEG (yet)

Potential Deliverables (Registry Related)

1. Complications education for registrars
2. Data dictionary tabs
3. Complication cheat sheets/pocket cards
4. Tabbed electronic data dictionary
5. Complications decision tree
6. Registry resources benchmarking

Potential Deliverables (Clinician Related)

7. Clinician manpower benchmarking
8. Best practices for specific conditions
 - Ex: TBI process measures, Pradaxa
9. Guidelines
 - Collecting guidelines
 - Start developing
10. Lag time issue
11. Age limit
12. Develop best practices QI audit tool for MTP' s

2012 Mattox Meeting

- Thromboembolic Prophylaxis in Head Trauma
- Tranexamic acid
- TEG

Thromboembolic Prophylaxis in Head Trauma

NS: Alex Valadka

- Routine Protocol:
 - Enoxaparin within 72 hours of injury
- In pts with severe TBI **AND** hemorrhage progression on follow up CT
 - 72 hour clock starts at time of follow up CT showing stable head pathology
- Moving toward 48 hours in select cases

Tranexamic acid (TXA)

- Derivative of AA Lysine - inhibits fibrinolysis
- Inexpensive (\$80/dose) and proven safety profile
- **Cochrane review (2007)** 53 RCT' s Cardiac/Ortho
 - Sig reduction in bleeding without thrombotic complications
- **CRASH2 trial (2010)** Prospective RCT, > 20,000 pts
 - Stat sig 1.5% reduction in mortality (overall)
 - Subgroup analysis (Severe bleeding & early admin)
 - Reduced bleeding by 30% **IF** given within 1 hour
- **MATTERs trial (2011)** Camp Bastion in Afghanistan
 - Marked improvement in survival in most severely injured compared to those who did not receive it
- Soldiers to carry autoinjectors on battlefield

Tranexamic Acid

Military Protocol (EAST)

- Give within 1-3 hours of injury
- 1 unit of blood
- 1 Gm of Bolus of TXA
- 1 Gm Infusion over 8 hrs

Oregon Health & Science University Protocol

- MTP activated
- Pt has received > 4 units within 2 hours
- Give 1 Gm bolus
- Start 1 Gm drip over 8 hrs

Thromboelastogram (TEG)

- Rapid, clinician operated, point of care test
- Measures the global function of all clotting components as they interact in a sample of whole blood at the pts temp & ph
- Technology is robust
- Commercially available
- Costs not prohibitive (?)

TEG Uses

- Predicts need for transfusion
- Targets use of blood components
- ID hyperfibrinolytic pts
- Assess LMW monitoring in high risk ICU pts
- Assess impact of platelet inhibitors (aspirin and Plavix) -Platelet Mapping
- Only method for detecting degree of anticoagulation by Dabigatran (Pradaxa)
- Pradaxa is only the beginning.....new anticoagulants coming

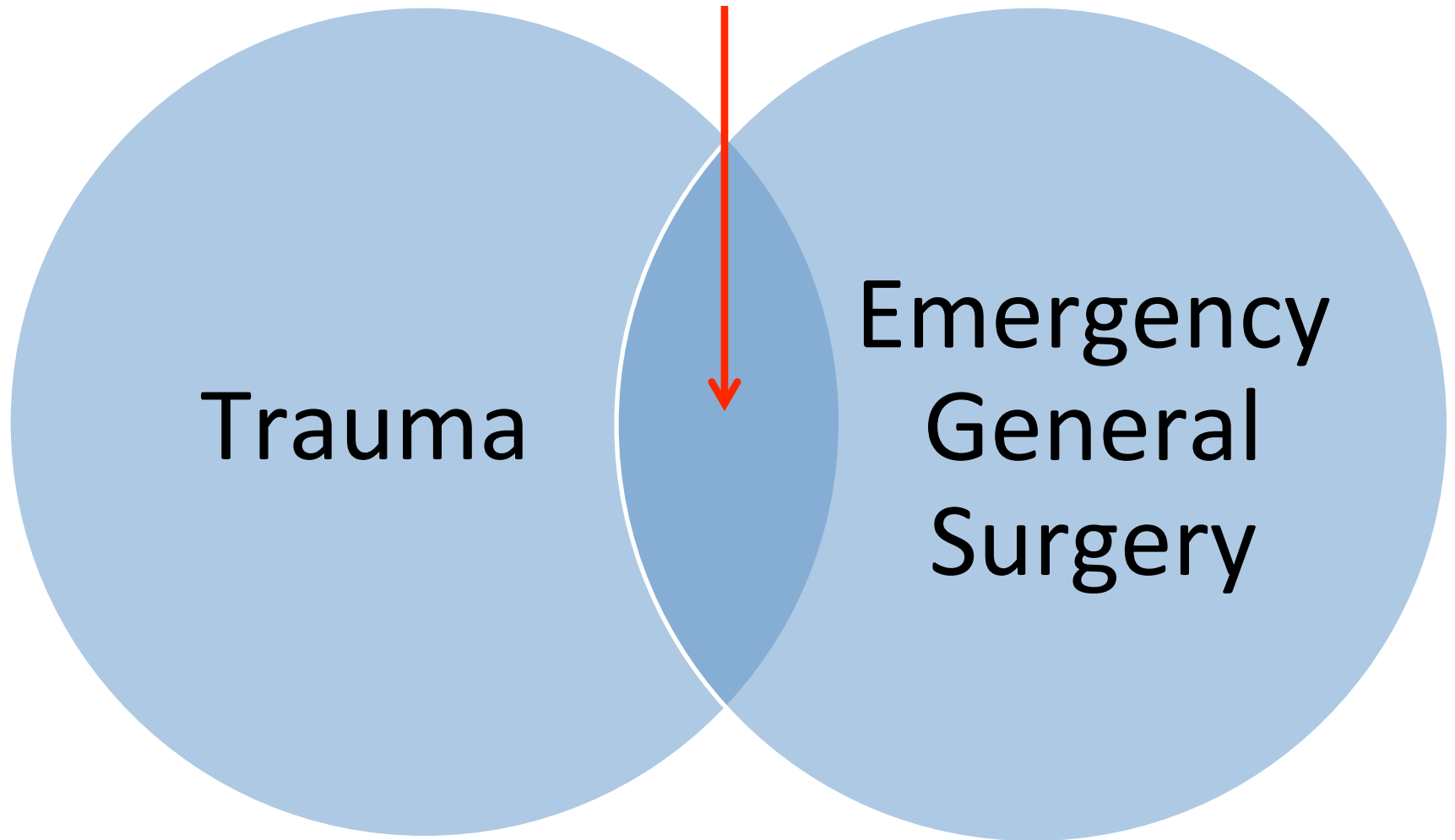
TEG

- Where used:
 - ED, OR, Angio, ICU
 - Flat screen monitors project results in all areas
- Large volume of research coming that will establish TEG protocols in trauma
- Pragmatic, Randomized Optimal Platelet Plasma Ratios (PROPPR Trial)
 - Phase III Multicenter trial (12 Trauma Centers)
 - Efficacy & safety of ratios 1:1:1 vs 1:1:2

BCBSM Collaborative Quality Initiatives (CQI)

#	CQI	Subgroup	Interest
1	Advanced Cardiovascular Imaging		
2	Percutaneous Coronary		
3	Vascular Interventions		
4	Hospital Medicine Safety		
5	Bariatric Surgery		
6	Arthroplasty		
7	Breast Oncology		
8	Radiation Oncology		
9	Thoracic/Cardiovascular Surgeons		
10	Surgical Quality	General Surgeons	Emergency General Surgery
		Vascular Surgeons	
		Anesthesiologists	
11	Trauma		
12	Perioperative Outcomes		

Trauma Surgeons



Survey Performed January 2012					# Critical Care Boarded	% Critical Care Boarded	% ICU pts covered by Surg's	Closed ICU?	Simultaneous Tr/EGS Call?
#	Hospital	# Tr Call Surgeons	% Tr Surg on EGS call	% EGS Call By Tr Surgs					
1	Beaumont	5	100	100	4	80	25	no	yes
2	Borgess	5	100	50	2	40	100	no	yes
3	Botsford	6	100	100	0	0	50	no	yes
4	Bronson	5	75	25	2	40	100	no	no
5	Covenant	5	100	50	0	0	0	no	no
6	Detroit Rec	8	100	100	4	50	100	no	yes
7	Genesys	5	100	50	1	20	50	yes	yes
8	Henry Ford	9	100	100	9	100	50	no	yes
9	Hurley	6	100	75	4	66	75	no	yes
10	Marquette	5	100	100	0	0	75	no	yes
11	Mt Clemens	10	100	100	2	20	25	no	yes
12	Munson	9	100	92	1	11	100	no	yes (90%)
13	Oakwood D	9	100	65	3	33	75	no	yes
14	Oakwood SS	4	100	100	1	25	75	no	yes
15	POH	4	100	100	0	0	50	no	yes
16	Sinai-Grace	10	35	35	4	40	100	yes	yes
17	Sparrow	5	0	0	4	80	100	yes	no
18	Spectrum	7	100	50	2	28	100	no	partly (50%)
19	St. John	6	75	75	2	33	50	no	yes
20	St. Joseph's AA	8	100	100	4	50	100	yes	yes
21	St. Mary's GR	8	100	100	2	25	0	no	yes
22	St. Mary's MI	6	50	50	0	0	25	yes	no
23	U of M	8	100	55	7	88	100	yes	yes
Mean		6.7	88	73	2.5	36	66	26% yes	80% yes

MTQIP Site-Specific PI Projects

Munson – Anticoagulant Reversal

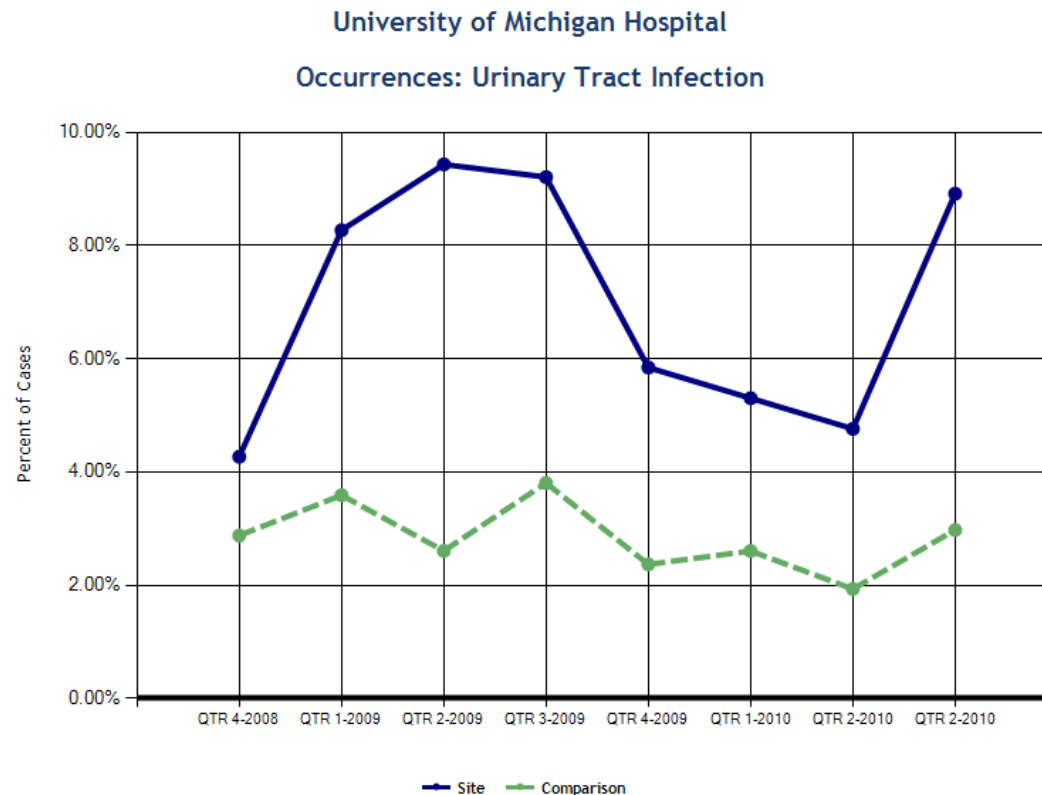
Hurley – Urinary Tract Infection

Univ. of Michigan – UTI, VTE



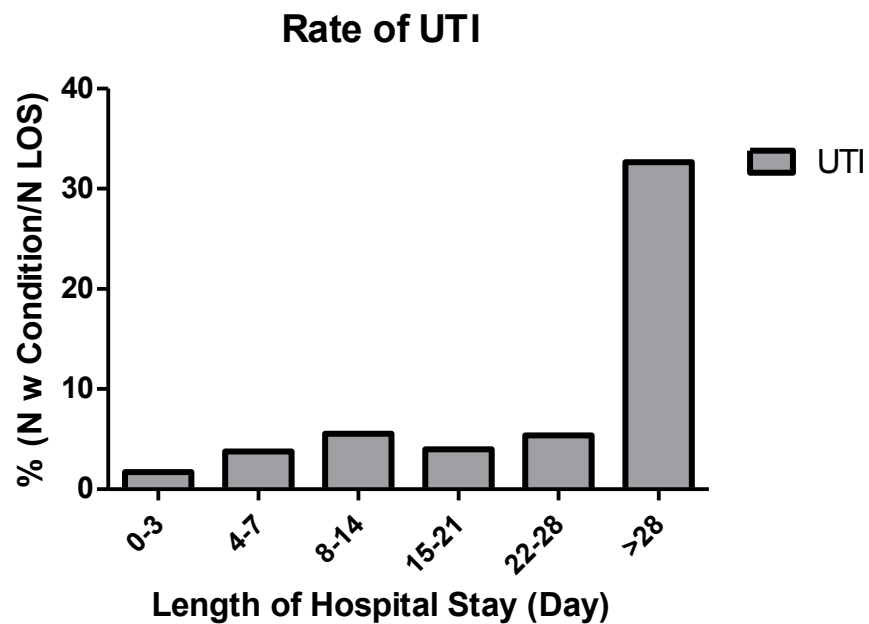
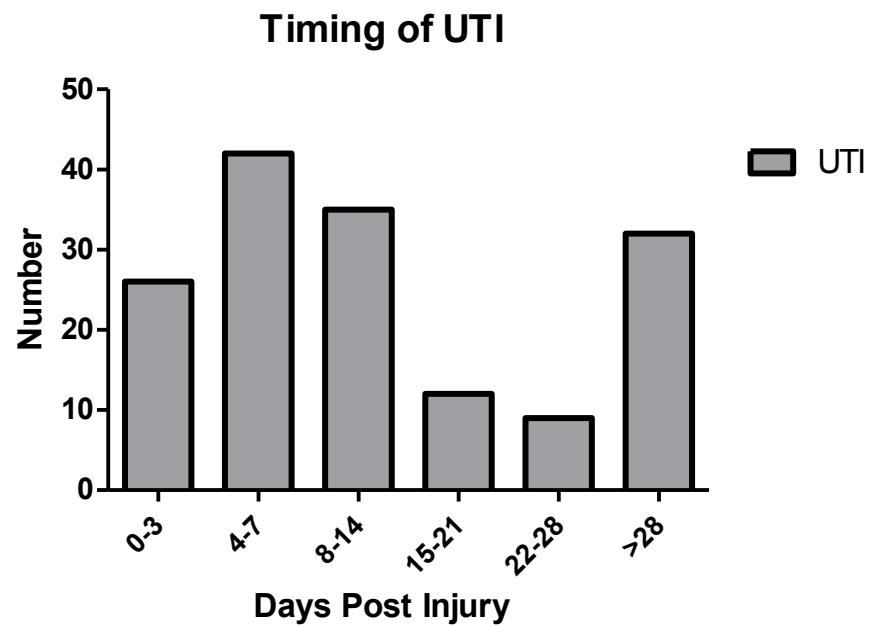
Urinary Tract Infection

- ◆ Always a high-outlier on MTQIP report



Approach

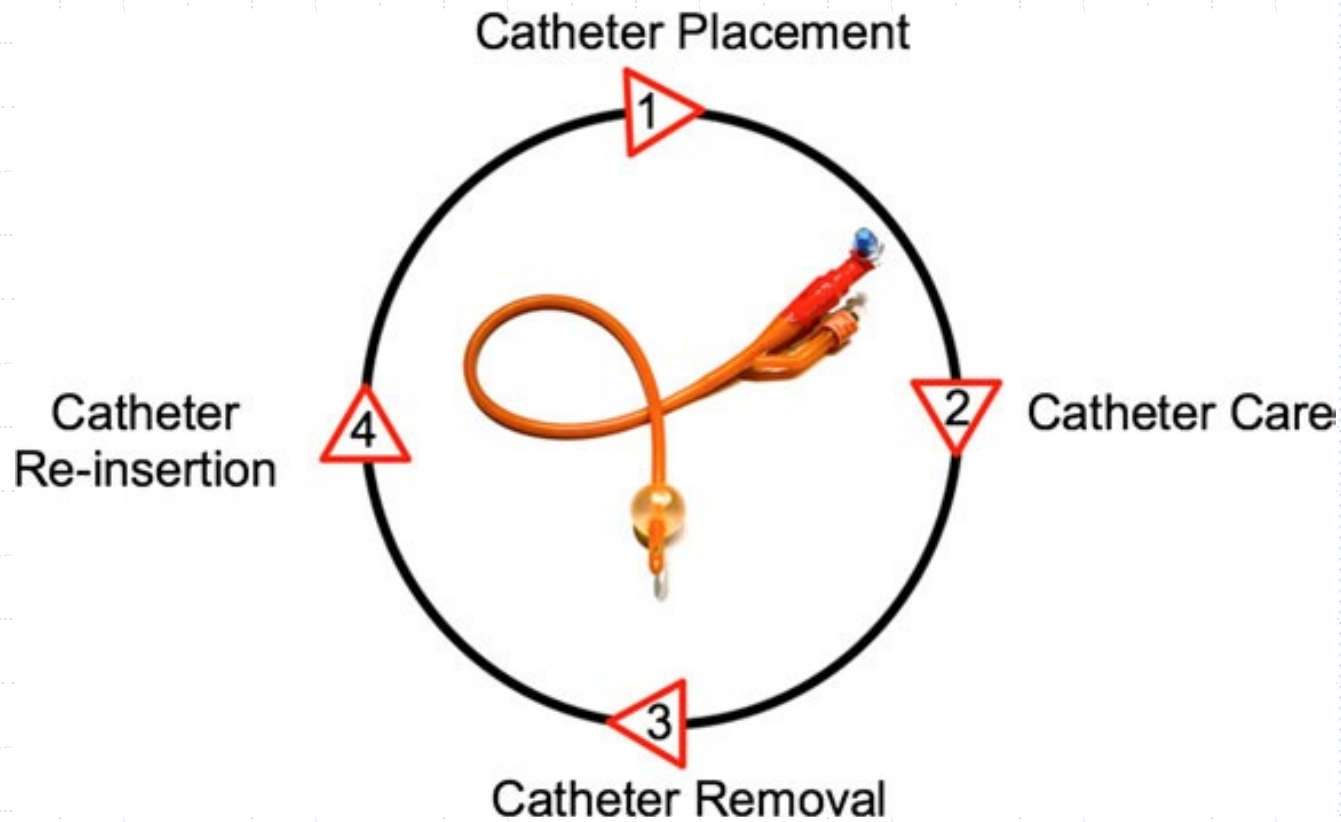
- ◆ Dive into data
- ◆ Reviewed definition with registrar
- ◆ Publicized problem
 - Nurses
 - Residents, PA' s
 - Attendings
- ◆ Meeting to discuss ideas
- ◆ Hospital initiative
 - Concurrent



Risk Factors

Age ≥ 75	OR 3.6 95% CI 1.8-7.4
Gender	OR 2.8 95% CI 1.9-4.0
ISS 25-35	OR 3.2 95% CI 2.0-7.4
ISS ≥ 35	OR 4.0 95% CI 2.1-7.4
 AIS Ext >2	OR 1.9 95% CI 1.3-2.8

Catheter Life-Cycle



Ideas – Actions Taken

◆ Catheter Placement

- Adjust criteria for ED Foley placement
- Silver tip Foley (Currently in use)
- Routine Urine Culture on high risk population/transfers on arrival

◆ Catheter Care

- Healthcare Infection Control Practices Advisory Committee (HICPAC) protocol

Ideas – Actions Taken

◆ Catheter Removal

- HICPAC protocol
- Trauma Service Foley Removal protocol (Nursing empowered and driven)

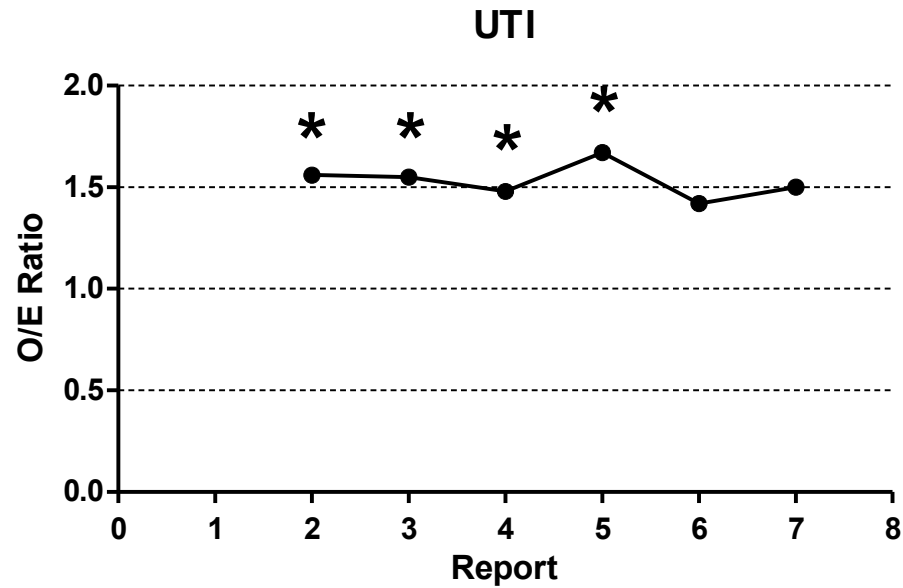
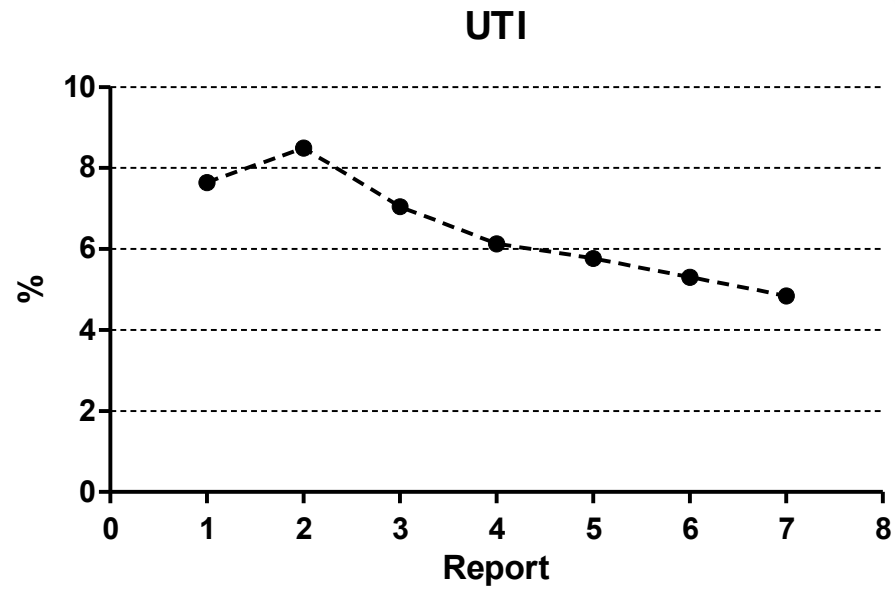
◆ Catheter Reinsertion

- Increased use of alternatives (straight cath, condom cath, female urinal)
- Post-Foley removal protocol

Ideas – Actions Taken

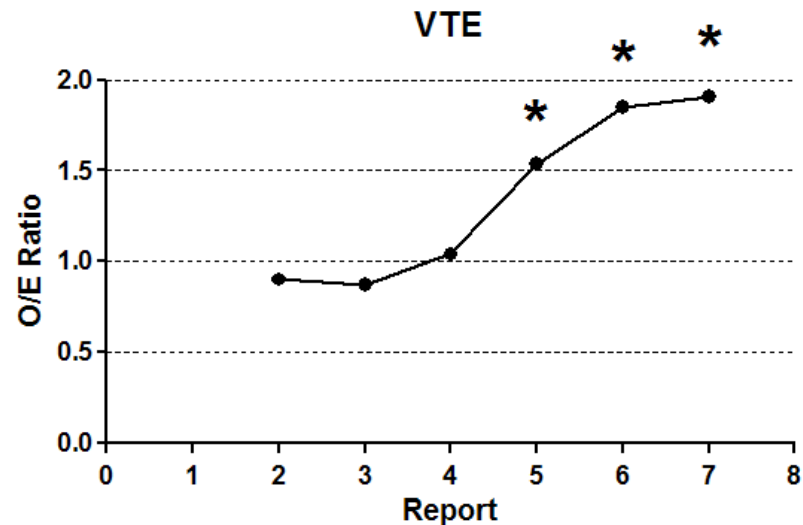
- ◆ Consider foregoing Foley catheter placement in an adult trauma patient who meets all of the following criteria after the primary and secondary survey.
 - 1) Blood pressure and heart rate are in the normal range and stable.
 - 2) The patient appears to have minimal to no obvious injuries based on H&P (e.g. minor distal extremity fracture).
 - 3) The patient is awake and has a GCS of 14-15 and is a candidate for early spine clearance.
- ◆ If the patient meets these criteria, at the discretion of the trauma team, Foley catheter placement can be deferred and the patient taken for additional imaging as appropriate. Should the patient's condition change or injuries are found that necessitate a Foley catheter then placement will proceed.

Results



Next Steps

- ◆ Reinforce feedback
- ◆ Track Foley catheter days
- ◆ Review positive cases
- ◆ Build QI culture





URINARY TRACT INFECTIONS: QUALITY IMPROVEMENT PROJECT

THINK HEALTHY.
THINK HURLEY.

URINARY TRACT INFECTIONS

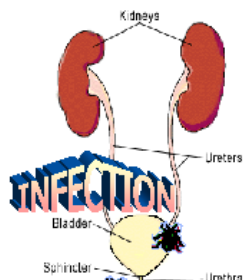
- Reason for choosing UTI
 - MTQIP reports
 - UTI consistent area of weakness
- MTQIP reports presented at Trauma Program Operational Process Performance Committee
- Presented MTQIP reports to the Board of Managers
 - Developed hospital wide initiative
 - Decrease use of foley catheters
 - Early discontinuation of catheters

STAFF EDUCATION

- Hospital-wide
- PowerPoint developed by Quality Department
- Michigan Health & Hospital Association Keystone Center for Patient Safety & Quality
 - Keystone: Hospital Acquired Infections (HAI) initiative
 - Goal to reduce and eliminate hospital-associated infections

- Take home messages
 - Not every patient needs a foley
 - Discontinuation of foley should occur as soon as the patient no longer meets criteria
 - Need for continuation of foley should be evaluated on a daily basis

Remove That Foley!



Foley Catheters Cause:

- > Infections ↑
- > Length of Stay ↑
- > Cost ↑\$\$
- > Patient Discomfort ☹
- > Antibiotic Usage ↑
- ♦ Patients with Foley Catheters tend to stay in bed, which increases risk of skin breakdown, DVTs, & pneumonia due to their immobility.

Foley Catheters are Indicated for:

- ✓ Acute urinary retention or obstruction
- ✓ Perioperative use in selected surgeries
- ✓ Assist healing of perineal and sacral wounds in incontinent patients
- ✓ Required immobilization for trauma or surgery
- ✓ Chronic indwelling urinary catheter on admission
- ✓ Accurate measurement of urinary output in critically ill patients (intensive care)
- ✓ Hospice/Comfort/Palliative care in critically ill patients (intensive care)

Foley Catheters are *not* indicated for:

- ✗ Close monitoring of outputs-outside of ICU.
- ✗ Patient Request
- ✗ Confused patient
- ✗ Incontinence without a sacral or perineal pressure sore
- ✗ Prolonged postoperative use
- ✗ Others (morbid obesity, immobility, patient transferred from ICU)

REMOVE THAT FOLEY!

Foley Catheter Project

Goal:

- Decrease Catheter Associated Urinary Tract Infections (CAUTI), which will in turn improve patient outcomes and decrease length of stay.
- Improve Patient Safety and Outcome.

Background:

- 600,000 patients develop hospital-acquired UTI per year.
- 80% of these are urinary catheter associated.
- Approximately half of the patients with a urinary catheter do not have a valid indication for placement.
- Each day the urinary catheter remains, the risk of the CAUTI increases 5%.

Specific Goals:

- Reduce the unnecessary use of urinary catheters in the inpatient setting.
- Reduce the risk of hospital-acquired urinary tract infections.

Prevention of CAUTI:

Follow criteria indicated for a urinary catheter:

1. Urinary tract obstruction.
2. Neurogenic bladder dysfunction and urinary retention.
3. Urologic or other surgery with contiguous structures.
4. Stage 3 or 4 sacral area decubitus in incontinent patients.
5. Hospice or palliative care (if patient requests)

Promptly Remove Unnecessary Foley Catheters

- MTQIP definitions
 - Culture results
 - $\geq 100,000$ microorganisms per cm^3 of urine with no more than 2 species of microorganisms
 - Vital Signs
 - Fever $>38^\circ \text{C}$
 - Laboratory Results
 - $\text{WBC} > 100,000$ or < 3000 per cubic millimeter
- Discussion of definitions with Trauma Surgeons and Mid-Level Practitioners

INTERDISCIPLINARY ROUNDING

- Badge backers
- Need for foley addressed daily
- All members of interdisciplinary team involved

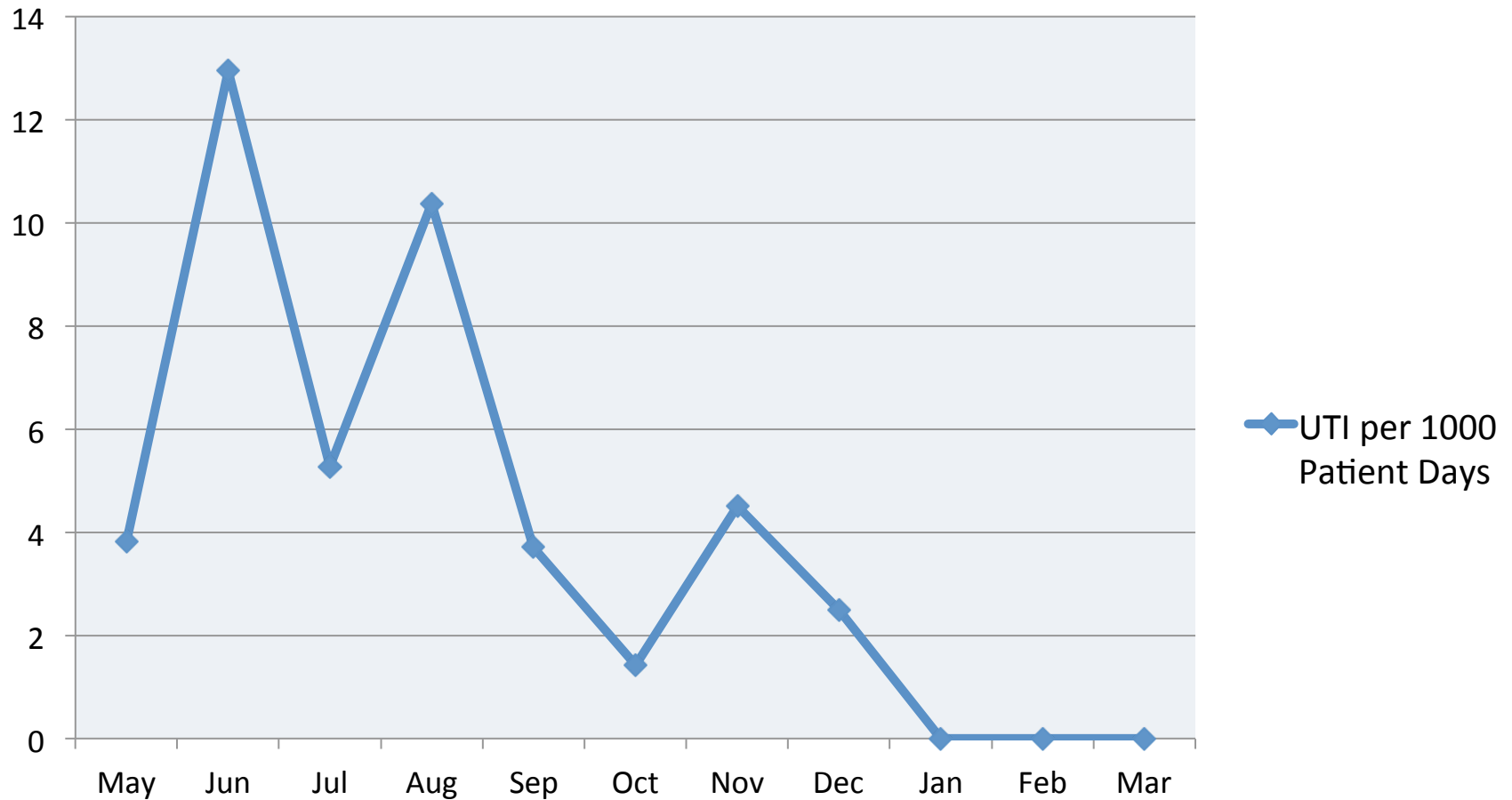
Interdisciplinary Rounds

1. **RASS** / Current **RASS**
2. **Sedative / Analgesic**
Infusion / Intermittent dosing
3. **SAT / SBT** - spontaneous awakening trial / spontaneous breathing trial
4. **DVT prophylaxis**
5. **GI prophylaxis**
6. **Foley** - Appropriate or not



RESULTS

UTI per 1000 Patient Days



May 2011 – March 2012

CONCLUSION

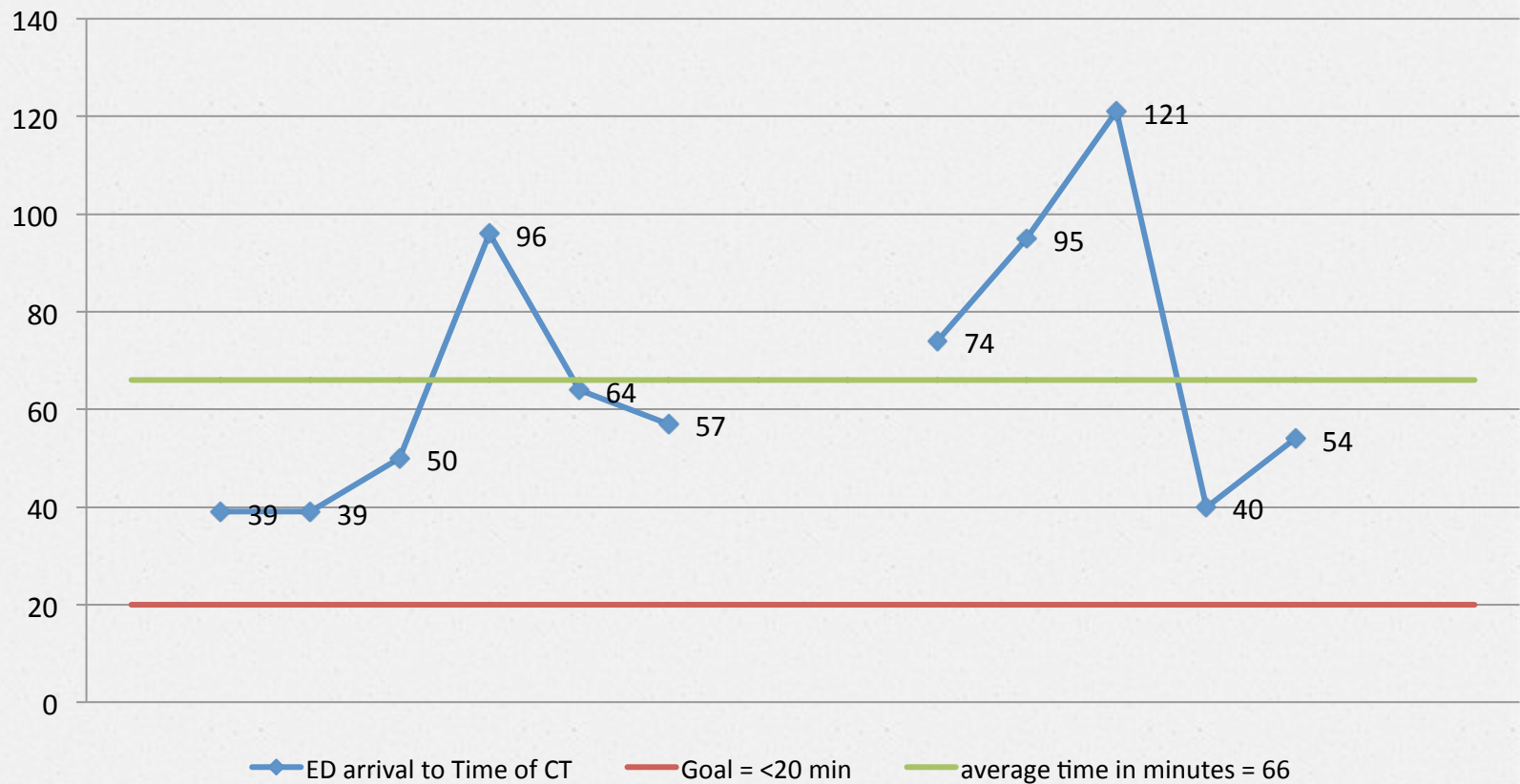
- Several interventions used
 - Staff education regarding Keystone initiative
 - Badge backers for interdisciplinary rounds
 - Modification of data collection methods to match MTQIP definitions
- Decrease in UTI incidence
 - Several interventions simultaneously

Munson PI Project

ANTICOAGULANT REVERSAL

- Revising existing Coumadin protocol to include anti-platelet agents
- Population: All TBI patients with a positive head CT on preexisting antiplatelet agents, excluding patients transferred from outside facility where head CT was obtained.

October 2011 - January 2012
ED Arrival to Time of CT as documented by RN



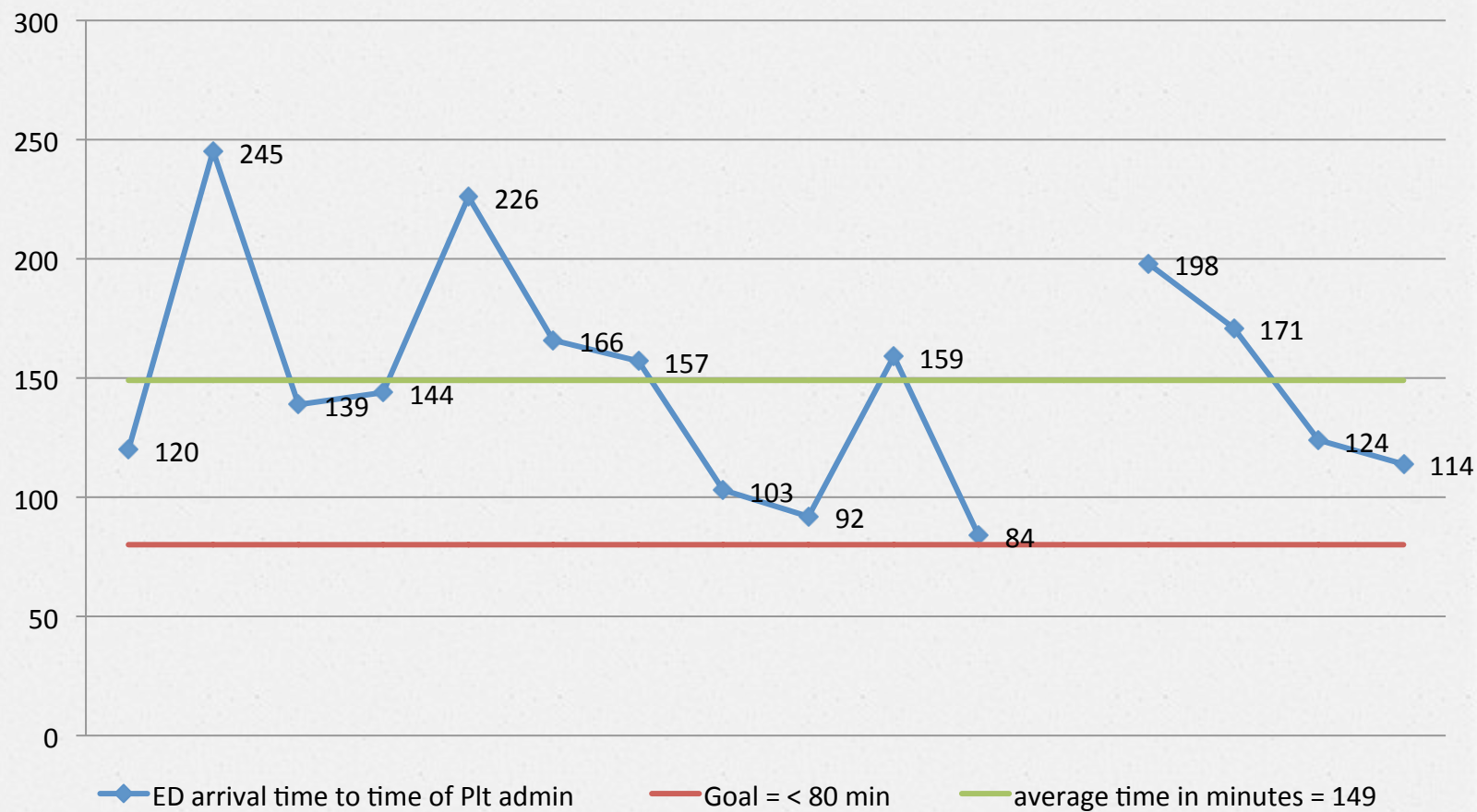
October 2011 - January 2012 CT Read Time to Platelet Order



October 2011 - January 2012 Time of Platelet Order to Time of Administration

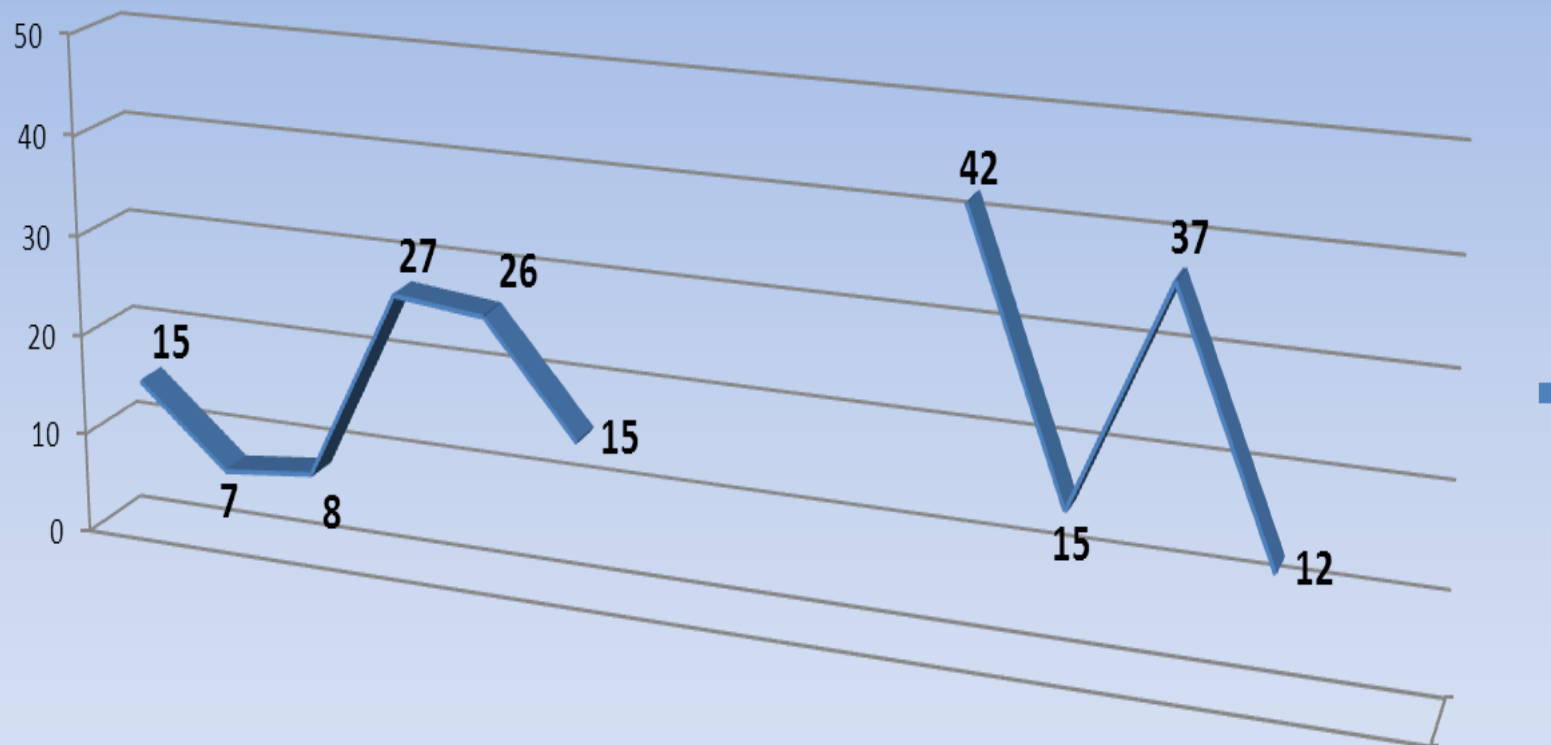


October 2011 - January 2012 ED Arrival Time to Time of Platelet Administration



Time of Transport to CT to Time of CT Read

Avg. = 20 minutes and 4 seconds



T R I A G E

Screen all patient for current anticoagulation therapy at triage/initial assessment with known/suspected bleeding or impact to head (falls, facial trauma, actual bleeding, etc.)

If patient is in the Emergency Department and has suspected Stroke/Intracranial Hemorrhage (ICH), initiate ESI Level 1 triage to be seen by attending immediately

If patient is hospitalized and suspected stroke/ICH, call Medical Response Team

Obtain Baseline Labs STAT:

- CBC with platelets, PT/INR, aPTT, fibrinogen and type & screen

Call to blood bank for 2 units AB FFP or 2 Packs of Platelets(if on antiplatelets such as clopidogrel or aspirin)

Suspected ICH

- Obtain Head CT Completed within 20 minutes of assessment
- Document TIME to CT

Suspected GI Bleed

- Endoscopy if clinically appropriate
- Evaluation of clinical signs and symptoms

Suspected Retroperitoneal Bleed

- Abdominal CT Completed within 20 minutes of assessment

Other Significant Bleeding

Appropriate Diagnostics of other major bleeding

??? Positive Bleed d ???

Continue to Rapid Reversal
Procedures for each specific
Anticoagulant

Positive ICH Patients:

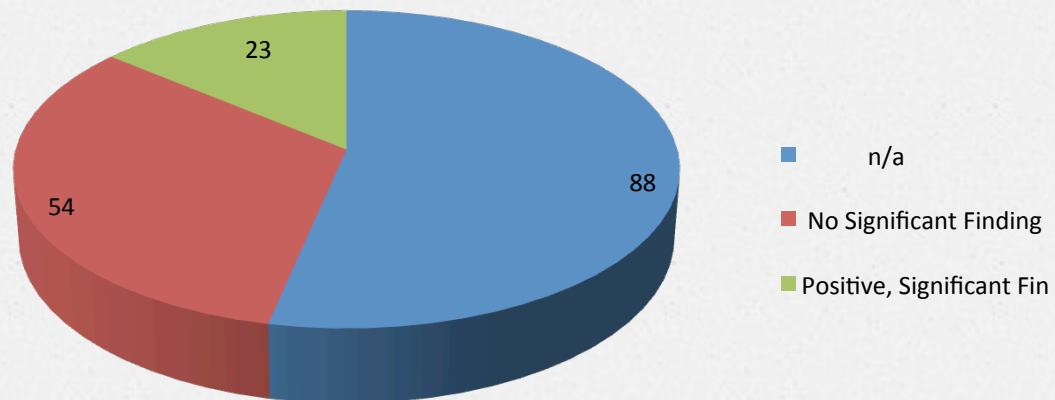
- STAT Trauma Service Consult:
Document time of call and arrival
- STAT Neurosurgical Consult:
Document time of call and arrival
- STAT Page to admitting Physician

Resume Routine Care

Negative ICH Patients with Trauma to Head

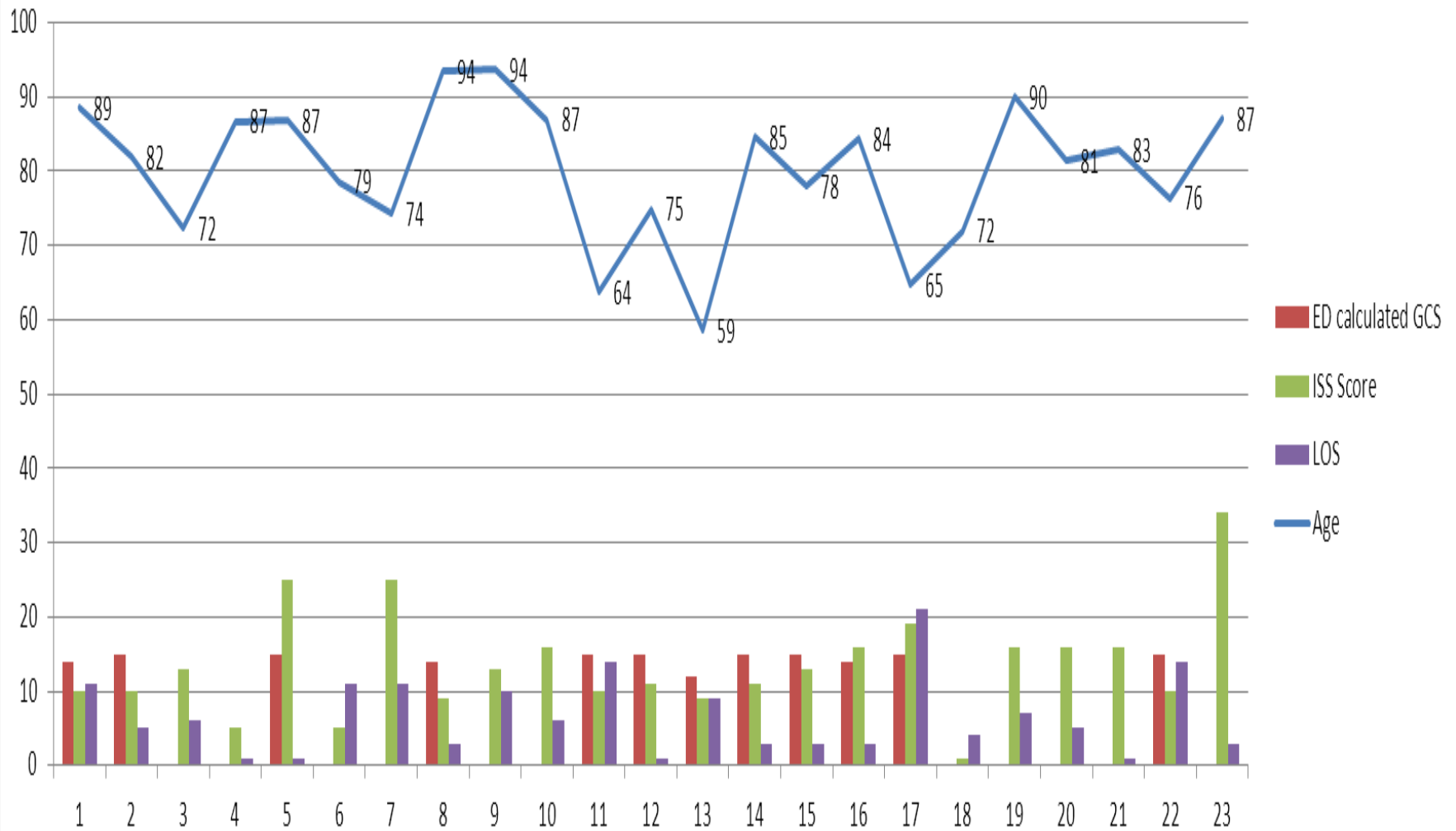
- Admit to Trauma Service for Observation if indicated
- Obtain Neurosurgical consult
- Obtain other specialty service consults
- STAT Head CT if any neurological changes
- Page Trauma Service if any changes

Oct. 2011 – Jan. 2012	
Row Labels	Patients on anticoagulants Count of Head CT
No Head CT performed	88
Negative	54
Positive	23
Grand Total	165



Positive Head CT, Age, ISS, LOS, and GCS

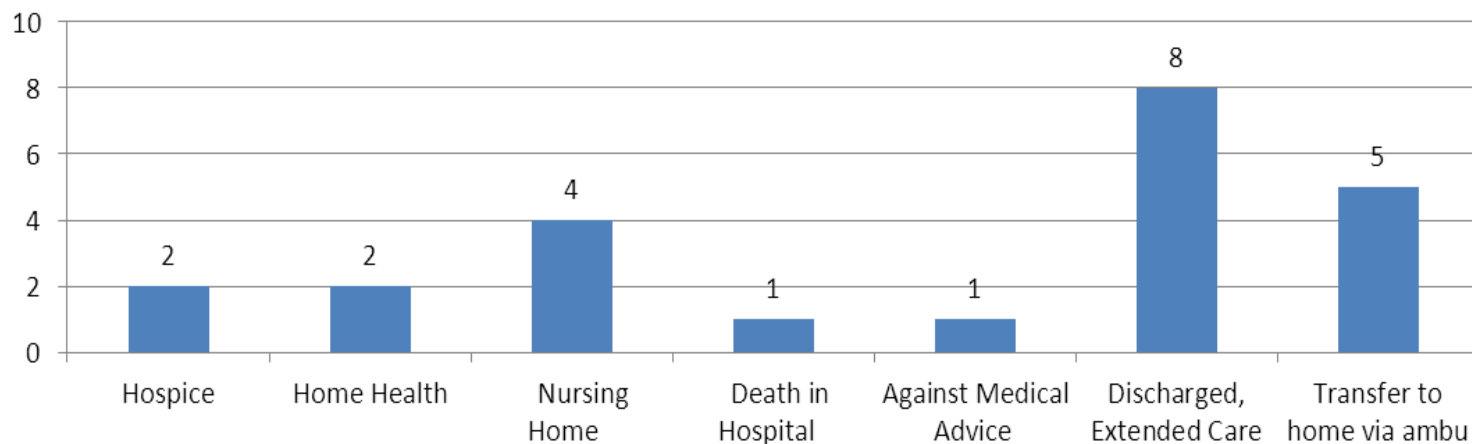
Total= 23 Oct 2011-Jan 2012



Row Labels	Count of Discharge disposition
Hospice	2
Home Health	2
Nursing Home	4
Death in Hospital	1
Against Medical Advice	1
Discharged, Extended Care	8
Transfer to home via ambu	5
Grand Total	23

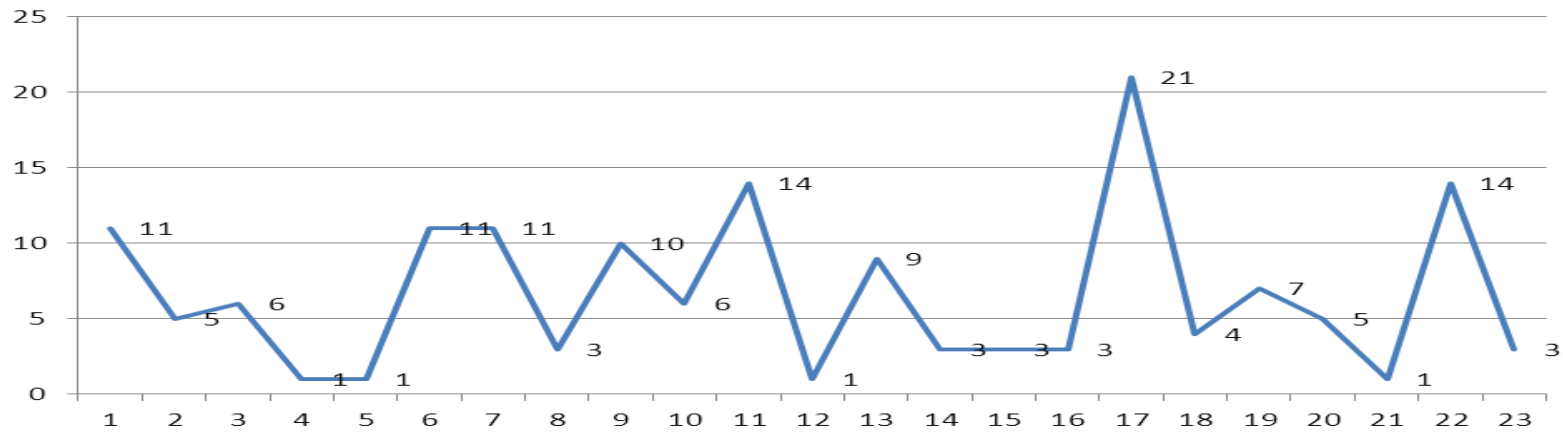
Count of Discharge disposition

Oct 2011-Jan 2012

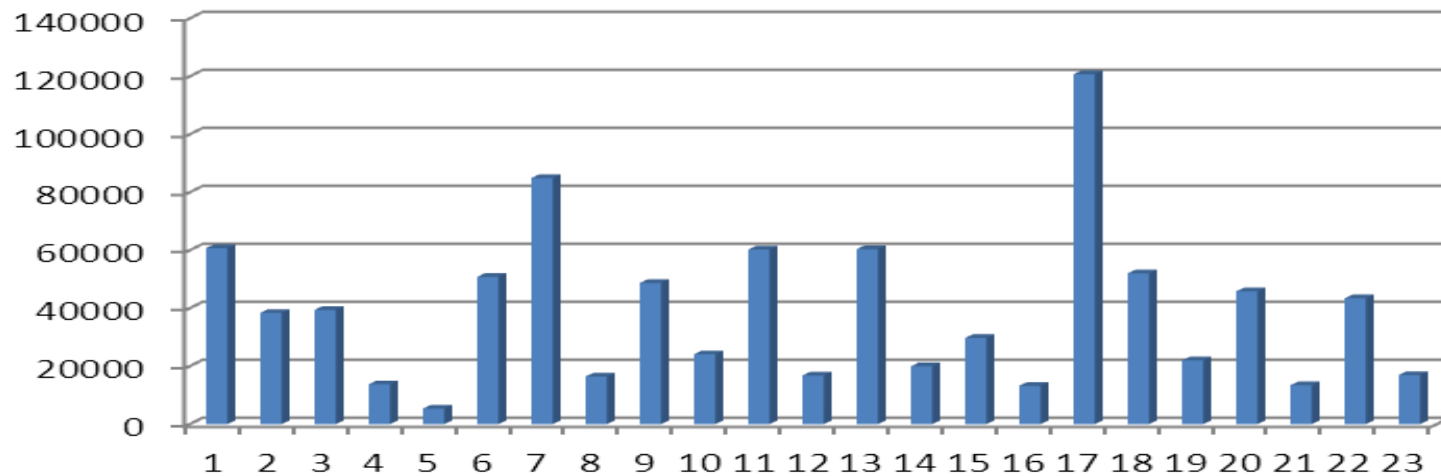


Discharge disposition ▼

LOS (AVG. LOS = 6.65)



Hospital charges (Avg.= 39,000)



Summary

- Why did we choose this project?

 - Delays noted in treatment

- Barriers to the project

 - Buy in

 - Overwhelmed ED

 - Real time documentation

 - Education

 - Communication between staff members

 - Vague patient history



Questions?

CDM, MTQIP Reports, etc.

Mark Hemmila, MD



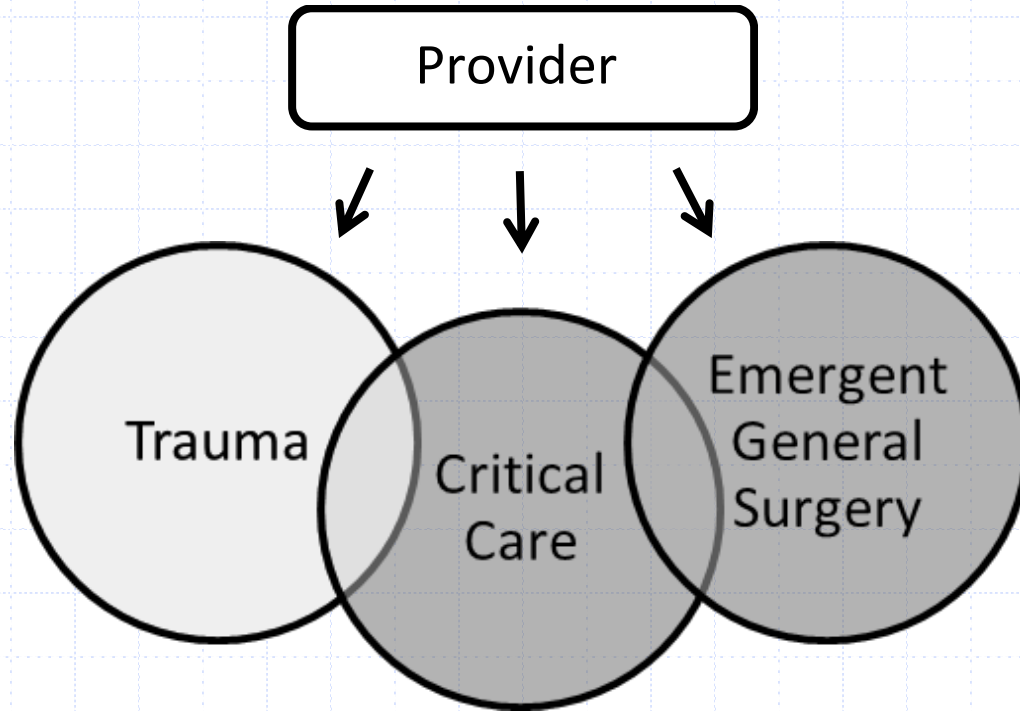
CDM

- ◆ 3 year contract (2013, 2014, 2015)
- ◆ 40 MTQIP custom data elements
- ◆ Mapping and transmittal of TQIP process measures
- ◆ Technical support for MTQIP tab
- ◆ Preprogramed report templates
- ◆ Will add future TQIP process measures

Costs

- ◆ Coordinating Center
 - \$5000 Create MTQIP tab
 - \$1500/yr Technical support
 - \$1000/yr/center Mapping and transmittal
 - \$65/hr Programming costs for additional process measures
- ◆ MTQIP Centers (5)
 - None

MTQIP and MSQC



MTQIP and MSQC

- ◆ Emergent General Surgery Collaboration
 - Feedback Reports
 - Best Practices
 - Dissemination of Information
- ◆ Acute Care Surgery Survey
- ◆ Advisory Committee
 - Direction

Case Counts

- ◆ MSQC Data
- ◆ 5 Years
- ◆ Not every case is sampled

<u>Case Type</u>	<u>Case Range</u>	<u># of Centers</u>
Appendectomy (8274)	1-25	16
	26-100	4
	101-200	9
	>200	20
Cholecystectomy (1220)	0-25	33
	26-100	12
	101-200	4
	>200	0
Colectomy (3013)	0-25	17
	26-100	18
	101-200	14
	>200	0
Age ≥ 65 (7449)	1-25	14
	26-100	7
	101-200	10
	>200	18

<u>Outcome</u>	<u>Appendectomy</u>	<u>Colectomy Emergent</u>	<u>Colectomy Elective</u>	<u>Elderly</u>
Superficial or Deep SSI	176 2%	283 9%	1092 8%	479 6%
Organ Space SSI	126 2%	151 5%	463 3%	214 3%
Sepsis or Septic Shock	130 2%	566 19%	947 7%	1069 13%
Major Complication	351 4%	1381 46%	2333 17%	2889 36%
Reoperation	145 2%	437 15%	881 6%	1077 13%
Total Hospital LOS	2	15	9	11
Postoperative LOS	2	12	8	9
Death within 30days	18 0.2%	511 17%	395 3%	1300 16%
Death	22 0.3%	577 19%	469 3%	1444 18%
Evidence of perforation	1589 19%			
Total Cases	8274	3013	13939	8049

Next Steps

- ◆ MSQC Redesign
- ◆ Feedback Reports
 - Appendectomy
 - Colectomy
 - Elderly
 - Aggregate
- ◆ Best Practices
 - Site Visits
 - Committee (Mike Englesbe, Greta Krapohl)

Reports

- ◆ 7/1/10 to 6/30/11
- ◆ Cohort selection
- ◆ Summaries
- ◆ Stratified mortality
- ◆ Risk adjusted mortality
- ◆ Risk adjusted complications
- ◆ Risk adjusted LOS

Cohort Formation

- ◆ Cohort 1
 - Blunt or penetrating
 - Age ≥ 18
 - ISS ≥ 5
 - Hospital LOS ≥ 1 or dead
- ◆ Cohort 2 (admit trauma service)
- ◆ Cohort 3 (blunt multi-system)
- ◆ Cohort 4 (blunt single-system)

Cohort Formation

◆ Complications

- Cohort 2 w/o DOA's
- Group 1 (All)
- Group 2 (Subset)
- Specific

◆ Length of Stay

- Hospital, ICU, Mechanical Ventilator Days
- Cohort 2
- Exclude deaths for Hospital LOS

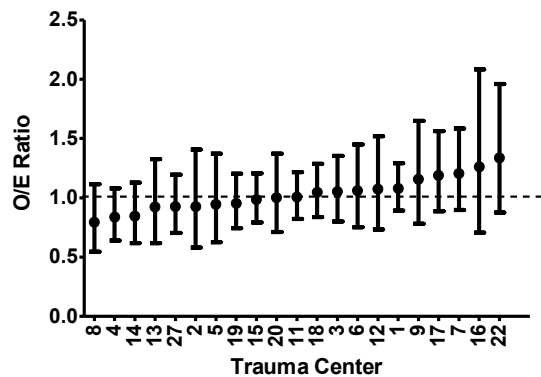
Risk Adjustment

- ◆ Univariate
- ◆ Imputed BP, Pulse, mGCS if missing
- ◆ Step-wise Multivariate Logistic Regression
 - Identify predictor variables, $p \leq 0.2$
- ◆ Logit Equation
- ◆ Expected Mortality
- ◆ O/E Ratios
 - 90% Confidence Interval, Mortality
 - 95% Confidence Interval, Complications
 - 95% Confidence Interval, LOS

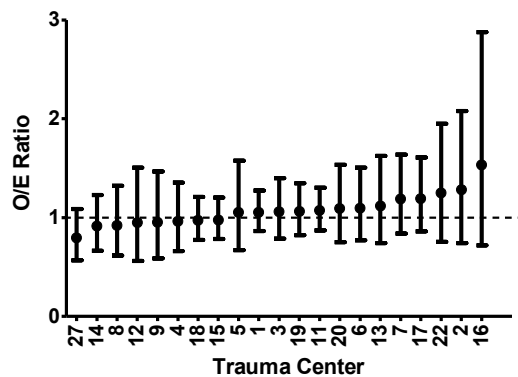
Mortality

- ◆ Cohort 1 (Overall Mortality - All Admissions)
- ◆ Cohort 1 (w/o DOA's)
- ◆ Cohort 2 (Admit to Trauma Service)
- ◆ Cohort 2 (w/o DOA's)
- ◆ Cohort 3 (Blunt Multi-System Mortality)
 - Trauma type classified as blunt with injuries of AIS ≥ 3 in at least two of the following AIS body regions: head/neck, face, chest, abdomen, extremities or external.
- ◆ Cohort 4 (Blunt Single-System Mortality)
 - Trauma type classified as blunt with injuries of AIS ≥ 3 limited to only one AIS body region with all other body regions having a maximum AIS ≤ 2 .
- ◆ Cohort 2 (w/o DOA's) Dead or Hospice

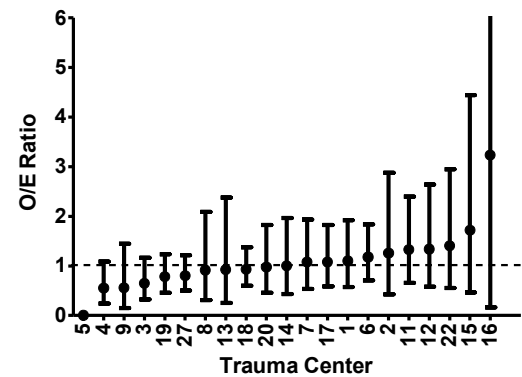
Mortality (Cohort 1)



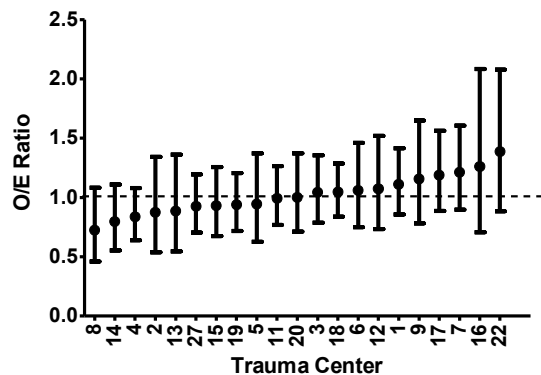
Mortality (Cohort 2)



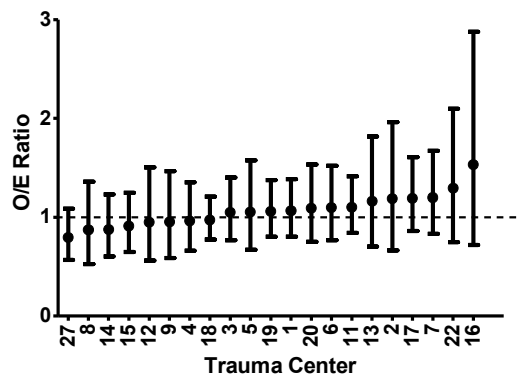
Mortality (Cohort 3 - Blunt Multi)



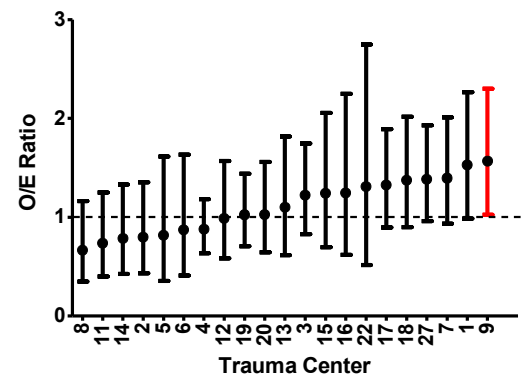
Mortality (Cohort 1 w/o DOA's)



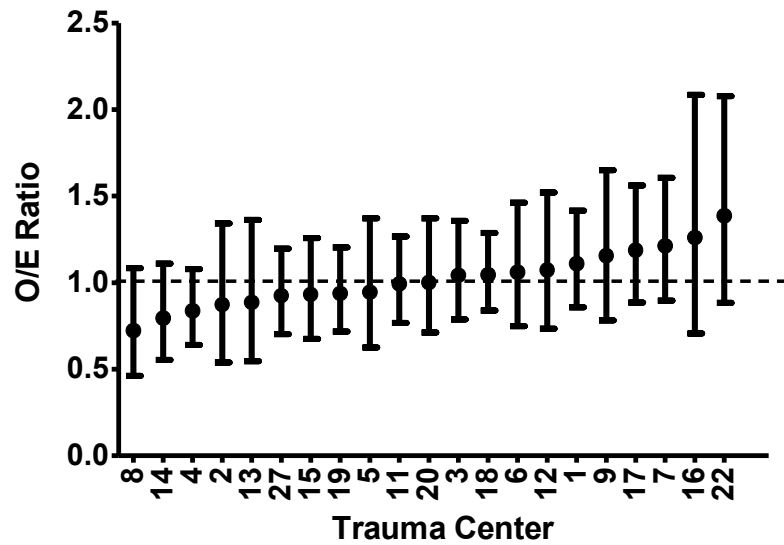
Mortality (Cohort 2 w/o DOA's)



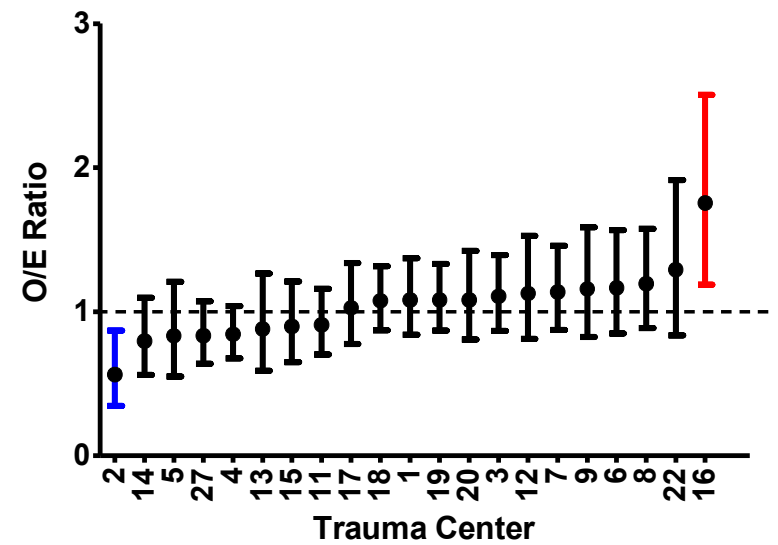
Mortality (Cohort 4 - Blunt Single)



Mortality (Cohort 1 w/o DOA's)



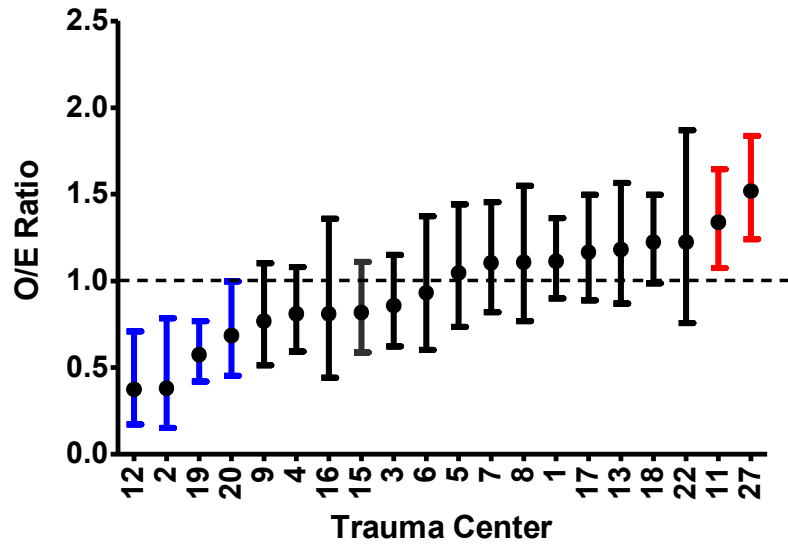
Mortality or Hospice (Cohort 1 w/o DOA's)



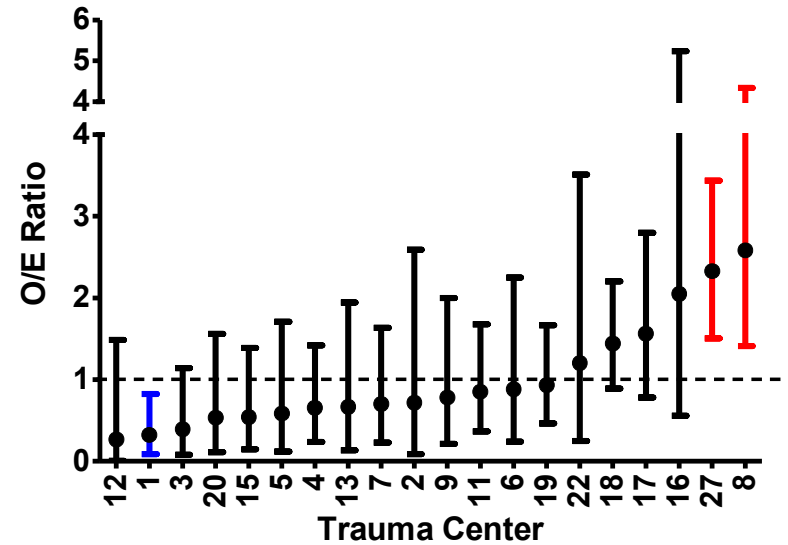
Complications

- ◆ Cohort 2 w/o DOA's
- ◆ Group 1
 - All complications
- ◆ Group 2
 - Organ space SSI, Wound disruption, ARDS, Pneumonia, PE, Acute renal failure, MI, DVT LE , DVT UE, Systemic sepsis.
- ◆ Specific
 - Cardiac/Stroke, Pneumonia, DVT/PE, UTI, Renal Failure, Sepsis

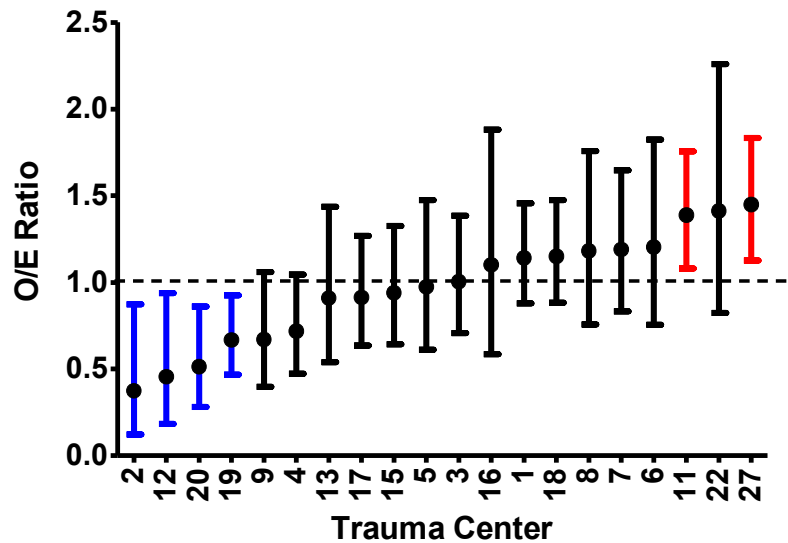
Complications (Group 1)



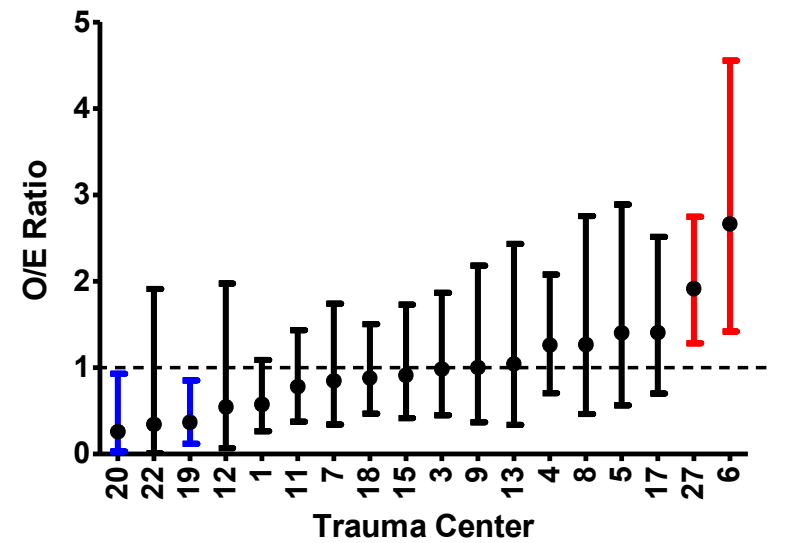
Cardiac/Stroke



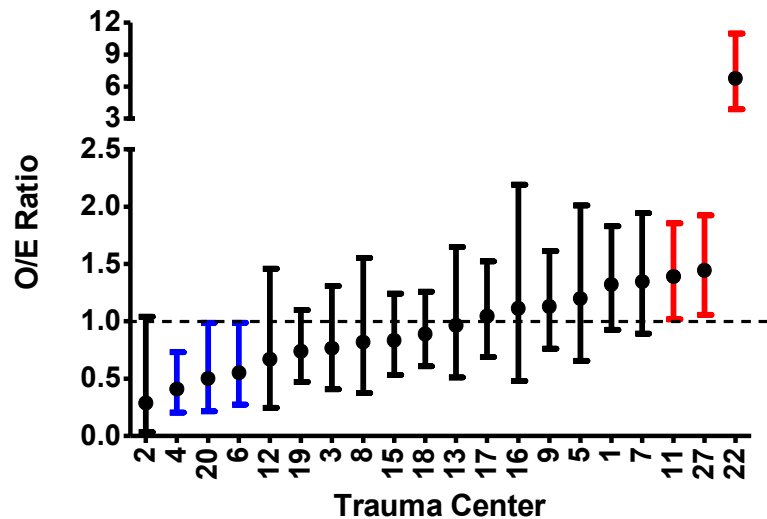
Complications (Group 2)



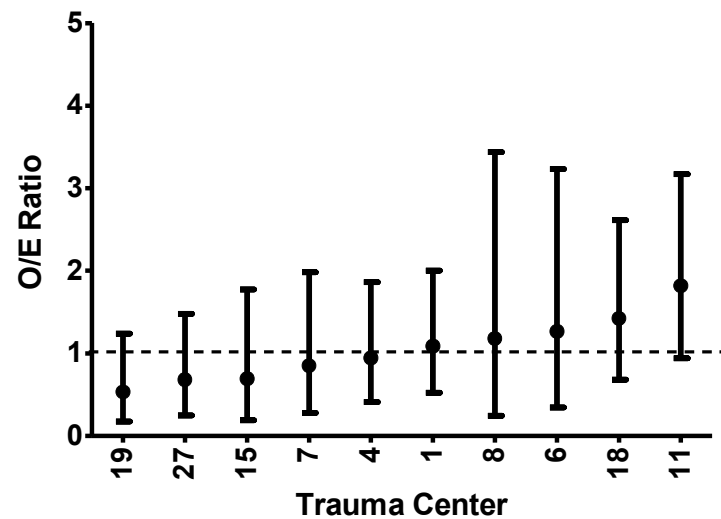
DVT/Pulmonary Embolus



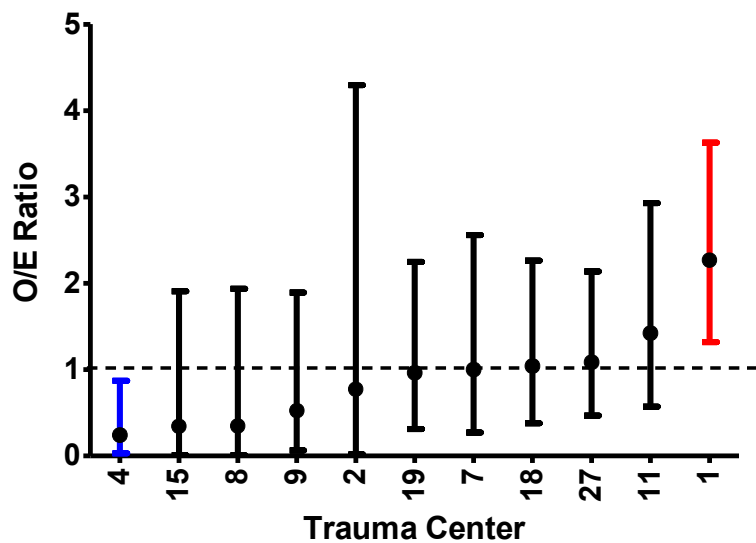
Pneumonia



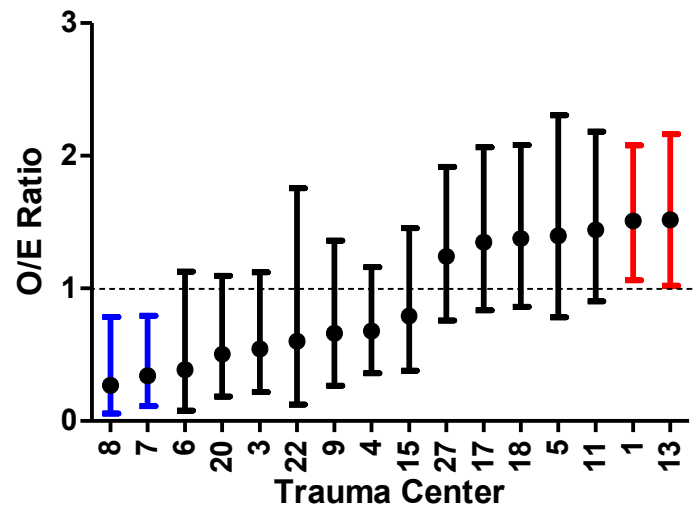
Sepsis



Renal Failure



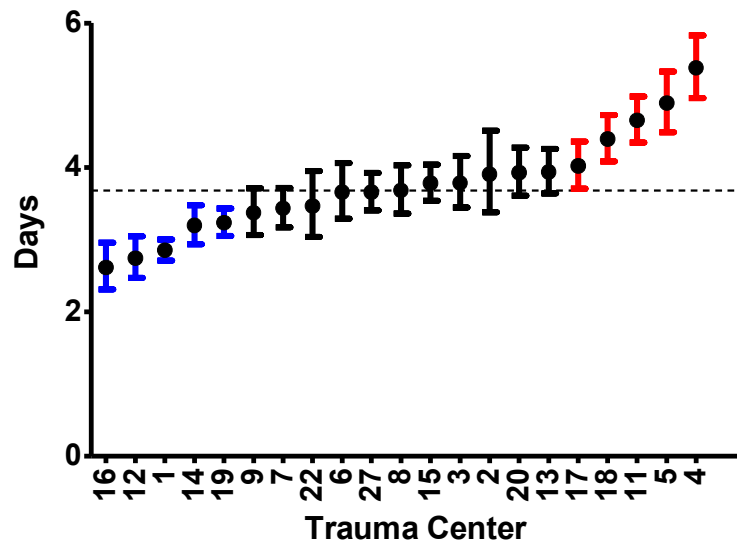
UTI



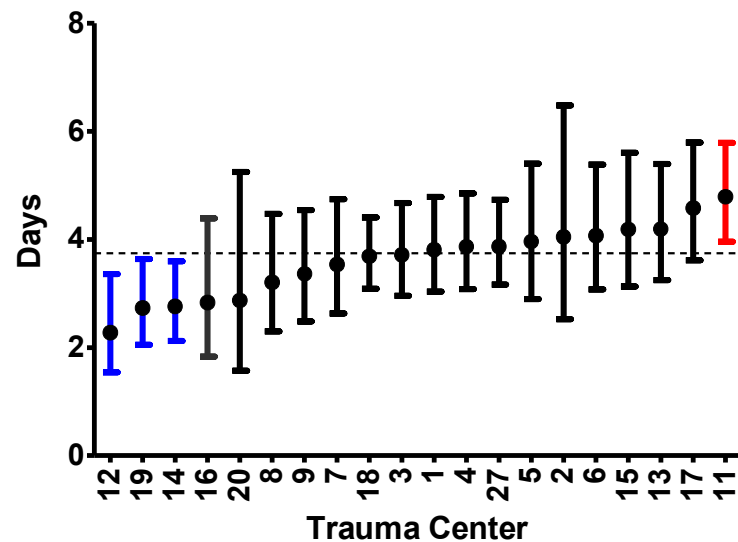
Length of Stay

- ◆ Cohort 2
- ◆ Risk Adjusted Rate
- ◆ Natural log transformed, linear regression
- ◆ Adjusted for age, ISS, mGCS, comorbidities, etc.
- ◆ Hospital LOS, ICU LOS, MV Days
- ◆ Exclude deaths for Hospital LOS
- ◆ 95% CI

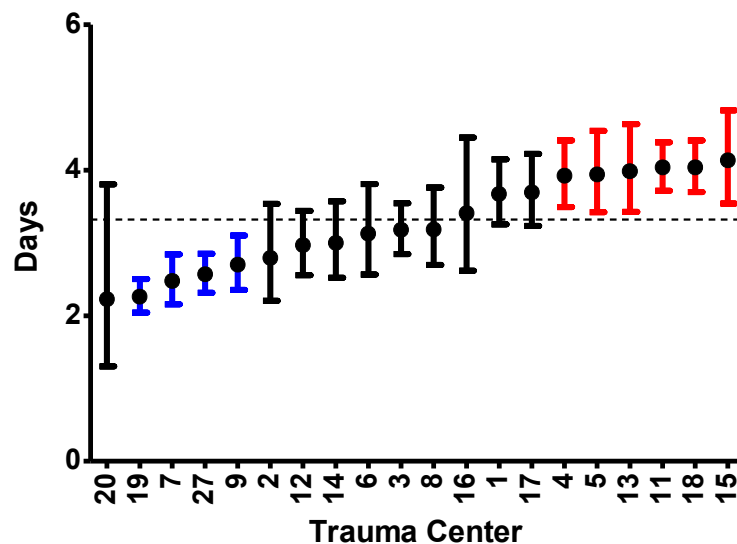
Adjusted Hospital LOS



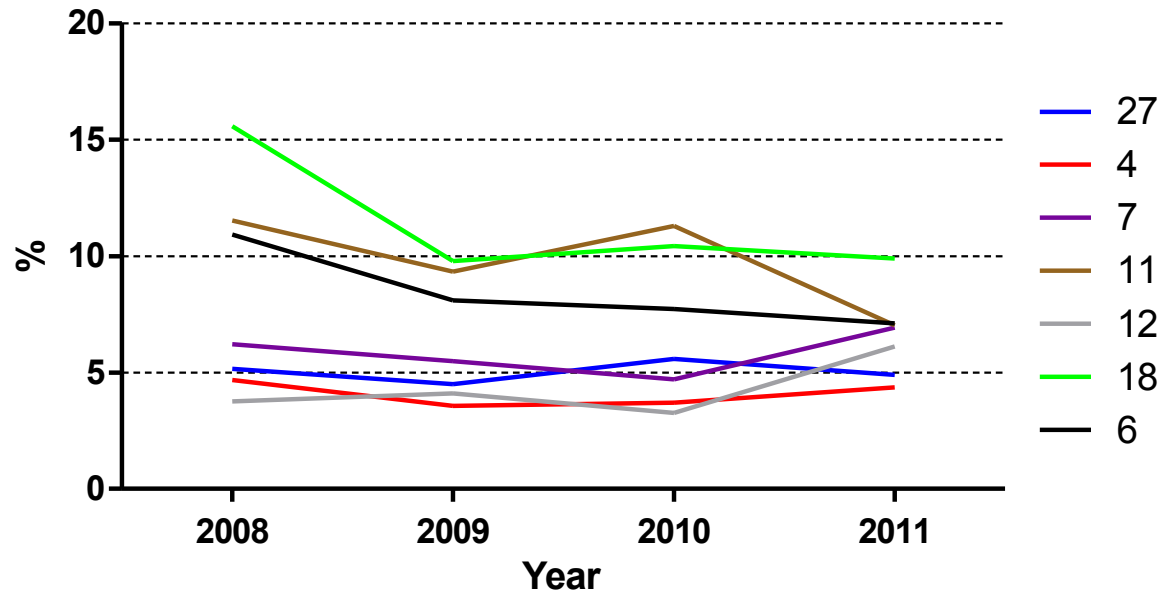
Adjusted Ventilator Days



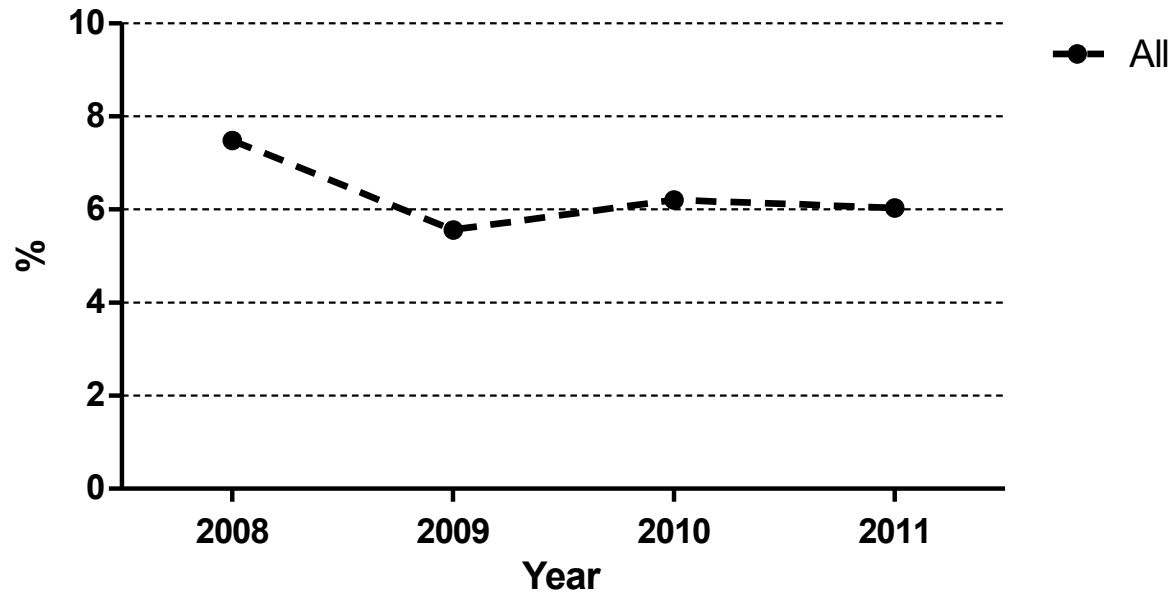
Adjusted ICU LOS



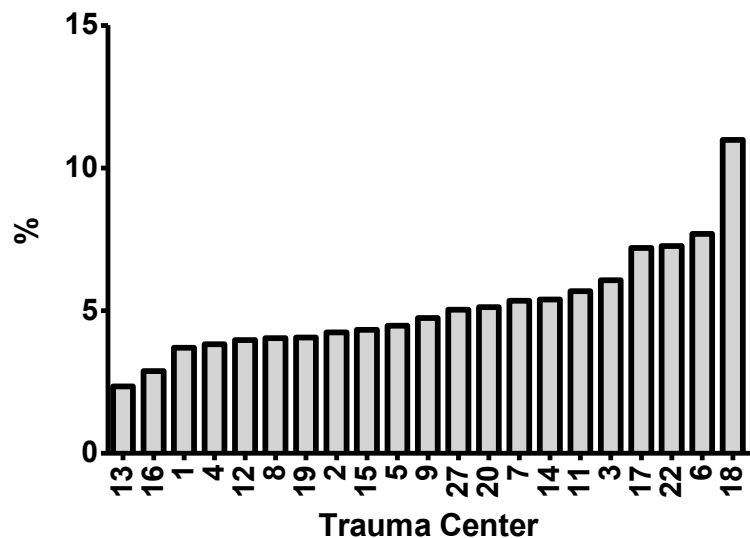
Mortality



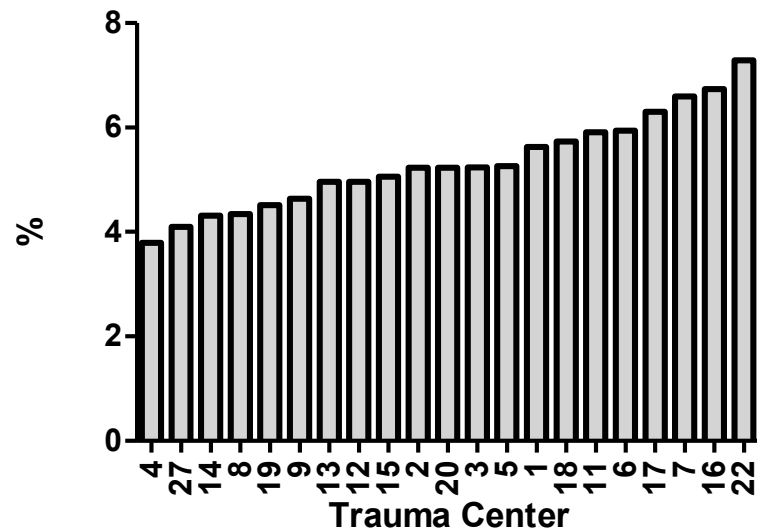
Mortality



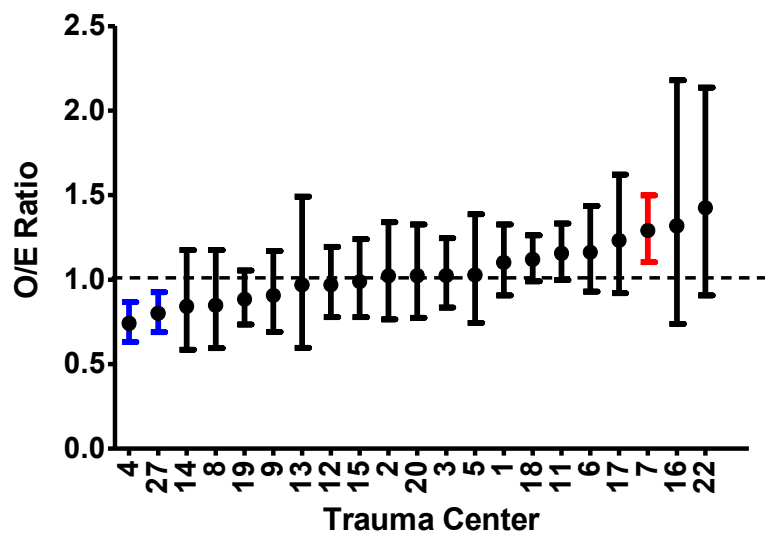
Crude Mortality



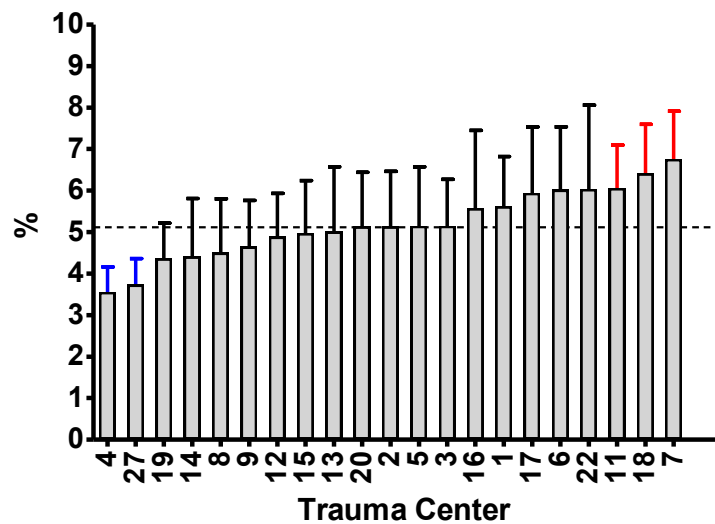
Adjusted Mortality



Mortality O/E



Risk and Reliability Adjusted Mortality



Questions



Call for Data, Feedback

- ◆ Submit data from 11/1/10 to 10/31/11
 - Due June 1, 2012
 - 23 centers
- ◆ Next call
 - Data from 3/1/11 to 2/29/12
 - Due October 1, 2012
- ◆ Evaluations
 - Meeting ideas, Reports, Web-site

Future Meetings

- ◆ Tuesday June 5, 2012
 - Location: Ann Arbor
 - Registrars
- ◆ Tuesday October 16, 2012
 - Location: Ann Arbor
- ◆ Tuesday February 12, 2013
 - Location: Ann Arbor