The Michigan Trauma Quality Improvement Program

Ann Arbor, MI
October 11, 2011

Agenda

- General Announcements (Hemmila)
- Sepsis (Purtill)
- Length of Stay (Kepros)
- Panel and Collaborative Discussion
- Lunch
- Projects, Data/Publications Policy, TQIP (Mikhail)
- Validation, Process Measures, NTDS (Jakubus)
- DI, On-line Reports, Reports, (Hemmila)

Information

- Current centers
  - 4 recent, 18 total
- New centers (January 1)
  - Mt. Clemons
  - Oakwood Dearborn
  - Oakwood Southshore
  - Saint Mary's Health Care - Grand Rapids
  - St. Mary's of Michigan - Saginaw

Information

- ACS-TQIP Enrollment
  - Applications for 2012
  - www.facs.org/trauma/ntdb/tqip
- ACS-TQIP Meeting
  - Chicago
  - November 13-15, 2011

NTDS/TQIP

- Process Measures
  - Fracture fixation
  - Hemorrhage control
  - Angiography
- ICD-10
  - October 2013
- AIS 2005
  - Injury coding system
  - Recommend hand coding
  - Michigan Trauma Coalition

Future Meetings

- February 14, 2012
  - Location: Ann Arbor
- May 16, 2012
  - Location: Traverse City
  - Registrar split
- October 16, 2011
  - Location: Ann Arbor

"Sepsis Resuscitation: Keeping Up the Pace"

Mary-Anne Purtill, MD

"A Disciplined Approach to Implementation of Evidence-Based Practices Decreases ICU and Hospital Length of Stay in Traumatically Injured Patients"

John Kepros, MD

Panelists

- John Kepros, MD
- Sujal Patel, MD
- Mary-Anne Purtill, MD
- Brian Shapiro, MD
- Jim Wagner, MD

Lunch

MTQIP Site Specific QI Projects

Judy Mikhail, BSN, MSN, MBA

MTQIP
Site Specific PI Projects

- Sharing and Learning From Each Other

Site Specific PI Projects

- Your choice of topic
- Data collection on going
- Submit monthly data quarterly
  - Oct,Nov,Dec 2011 data
  - Due by Apr 1,2012 (3 month lag)
- Share success and barriers at MTQIP meetings

Site Specific PI Projects

- Topics
  - Anticoagulant Reversal
  - Complications
  - Length of Stay
  - Care Management Issues

Anticoagulant Reversal

Site	Measure	Baseline	Goal
Beaumont	Coumadin Time to reversal product administration (avg)	120 min	< 100 min
Borgess	Coumadin Time to initial labs (avg) Time to CT Time to reversal product Time to INR<1.3	15 min ≤ 35 min ≤ 115 min > 200 min	< 15 min ≤ 25 min < 95 min (85%) < 180 min (85%)

Anticoagulant Reversal

Site	Measure	Baseline	Goal
Botsford	Coumadin Reversal (avg) Time to CT Time to reversal agent	100 min	< 45 min
Munson	Coumadin & Antiplatelet (mdn) Time door to CT read Time CT read to PLT order Time order to PLT admin Total time (door to PLT)	 33 min 60 min 45 min 80 min	 ≤ 20 min ≤ 30 min ≤ 30 min ≤ 80 min
Spectrum	Coumadin (avg) Time CT to FFP admin	> 30 min	< 30 min
Sparrow	Bebulin Protocol [Factor IX](avg) Time to INR correction <1.5	150 min	120 min (90%)

Complications

Site	Measure	Baseline	Goal
POH	DVT's	2.9%	<2.0%
Bronson	Pneumonia	12.2%	<6.6%
Oakwood SouthShore	Pneumonia	5.2%	25% reduction
St. Joseph	Aspiration Pneumonia	1%	50% reduction
Hurley	UTI	2.3%	20% reduction
U of M	UTI	6.8%	25% reduction

Length of Stay

Site	Measure	Baseline	Goal
Covenant	ED LOS for ICU pts (avg)	4.20 hrs	↓ 30 min
Oakwood Dearborn	ED LOS for ICU pts(mdn) ED LOS for H-Activations	4.25 hrs 3.18	< 3 hrs < 2 hrs
Mount Clemens	ED LOS for ICU pts (avg)	4.2 hrs	< 3 hrs
Henry Ford	Hospital LOS (avg)	> 5 days	< 5 days

Length of Stay

Site	ED LOS	Baseline	Goal
Detroit Receiving	ICU within 2 hrs	22.5%	90%
	ICU within 4 hrs	43.0%	
	Burn ICU within 2 hrs	52.9%	
	Burn ICU within 4 hrs	79.4%	
	Burn floor within 4 hrs	44.7%	
	Burn floor within 8 hrs	59.0%	
	Floor within 4 hrs	25.6%	
	Floor within 8 hrs	47.7%	
	Obs within 4 hrs	21.7%	
	Obs within 8 hrs	38.4%	
	All Acute care within 4 hrs	23.7%	
	All Acute care within 8 hrs	36.6%	

Care Management Issues

Site	Measure	Baseline	Goal
Genesys	EMS Run Sheets on Chart	<50%	90%
Beaumont	Time to complete oral / parenteral nutrition	5 days	3 days
St. Mary's	Non Surgeon Admits	16.5%	<5%
Sinai Grace	Massive Transfusion Ratio Compliance 6:4:1	40%	75%
St. John	Massive Transfusion Ratios	Pending	Pending

MTQIP Publication Policy

- Proactive
- Transparent
- Inclusive

MTQIP Publications Policy

- Sites can use their own individual institutional data as they wish

- MTQIP reports and comparative data:
  a. Intended for internal QI efforts only
  b. Not for marketing purposes
  c. Not to be published without written permission

Publications Committee Purpose

- Responsible for setting policy regarding publications on MTQIP data:
  a. Authorship
  b. Conflict of Interest
  c. Processes for proposing & approving research questions

Publications Committee Membership

- MTQIP Program Manager, Chair
- 2 participating site members
- 1 BCBSM member: Dr.Share /designee

- Forward nominations for membership consideration to the Program Director

Publication Committee Work

- Review submitted concepts for abstracts and manuscripts
- Ensure consistency with MTQIP mission
- Manage any potential conflicts
- Committee will recommend proposed abstracts/manuscripts for approval from the Program Director

Proposal Submissions

- Brief 1-2 paragraph proposal
- Names of the participants
- Working hypothesis
- Inclusion and exclusion criteria
- Major outcomes to be studied
- Basic outline of analysis to be performed

- Forward proposals to MTQIP Program Manager

Timing

- Submit the proposal before data analysis and manuscript preparation
- Following acceptance of the proposal, analysis will be performed by the MTQIP coordinating center
- Allow up to 6 months for this to occur

Publication Committee

- Upon completion of research project
- Committee to review final abstract / publication prior to submission
- The committee and Program Director will reply with approval or recommendations for revision
- 14 day turn around

Publications Committee
Authorship Guidelines

- Proposed authorship represents significant intellectual contributions to the study
- Appropriate recognition for MTQIP development by the Program Director, Dr. Share, and others
- Follow authorship guidelines:
  - International Committee of Medical Journal Editors

TQIP Annual Conference!

Nov 14 & 15, 2011 in Chicago

- Trauma Director
- Program Manager
- Registrar

Validation Results Process Measures NTDS Update 2012

Jill Jakubus, PA-C

Chart Selection

- ISS < 16 and mortality
- ISS > 24 and no complications and hospital days > 1
- Length of stay > 14 days and no complication or mortality
- Age > 64 and no co-morbidities.
- Mechanical ventilator days > 7 and no pneumonia
- Motor GCS = 1 and no complications and hospital days > 1

Overview

- Time frame: 3/30/10 - 4/19/11
- Visits: 10
- Centers: 8
- Cases: 97
- Variables per case: 95
- Total variables assessed: 9215
- Overall error rate 6.8%

Types of Disagreement

Type 0 – No disagreement	8584
Type 1 – Site Visit Validator identified variable, Registrar did not	366
Type 2 – Site Visit Validator and Registrar identified variable but disagreed with the answer	201
Type 3 – Registrar identified variable, Site Visit Validator did not	64

Breakdown by Category Disagreement

Category	# of Disagreements	# of Variables	Disagreement Rate (%)
Trauma Profile	3	291	1.0
Mechanism Profile	16	291	5.5
Pre-Hospital /ED	138	1940	7.1
Injury Profile	73	582	12.5
Comorbidities	93	2037	4.6
Operation Data	49	194	25.3
Blood Data	111	776	14.3
Complications	60	2037	2.9
Discharge Data	88	1067	8.2

Highest Error Breakdown

Variable	Rate %	Type 1	Type 2	Type 3
Operation	36.1	35	0	0
Intubation Location	35.1	26	8	0
Units PRBC Total	28.9	21	6	1
ICU Days	22.7	13	8	1
Units PRBC 0-24 hrs	22.7	14	7	1
GCS Assess Qualifier	21.6	12	9	0
Max External AIS	21.6	15	3	3
Hematocrit	20.6	12	8	0
HTN requiring Rx	19.6	11	0	8
Units FFP Total	17.5	10	5	2

Highest Error Breakdown

Variable	Rate %	Type 1	Type 2	Type 3
Operation	36.1	35	0	0
Intubation Location	35.1	26	8	0
Units PRBC Total	28.9	21	6	1
ICU Days	22.7	13	8	1
Units PRBC 0-24 hrs	22.7	14	7	1
GCS Assess Qualifier	21.6	12	9	0
Max External AIS	21.6	15	3	3
Hematocrit	20.6	12	8	0
HTN requiring Rx	19.6	11	0	8
Units FFP Total	17.5	10	5	2

Highest Error Excluding Custom Data Points

Variable	Rate %	Type 1	Type 2	Type 3
ICU Days	22.7	13	8	1
GCS Assess Qualifier	21.6	12	9	0
Max External AIS	21.6	15	3	3
Hematocrit	20.6	12	8	0
HTN requiring Rx	19.6	11	0	8
Max Head/Neck AIS	14.4	1	12	1
Discharge Service	14.4	10	4	0
Max Extremity AIS	13.4	5	7	1
Disposition	13.4	1	12	0
First ED Temperature	12.4	0	11	1

Complication Error Breakdown

Variable	Rate %	Type 1	Type 2	Type 3
Pneumonia	9.3	9	0	0
Decubitus Ulcer	6.2	6	0	0
Unplanned Intubation	7.2	5	0	2
Organ/Space SSI	5.2	5	0	0
UTI	5.2	3	0	2

Chart Selection Focus Variables

- ISS > 24 and no complications and hospital days > 1
- Length of stay > 14 days and no complication or mortality
- Mechanical ventilator days > 7 and no pneumonia
- Motor GCS = 1 and no complications and hospital days > 1

Overview

- Site visits: 2
- Centers visited: 2
- Cases: 20
- Variables per case: 13
- Total variables assessed: 260
- Overall error rate 13.8%

Breakdown by Category Disagreement

Category	# of Disagreements	# of Variables	Disagreement Rate (%)
Center Specific	2	60	3.3
Low Sample Size	4	40	10.0
Process Measures	7	100	7.0
Multicenter Analysis	23	60	38.3

Types of Disagreement

Type 0 – No disagreement	224
Type 1 – Site Visit Validator identified variable, Registrar did not	21
Type 2 – Site Visit Validator and Registrar identified variable but disagreed with the answer	13
Type 3 – Registrar identified variable, Site Visit Validator did not	2

Summary of Findings

Center Specific	# Disagreements	%
Sepsis	1	5.0%
UTI	1	5.0%
Acute Renal Failure	0	0.0%
Low Sample Size		
Pneumonia	4	20.0%
Pulmonary Embolism	0	0.0%
Process Measures		
OR	5	25.0%
ICP Monitor	1	5.0%
IVC Filter	1	5.0%
DVT LE	0	0.0%
DVT UE	0	0.0%
Multicenter Analysis		
Intubation Location	13	65.0%
Ventilator Days	6	30.0%
ICU Days	4	20.0%

Summary of Findings

Center Specific	# Disagreements	%
Sepsis	1	5.0%
UTI	1	5.0%
Acute Renal Failure	0	0.0%
Low Sample Size		
Pneumonia	4	20.0%
Pulmonary Embolism	0	0.0%
Process Measures		
OR	5	25.0%
ICP Monitor	1	5.0%
IVC Filter	1	5.0%
DVT LE	0	0.0%
DVT UE	0	0.0%
Multicenter Analysis		
Intubation Location	13	65.0%
Ventilator Days	6	30.0%
ICU Days	4	20.0%

Process Measures

Traumatic Brain Injury
Venous Thromboembolism Prophylaxis

TBI Criteria

- At least one injury in AIS head region

AND

- Best post resuscitation GCS within the first 24 hours after ED/hospital arrival $\leq$ 8 **OR** best post resuscitation motor score $\leq$ 3 within the first 24 hrs of ED/hospital arrival

Highest GCS Total

Definition: Highest total GCS within 24 hours of ED/hospital arrival.

Criteria: Injury in AIS head region AND Best total GCS $\leq$ 8 or best motor GCS $\leq$ 3

GCS Motor Component of Highest GCS Total

Definition: Highest motor GCS (of the motor component of Highest GCS Total) within 24 hours of ED/hospital arrival.

Criteria: Injury in AIS head region AND Best total GCS $\leq$ 8 or best motor GCS $\leq$ 3

GCS Assessment Qualifier Component of Highest GCS Total

Definition: Documentation of factors potentially affecting the highest GCS within 24 hours of ED/hospital arrival.

1. Patient Chemically Sedated
2. Obstruction to the Patient's eye
3. Patient intubated
4. Valid GCS: patient was not sedated, not intubated, and did not have obstruction to the eye

Criteria: Injury in AIS head region AND Best total GCS $\leq$ 8 or best motor GCS $\leq$ 3

Cerebral Monitor

Definition: Enter the first (TBIMON1), and if applicable second (TBIMON2), and third (TBIMON3) cerebral monitors placed.

1. Intraventricular monitor/catheter (e.g. ventriculostomy, external ventricular drain)
2. Intraparenchymal pressure monitor (e.g. Camino bolt, subarachnoid bolt, intraparenchymal catheter)
3. Parenchymal oxygen monitor (e.g. Licox monitor)
4. Jugular venous bulb

Criteria: Injury in AIS head region AND Best total GCS $\leq$ 8 or best motor GCS $\leq$ 3

Cerebral Monitor Date

Definition: Date of first (MON1DATE), and if applicable, second (MON2DATE) and third (MON3DATE) cerebral monitors placed.

- mm/dd/yyyy

Criteria: Injury in AIS head region AND Best total GCS ≤ 8 or best motor GCS ≤ 3

Cerebral Monitor Time

Definition: Time of first (MON1TIME), and if applicable, second (MON2TIME) and third (MON3TIME) cerebral monitors placed.

- HH:MM (military time)

Criteria: Injury in AIS head region AND Best total GCS ≤ 8 or best motor GCS ≤ 3

Reason Cerebral Monitor Withheld

Definition: Reason for withholding cerebral monitor placement.

0. Not Known/Not Recorded
1. Decision to withhold life sustaining measures within 8 hours of ED arrival
2. Death prior to correction of coagulopathy
3. Expected to improve within 8 hours due to effects of alcohol and/or drugs
4. Operative evacuation with improvement post-op
5. No ICP because of coagulopathy

Criteria: Injury in AIS head region AND Best total GCS $\leq$ 8 or best motor GCS $\leq$ 3

Beta Blocker Treatment

Definition: Patients who receive scheduled administration of parenteral or oral beta blocker medication within 48 hours of admission time to the TQIP institution.

Criteria: Injury in AIS head region AND Best total GCS ≤ 8 or best motor GCS ≤ 3

VTE Prophylaxis Criteria

- All MTQIP patients

VTE Prophylaxis Type

Definition: Type of first prophylactic agent administered.

1. Heparin
2. Lovenox (enoxaparin)
3. Fragmin (dalteparin)
4. Other low molecular weight heparins (including but not limited to tinzaparin (Innohep, Logiparin); nadroparin (Fraxiparine)
5. None

Criteria: All MTQIP patients

VTE Prophylaxis Date

Definition: Refers to date upon which patient first received prophylactic agent indicated in VTE Prophylaxis Type field. Choose NA if never received prophylaxis.

Criteria: All MTQIP patients

VTE Prophylaxis Time

Definition: Refers to time upon which patient first received prophylactic agent indicated in VTE Type field. Choose NA if never received prophylaxis.

Criteria: All MTQIP patients

NTDS Update 2012

Co-Morbid NTDS 2012 Variable Name Changes

- 3 Ascites within 30 days
  Addition of 30 day interval requirement
- 5 Currently receiving chemotherapy for cancer
  Previously chemotherapy for cancer within 30 days
- 9 Chronic renal failure
  Previously currently requiring or on dialysis
- 13 Advanced directive limiting care
  Previously do not resuscitate (DNR) status

Co-Morbid NTDS 2012 Retired Variables

- 20 Impaired sensorium

Co-Morbid NTDS 2012 New Variables

- 26 Dementia

  With particular attention to senile or vascular dementia (eg Alzheimer's).

- 27 Major psychiatric illness

  Defined as documentation of the presence of pre-injury major depressive disorder, bipolar disorder, schizophrenia, anxiety / panic disorder, borderline or antisocial personality disorder, and / or adjustment disorder / post-traumatic stress disorder.

- 28 Drug abuse or dependence

  With particular attention to opioid, sedative, amphetamine, cocaine, diazepam, alprazolam, or lorazepam dependence (excludes ADD / ADHD or chronic pain with medication use asprescribed).

- 29 Pre-hospital cardiac arrest with CPR

  A sudden, abrupt loss of cardiac function which occurs outside of the hospital, prior to admission at the center in which the registry is maintained, that results in loss of consciousness requiring the initiation of any component of basic and/or advanced cardiac life support by a health care provider.

Co-Morbid NTDS 2012 Definition Changes

- 2 Alcoholism
  - 2012: Evidence of chronic use, such as withdrawal episodes. Exclude isolated elevated blood alcohol level in absence of history of abuse.
  - 2011: To be determined based upon the brief screening tool used at your institution.
- 8 Current smoker
  - 2012: every day or some days
  - 2011: in the year prior to admission
- 18 History of PVD
  - 2012: excludes amputation commentary
  - 2011: includes amputation commentary
- 22 Obesity
  - 2012: BMI $\geq$ 30
  - 2011: BMI $\geq$ 40

Co-Morbid NTDS 2012 MTQIP Reconciliation

- 7 Congestive heart failure
  - Addition of symptom manifestations
    - 1. Abnormal limitation in exercise tolerance due to dyspnea or fatigue
    - 2. Orthopnea (dyspnea on lying supine)
    - 3. Paroxysmal nocturnal dyspnea (awakening from sleep with dyspnea)
    - 4. Increased jugular venous pressure
    - 5. Pulmonary rales on physical examination
    - 6. Cardiomegaly
    - 7. Pulmonary vascular engorgement
- 8 Current smoker
  - Removed the one year history of use requirement
- 14 Esophageal varices
  - Removed requirement for identification prior to injury
- 24 Steroid use
  - Deleted exclusion of patients on short course steroids

Hospital Complications NTDS 2012 Variable Name Changes

- 4 Acute kidney injury
  Previously acute renal failure
- 5 Acute lung injury/Acute respiratory distress syndrome
  Previously ARDS

Hospital Complications NTDS 2012 Retired Variables

- None

Hospital Complications NTDS 2012 New Variables

- None

Hospital Complications NTDS 2012 Definition Changes

- 4 Acute kidney injury
  - 2012: If the patient or family refuses treatment (e.g., dialysis), the condition is still considered to be present if a combination of oliguria and creatinine are present.
    - GFR criteria: Increase creatinine x3 or GFR decrease > 75%
    - Urine output criteria: UO < 0.3ml/kg/h x 24 hr or Anuria x 12 hrs
  - 2011: If the patient refuses treatment (e.g., dialysis), the condition is still considered present

Hospital Complications NTDS 2012 Definition Changes

- 5 ALI/ARDS
  - 2012: a PaO2 / FiO2 ratio of < 300 mmHg, bilateral fluffy infiltrates seen on a frontal chest radiograph, and an absence of clearly demonstrable volume overload (as signified by pulmonary wedge pressure < 18 mmHg, if measured, or other similar surrogates such as echocardiography which do not demonstrate analogous findings).
  - 2011: PaO2/FiO2 ≤ 200, decreased compliance, and diffuse bilateral pulmonary infiltrates without associated clinical evidence of CHF. The process must persist beyond 36 hours and require mechanical ventilation.

Hospital Complications NTDS 2012 Definition Changes

- 13 Drug or alcohol withdrawal syndrome
  - 2012: habitually using certain drugs (e.g. narcotics, benzodiazepine)
  - 2011: Drug type not specified
- 15 Extremity compartment syndrome
  - 2012: Record as a complication if it is originally missed, leading to late recognition, a need for late intervention, and has threatened limb viability.
  - 2011: Timing of recognition not specified

Hospital Complications NTDS 2012 Definition Changes

- 22 Stroke/CVA

  A focal or global neurological deficit of rapid onset and NOT present on admission. The patient must have at least one of the following symptoms:

  1. Change in level of consciousness,
  2. Hemiplegia,
  3. Hemiparesis,
  4. Numbness or sensory loss affecting one side of the body,
  5. Dysphasia or aphasia,
  6. Hemianopia
  7. Amaurosis fugax,
  8. Or other neurological signs or symptoms consistent with stroke

  AND

  Duration of neurological deficit ≥24 h
  OR duration of deficit <24 h, if neuroimaging (MR, CT, or cerebral angiography) documents a new hemorrhage or infarct consistent with stroke, or therapeutic intervention(s) were performed or stroke, or the neurological deficit results in death

  AND

  No other readily identifiable nonstroke cause, e.g., progression of existing traumatic brain injury, seizure, tumor, metabolic or pharmacologic etiologies, is identified

  AND

  Diagnosis is confirmed by neurology or neurosurgical specialist or neuroimaging procedure (MR, CT, angiography) or lumbar puncture (CSF demonstrating intracranial hemorrhage that was not present on admission). Although the neurologic deficit must not present on admission, risk factors predisposing to stroke (e.g., blunt cerebrovascular injury, dysrhythmia) may be present on admission

Hospital Complications NTDS 2012 Definition Changes

- 25 Unplanned intubation
  - 2012: In patients who were intubated unplanned intubation occurs if they require reintubation > 24 hours after extubation
  - 2011: In patients who were intubated unplanned intubation occurs if they require reintubation after being extubated

Hospital Complications NTDS 2012 Definition Changes

- 27 UTI Option 2

OR at least two of the following signs or symptoms with no other recognized cause:

1. Fever≥38 C
2. WBC> 100,000 or < 3000 per cubic millimeter
3. Urgency
4. Frequency
5. Dysuria
6. Suprapubic tenderness

AND at least one of the following:

1. Positive dipstick for leukocyte esterase and/or nitrate
2. Pyuria (urine specimen with >10 WBC/mm 3 or >3 WBC/high power field of unspun urine)
3. Organisms seen on Gram stain of unspun urine
4. At least two urine cultures with repeated isolation of the same uropathogen (gram-negative bacteria or S. saprophyticus) with ≥10 2 colonies/ml in nonvoided specimens
5. ≤10 5 colonies/ml of a single uropathogen (gram-negative bacteria or S. saprophyticus) in a patient being treated with an effective antimicrobial agent for a urinary tract infection
6. Physician diagnosis of a urinary tract infection
7. Physician institutes appropriate therapy for a urinary tract infection

Hospital Complications NTDS 2012 Definition Changes

28 CRBSI

2012: Defined as organism cultured from the bloodstream that is not related to an infection at another site and attributed to a central venous catheter. Patients must have evidence of infection including at least one of:

Criterion 1: Patient has a recognized pathogen cultured from one or more blood cultures and organism cultured from blood is not related to an infection at another site.

Criterion 2: Patient has at least one of the following signs or symptoms:

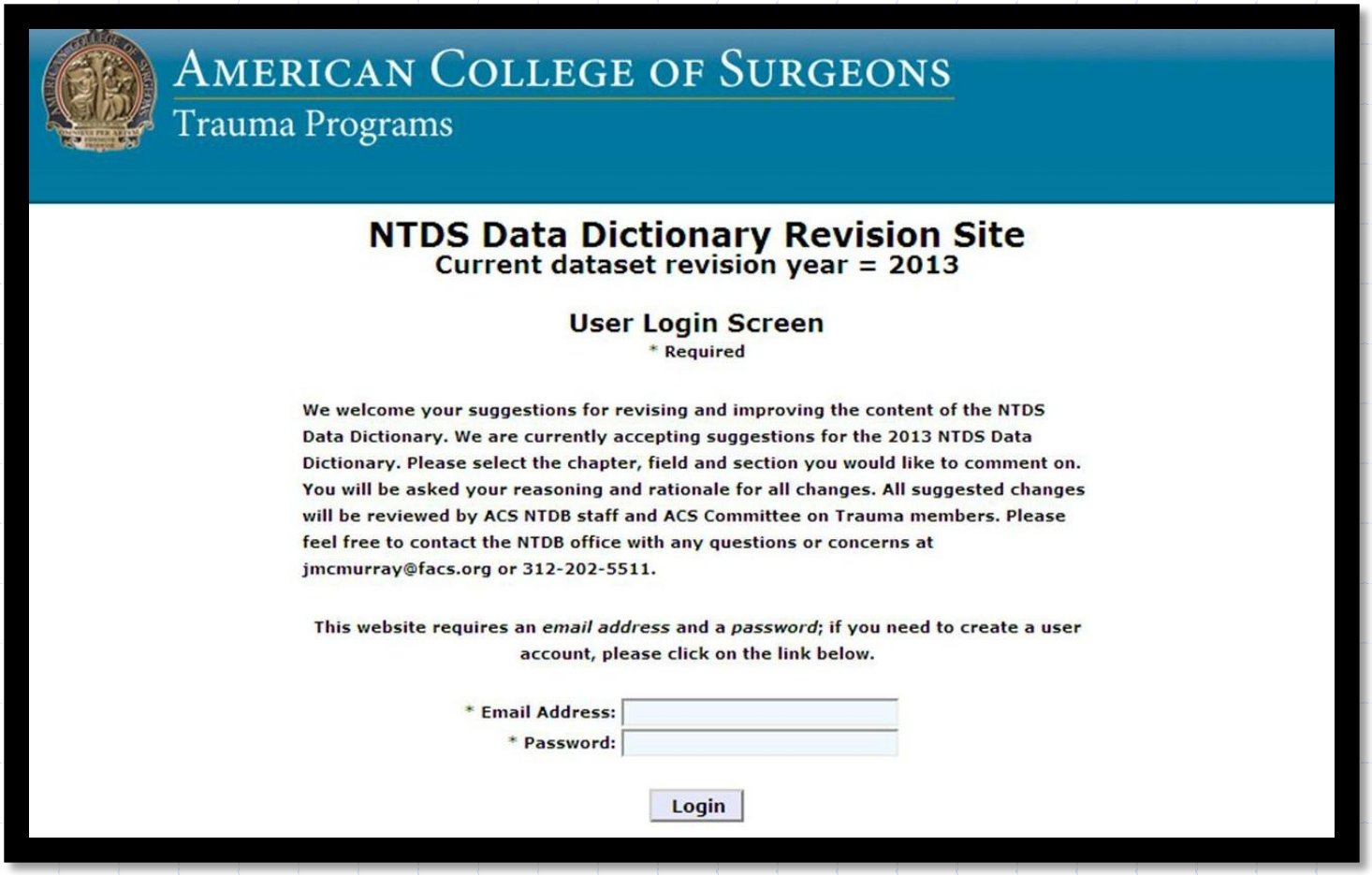
- Fever>38 C
- Chills
- WBC> 100,000 or < 3000 per cubic millimeter
- Hypotension (SBP<90) or >25% drop in systolic blood pressure
- Signs and symptoms and positive laboratory results are not related to an infection at another site AND
- Common skin contaminant (i.e., diphtheroids [Corynebacterium spp.], Bacillus [not B. anthracis] spp., Propionibacterium spp., coagulase-negative staphylococci [including S. epidermidis], viridans group streptococci, Aerococcus spp., Micrococcus spp.) is cultured from two or more blood cultures drawn on separate occasions.

Erythema at the entry site of the central line or positive cultures on the tip of the line in the absence of positive blood cultures is not considered a CRBSI

Hospital Complications NTDS 2012 MTQIP Reconciliation

- Myocardial Infarction
  - Deleted requirement of manifestation of Q waves post MI
- Severe Sepsis
  - Deleted criterion for tachycardia and tachypnea
  - Increased requirement for immature bands from 10% to 20%

Questions


AMERICAN COLLEGE OF SURGEONS
Trauma Programs
NTDS Data Dictionary Revision Site
Current dataset revision year = 2013
User Login Screen
* Required
We welcome your suggestions for revising and improving the content of the NTDS Data Dictionary. We are currently accepting suggestions for the 2013 NTDS Data Dictionary. Please select the chapter, field and section you would like to comment on. You will be asked your reasoning and rationale for all changes. All suggested changes will be reviewed by ACS NTDB staff and ACS Committee on Trauma members. Please feel free to contact the NTDB office with any questions or concerns at jmcmurray@facs.org or 312-202-5511.
This website requires an email address and a password; if you need to create a user account, please click on the link below.
* Email Address:
* Password:
Login

DI, On-line Reports, MTQIP Reports

Mark Hemmila, MD

DI

- 3 year contract (2012, 2013, 2014)
- 35 MTQIP custom data elements
- Mapping and transmittal of TQIP process measures
- Technical support for MTQIP tab
- DI Report Writer
- 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
  - $2000 DI Report Writer new purchase
  - $700/yr DI Report Writer license fee

DI Report Writer Training

- In person $1000 plus travel expenses
- Web

- February meeting?

Other Vendors

- CDM (Trauma Base)
  - Will discuss MTQIP tab
- Lancet (Trauma One)
  - Synchronize custom data elements between BM and POH

MTQIP Web-site

- Web-site (www.mtqip.org)
  - On-line report and query tool for trending
  - Meeting information

Reports

- 11/1/09 to 10/31/10
- 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

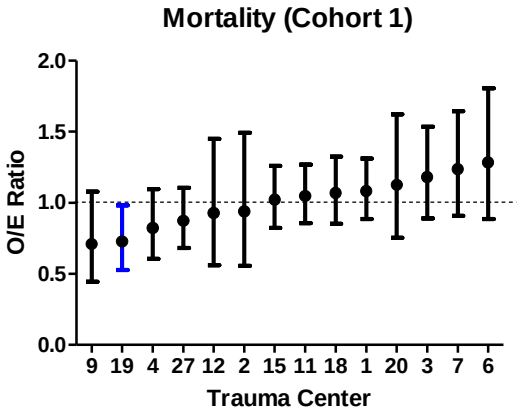
- Complications
  - Cohort 2 w/o DOA's
  - Group 1 (All)
  - Group 2 (Subset)
  - Specific
- Length of Stay
  - Hospital, ICU, Mechanical Ventilator Days
  - Cohort 2
  - Exclude deaths for Hospital LOS

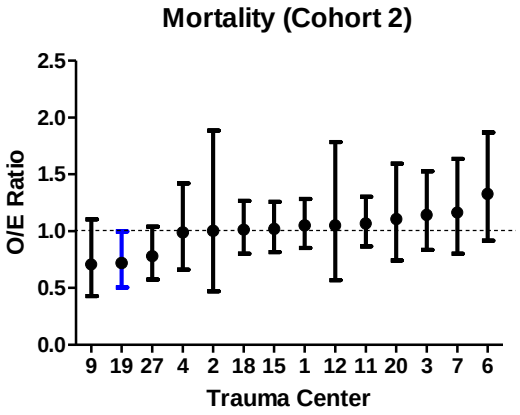
Risk Adjustment

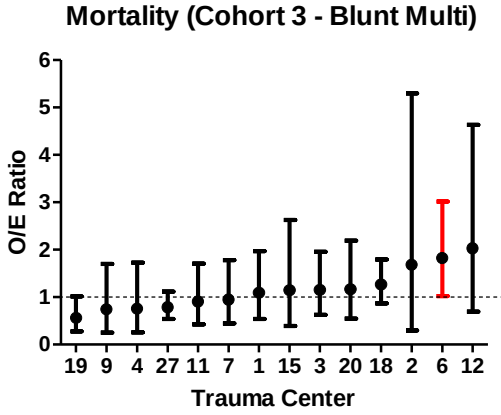
- Univariate
- Imputed BP, Pulse, mGCS if missing
- Step-wise Multivariate Logistic Regression
  - Identify predictor variables, $p \leq 0.2$
- Logit Equation
- Expected Mortality
- O/E Ratios
  - 90% Confidence Interval, Mortality
  - 95% Confidence Interval, Complications
  - 95% Confidence Interval,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

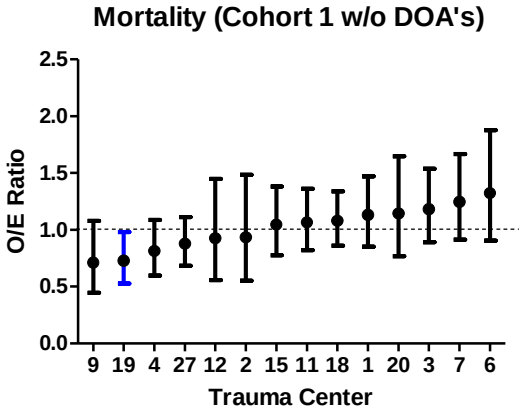
Mortality

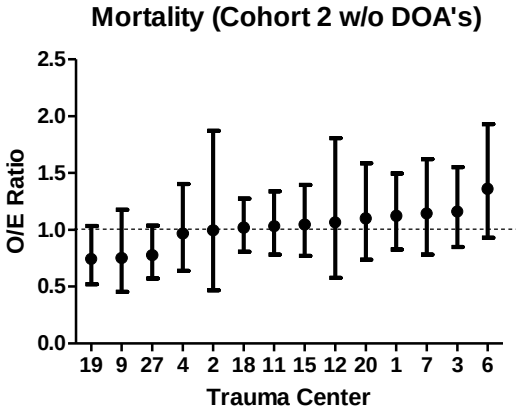
- Cohort 1 (Overall Mortality - All Admissions)
- Cohort 1 (w/o DOA's)
- Cohort 2 (Admit to Trauma Service)
- Cohort 2 (w/o DOA's)
- Cohort 3 (Blunt Multi-System Mortality)
  - Trauma type classified as blunt with injuries of AIS ≥ 3 in at least two of the following AIS body regions: head/neck, face, 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

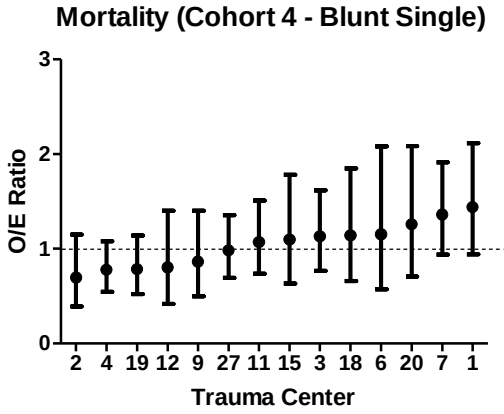

Mortality (Cohort 1)
O/E Ratio
2.0
1.5
1.0
0.5
0.0
9 19 4 27 12 2 15 11 18 1 20 3 7 6
Trauma Center


Mortality (Cohort 2)
O/E Ratio
2.5
2.0
1.5
1.0
0.5
0.0
9 19 27 4 2 18 15 1 12 11 20 3 7 6
Trauma Center

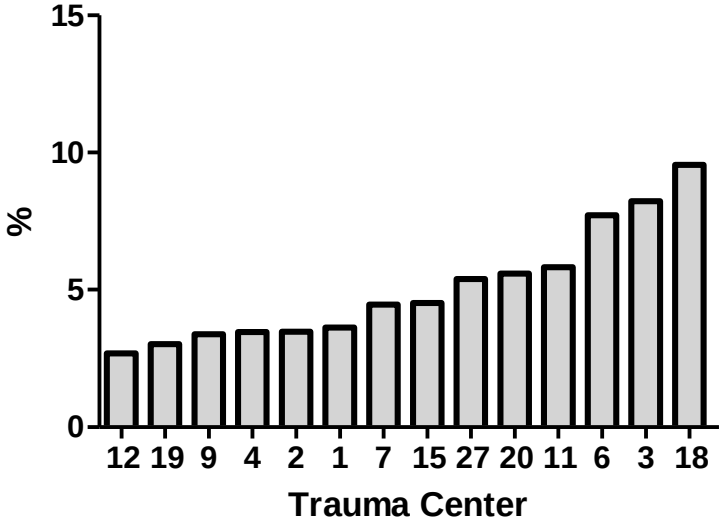

Mortality (Cohort 3 - Blunt Multi)
O/E Ratio
6
5
4
3
2
1
0
19 9 4 27 11 7 1 15 3 20 18 2 6 12
Trauma Center


Mortality (Cohort 1 w/o DOA's)
O/E Ratio
2.5
2.0
1.5
1.0
0.5
0.0
9 19 4 27 12 2 15 11 18 1 20 3 7 6
Trauma Center

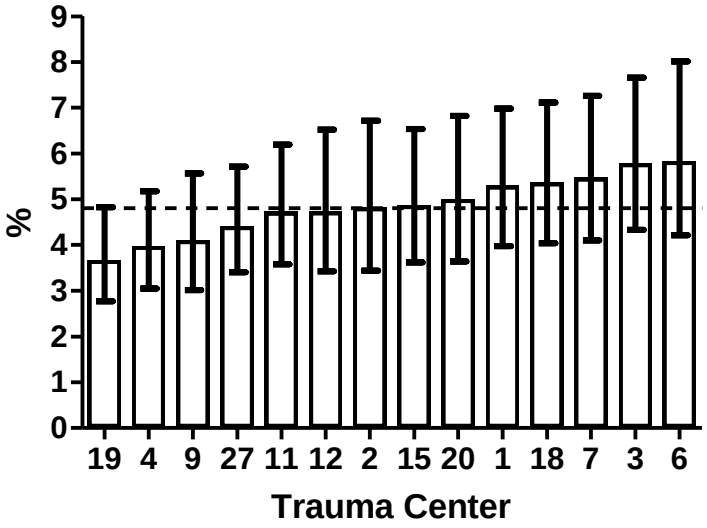

Mortality (Cohort 2 w/o DOA's)
O/E Ratio
2.5
2.0
1.5
1.0
0.5
0.0
19 9 27 4 2 18 11 15 12 20 1 7 3 6
Trauma Center


Mortality (Cohort 4 - Blunt Single)
O/E Ratio
3
2
1
0
2 4 19 12 9 27 11 15 3 18 6 20 7 1
Trauma Center

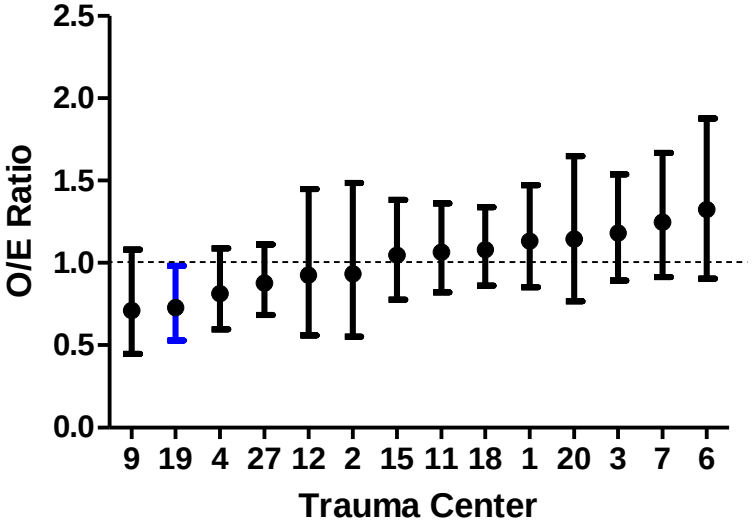
Crude Mortality



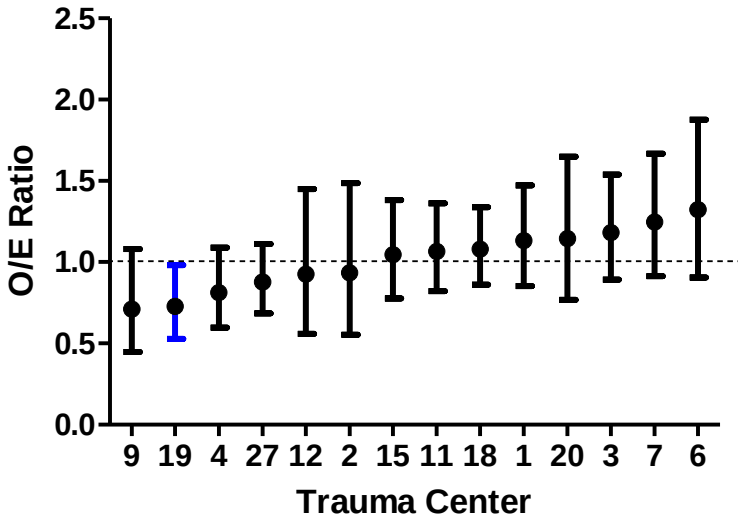
Risk and Reliability Adjusted Mortality



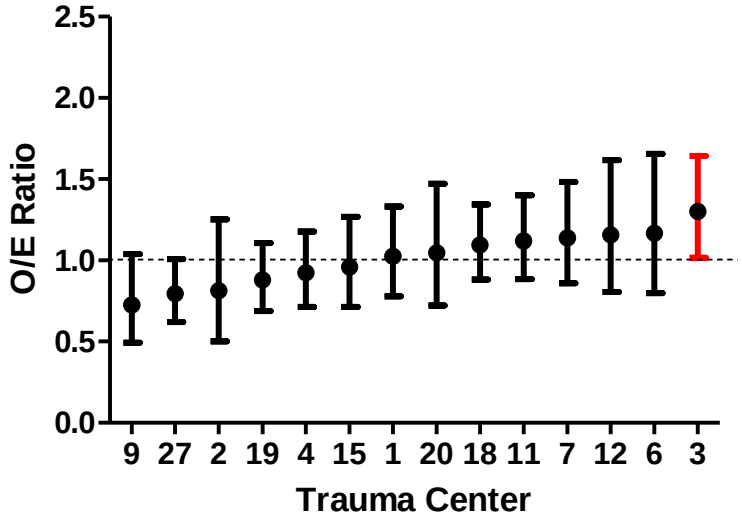
Mortality (Cohort 1 w/o DOA's)



Mortality (Cohort 1 w/o DOA's)



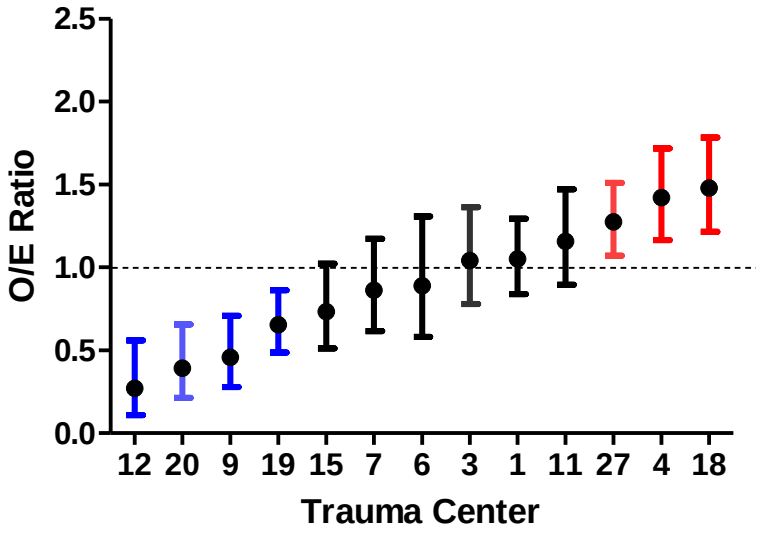
Mortality or Hospice (Cohort 1 w/o DOA's)



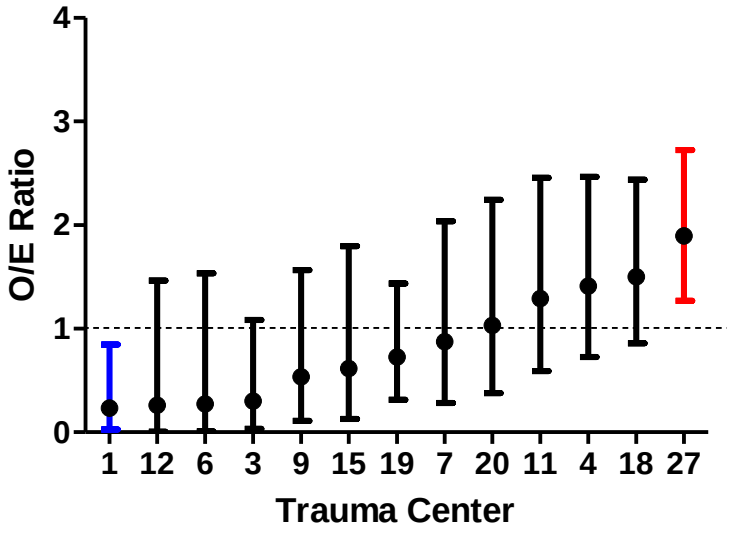
Complications

- Cohort 2 w/o DOA's
- Group 1
  - Superficial SSI, Deep SSI, Organ space SSI, Wound disruption, ARDS, Pneumonia, Unplanned intubation, PE, Acute renal failure, UTI, Stroke/cva, Cardiac arrest requiring cpr, MI, New onset arrhythmia, DVT LE , DVT UE, Systemic sepsis, Decubitus ulcer,C. difficle colitis.
- 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

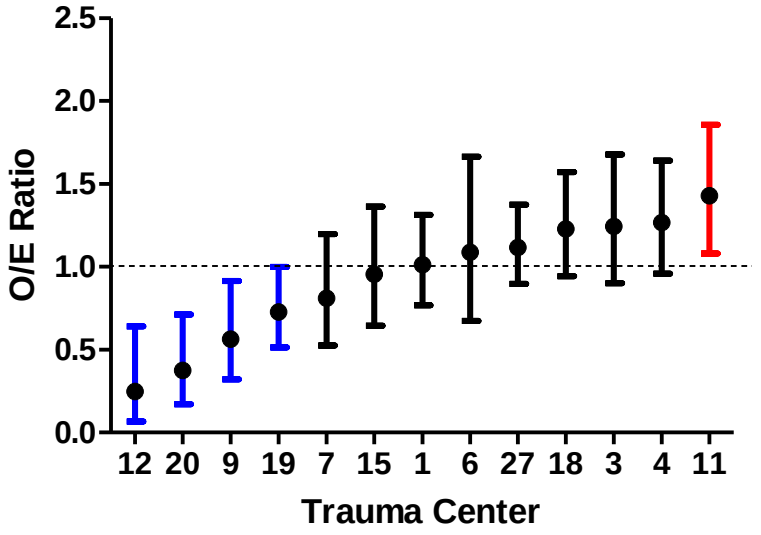
Complications (Group 1)



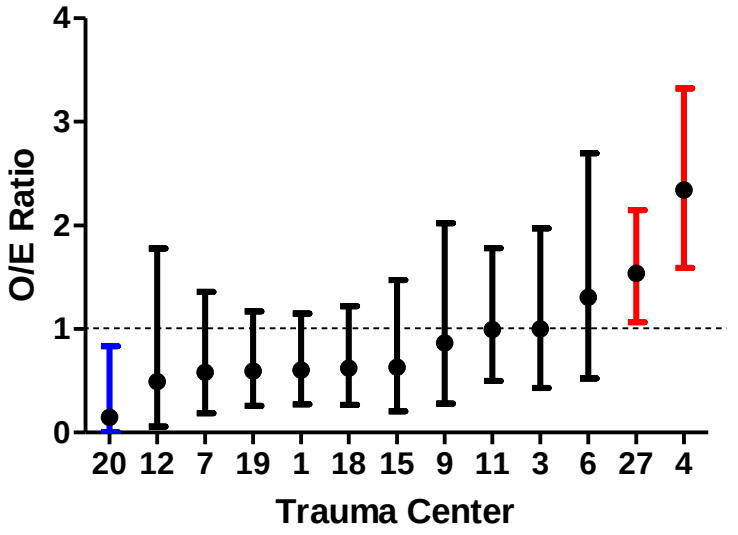
Cardiac/Stroke

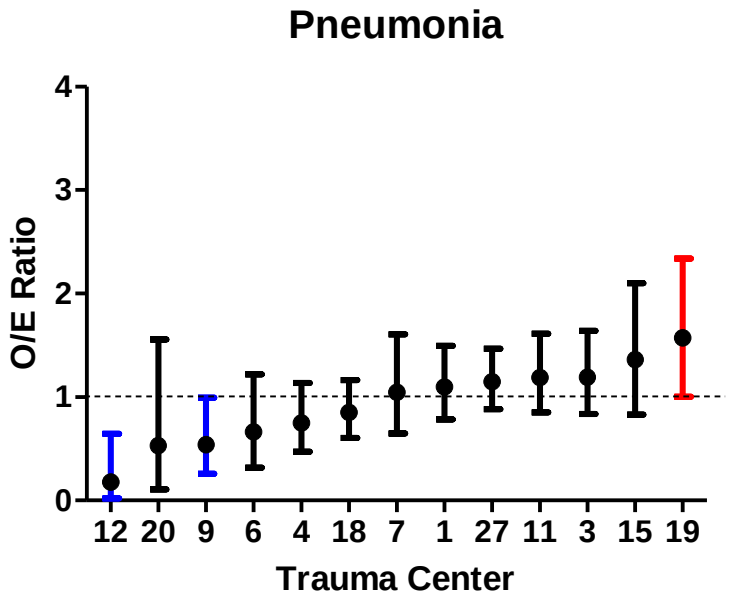


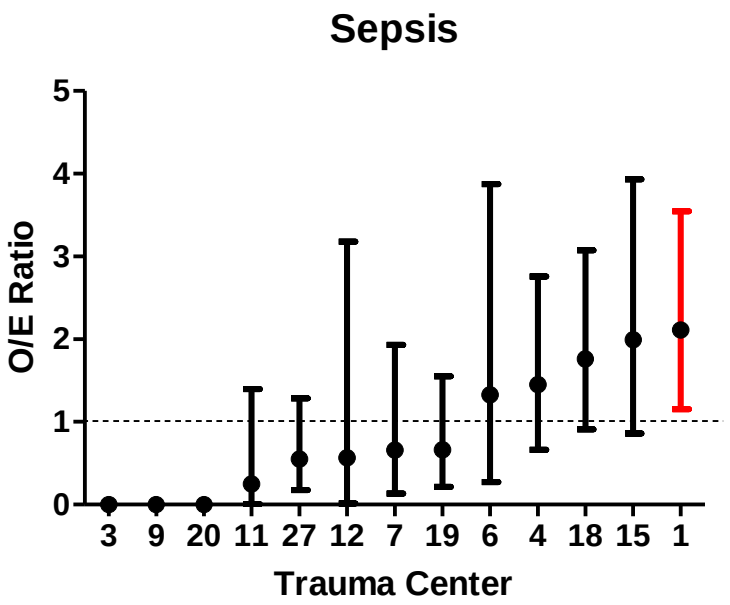
Complications (Group 2)

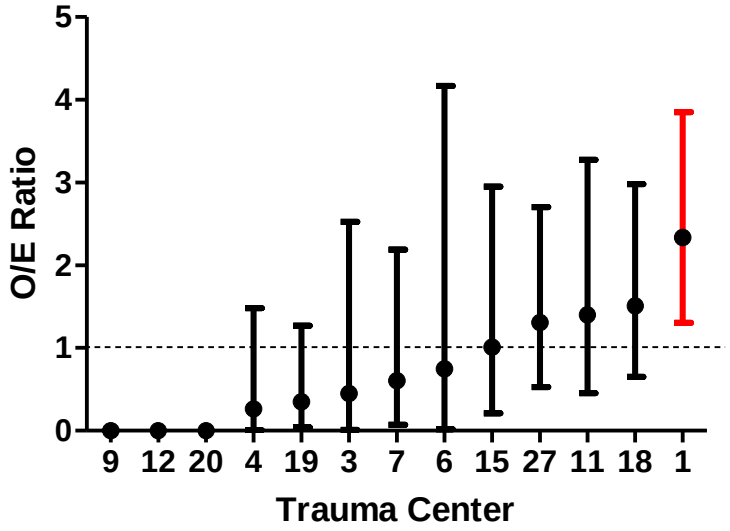


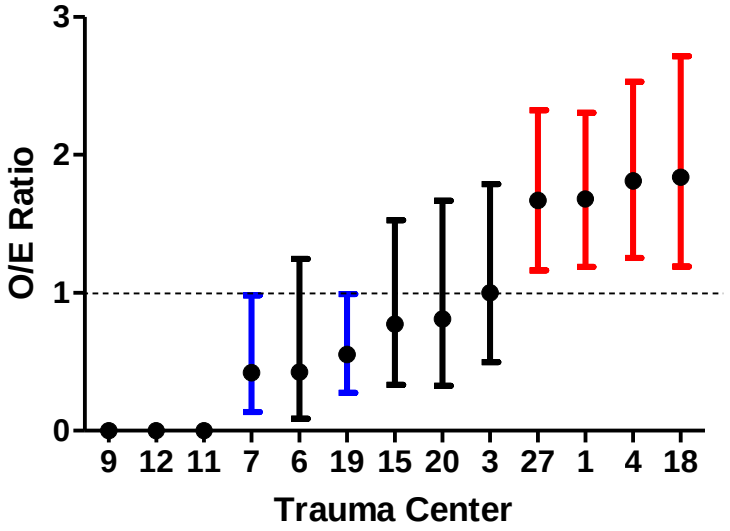
DVT/Pulmonary Embolus




Pneumonia
O/E Ratio
0
1
2
3
4
12 20 9 6 4 18 7 1 27 11 3 15 19
Trauma Center

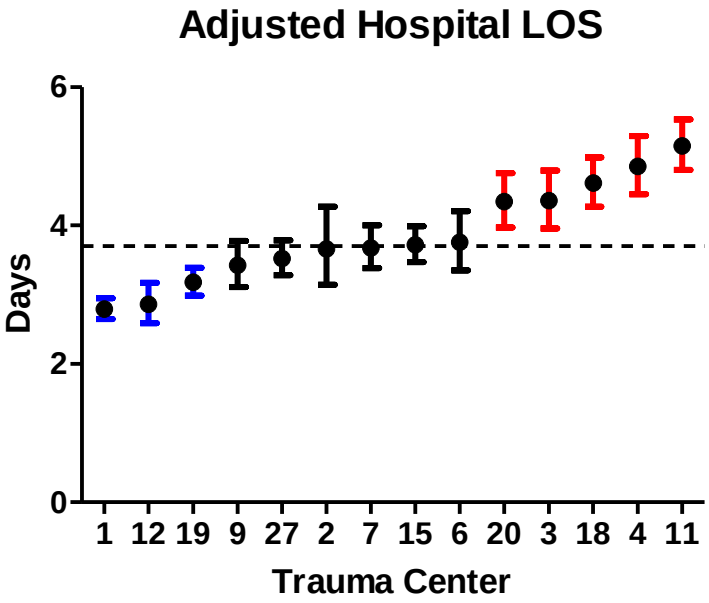

Sepsis
O/E Ratio
0
1
2
3
4
5
3 9 20 11 27 12 7 19 6 4 18 15 1
Trauma Center

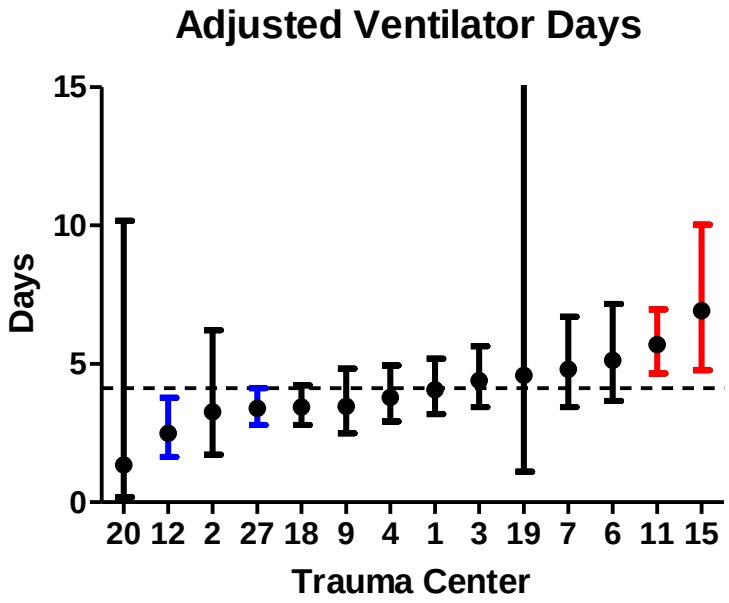

Renal Failure
O/E Ratio
0
1
2
3
4
5
9 12 20 4 19 3 7 6 15 27 11 18 1
Trauma Center

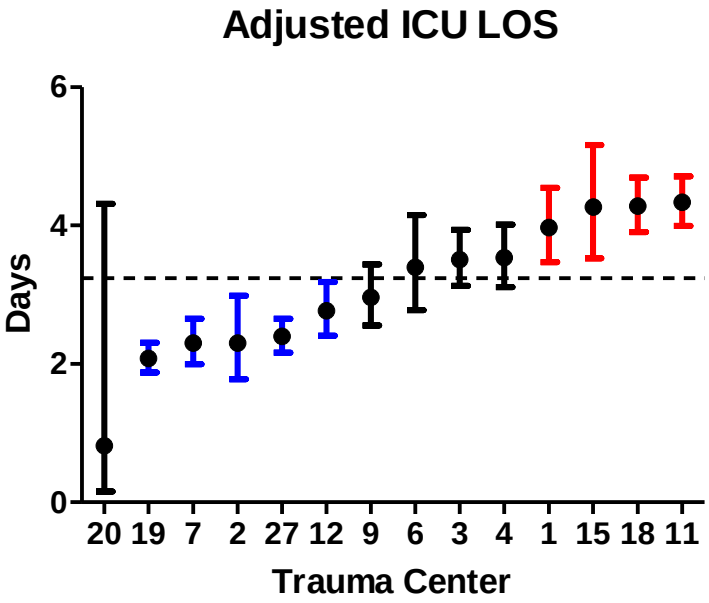

UTI
O/E Ratio
0
1
2
3
9 12 11 7 6 19 15 20 3 27 1 4 18
Trauma Center

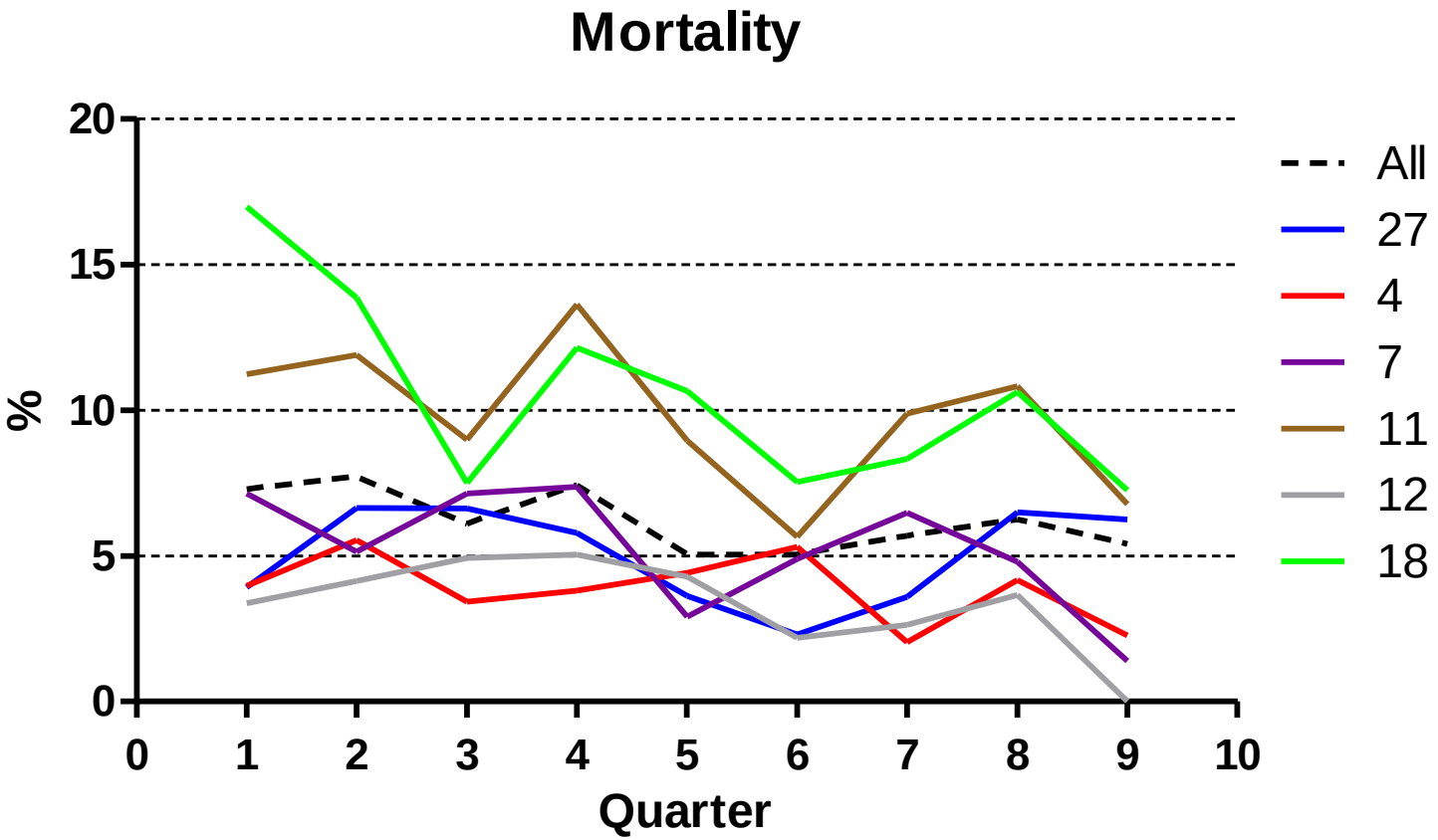
Length of Stay

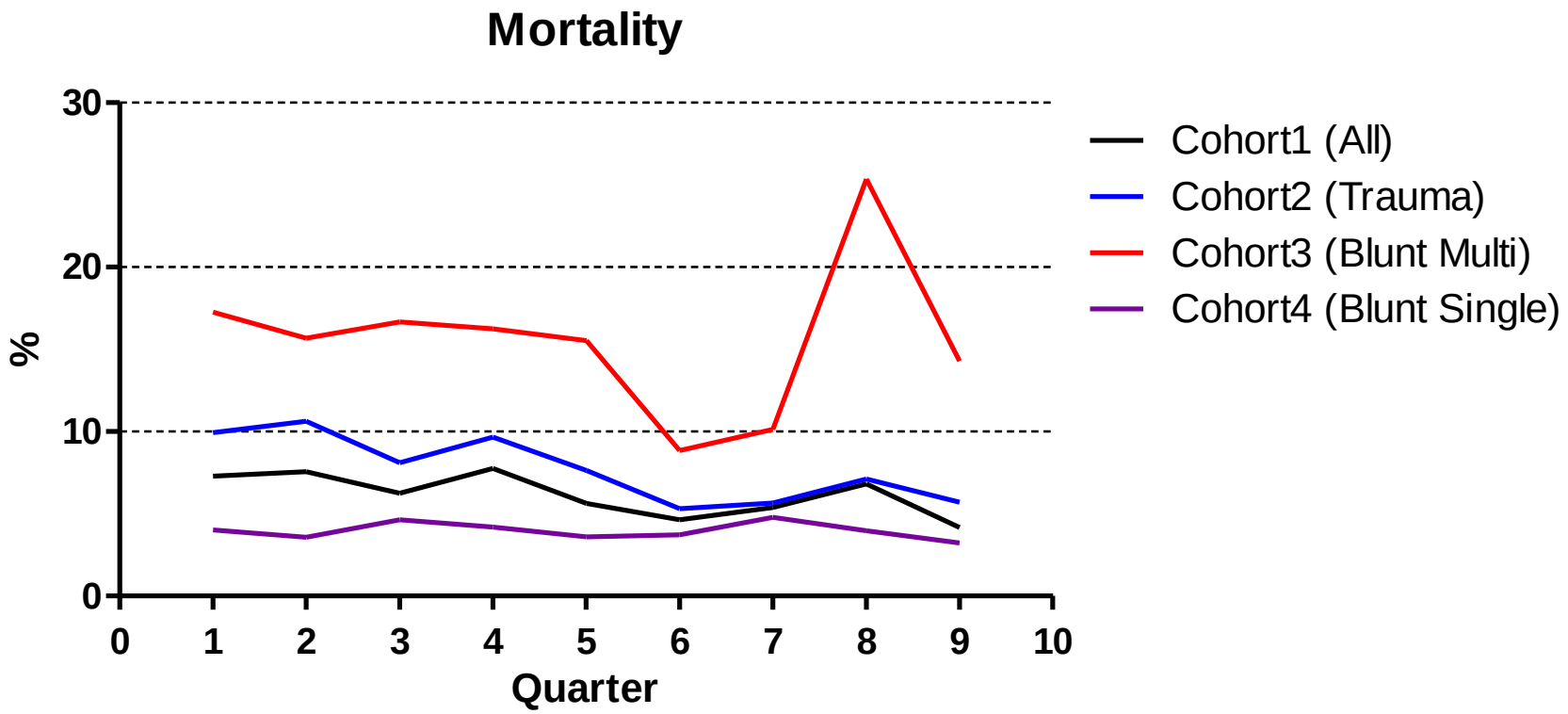
- Cohort 2
- Risk Adjusted Rate
- Natural log transformed, linear regression
- Adjusted for age, ISS, mGCS, comorbids, etc.
- Hospital LOS, ICU LOS, MV Days
- Exclude deaths for Hospital LOS
- 95% CI

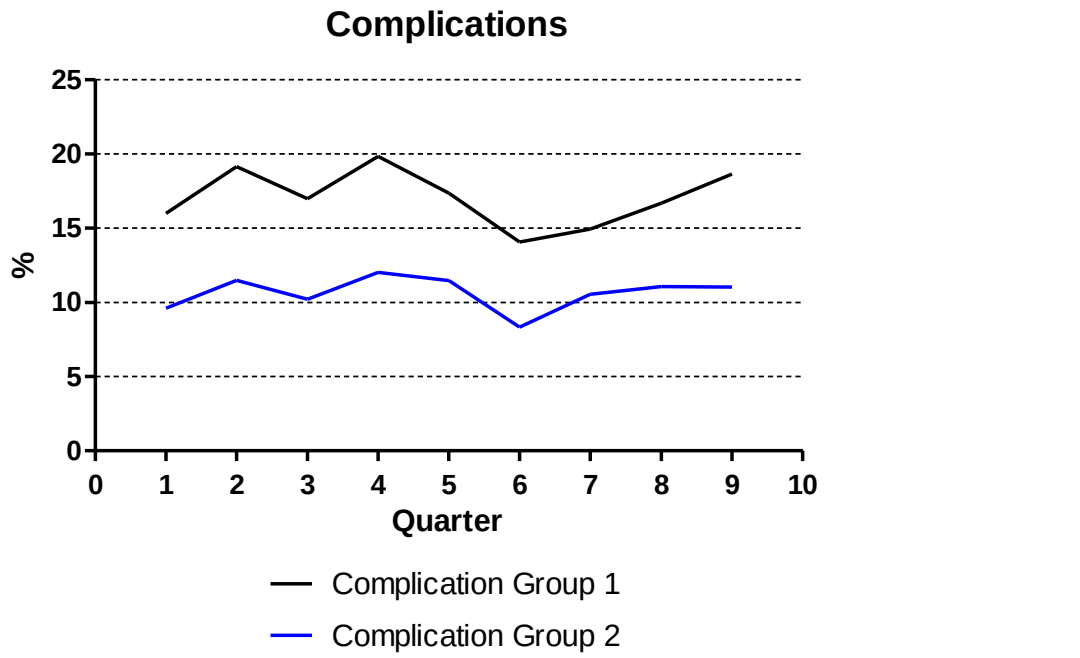

Adjusted Hospital LOS
Days
0
2
4
6
1 12 19 9 27 2 7 15 6 20 3 18 4 11
Trauma Center

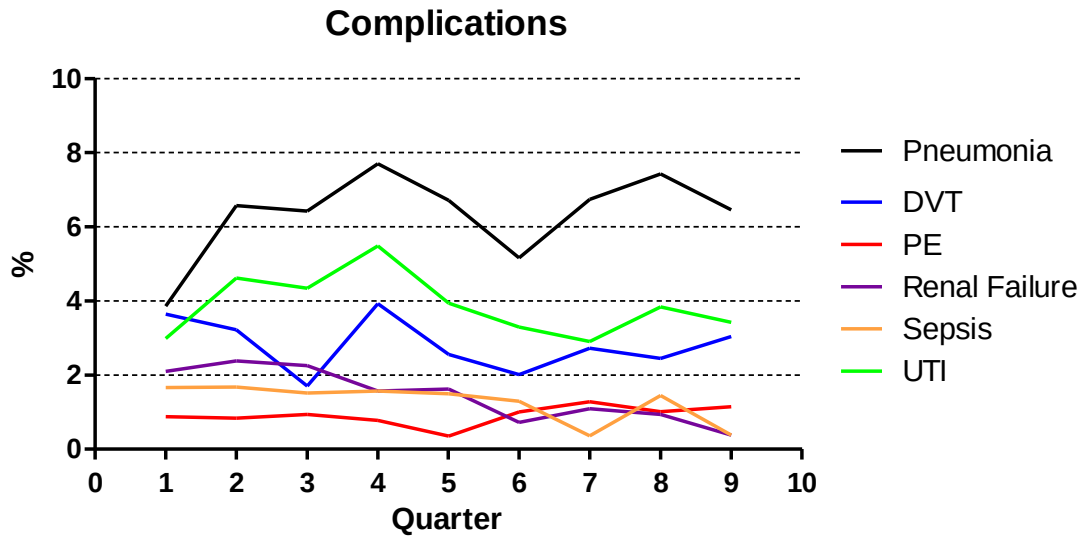

Adjusted Ventilator Days
Days
0
5
10
15
20 12 2 27 18 9 4 1 3 19 7 6 11 15
Trauma Center


Adjusted ICU LOS
Days
0
2
4
6
20 19 7 2 27 12 9 6 3 4 1 15 18 11
Trauma Center


Mortality
20
15
10
5
0
%
0
1
2
3
4
5
6
7
8
9
10
Quarter
All
27
4
7
11
12
18


Mortality
30
20
10
0
%
0
1
2
3
4
5
6
7
8
9
10
Quarter
Cohort1 (All)
Cohort2 (Trauma)
Cohort3 (Blunt Multi)
Cohort4 (Blunt Single)


Complications
25
20
15
10
5
0
%
0 1 2 3 4 5 6 7 8 9 10
Quarter
Complication Group 1
Complication Group 2


Complications
10
8
6
4
2
0
%
0 1 2 3 4 5 6 7 8 9 10
Quarter
Pneumonia
DVT
PE
Renal Failure
Sepsis
UTI

Questions

Process Measures

Putting it together

- Date and type of pharmacologic VTE prophylaxis
- Date IVC filter (Procedure)
- Date PE or DVT (Complications)
- Risk factors (Injury, comorbids, etc.)

Future Meetings

- February 14, 2012
  - Location: Ann Arbor
- May 16, 2012
  - Location: Traverse City
- October 16, 2011
  - Location: Ann Arbor

Call for Data, Feedback

- Submit data from 3/1/10 to 2/28/11
  - Due October 7, 2011
  - 18 centers
- Next call
  - Data from 7/1/10 to 6/30/11
  - Due February 3, 2012
  - 23 centers
- Evaluations
  - Meeting ideas, Reports, Web-site
  - How can we help you?

MTQIP Location

- U of M North Campus Research Complex
- MSCORE-MTQIP
  Building 520 NCRC, 3rd Floor, Rm 3180C
  2800 Plymouth Road
  Ann Arbor, MI 48109-2800
- Phone 734 763-2854
- Fax 734 998-7473
- MSQC, MBSC

Sepsis Resuscitation: Keeping Up the Pace

Mary-Anne Purtill, MD
Director, Surgical Critical Care
Interim Director, Trauma
SJMHS
October 11, 2011


Joe's
Java

Compliance = Mortality

- Managing Change
- Placing Power
- Leadership

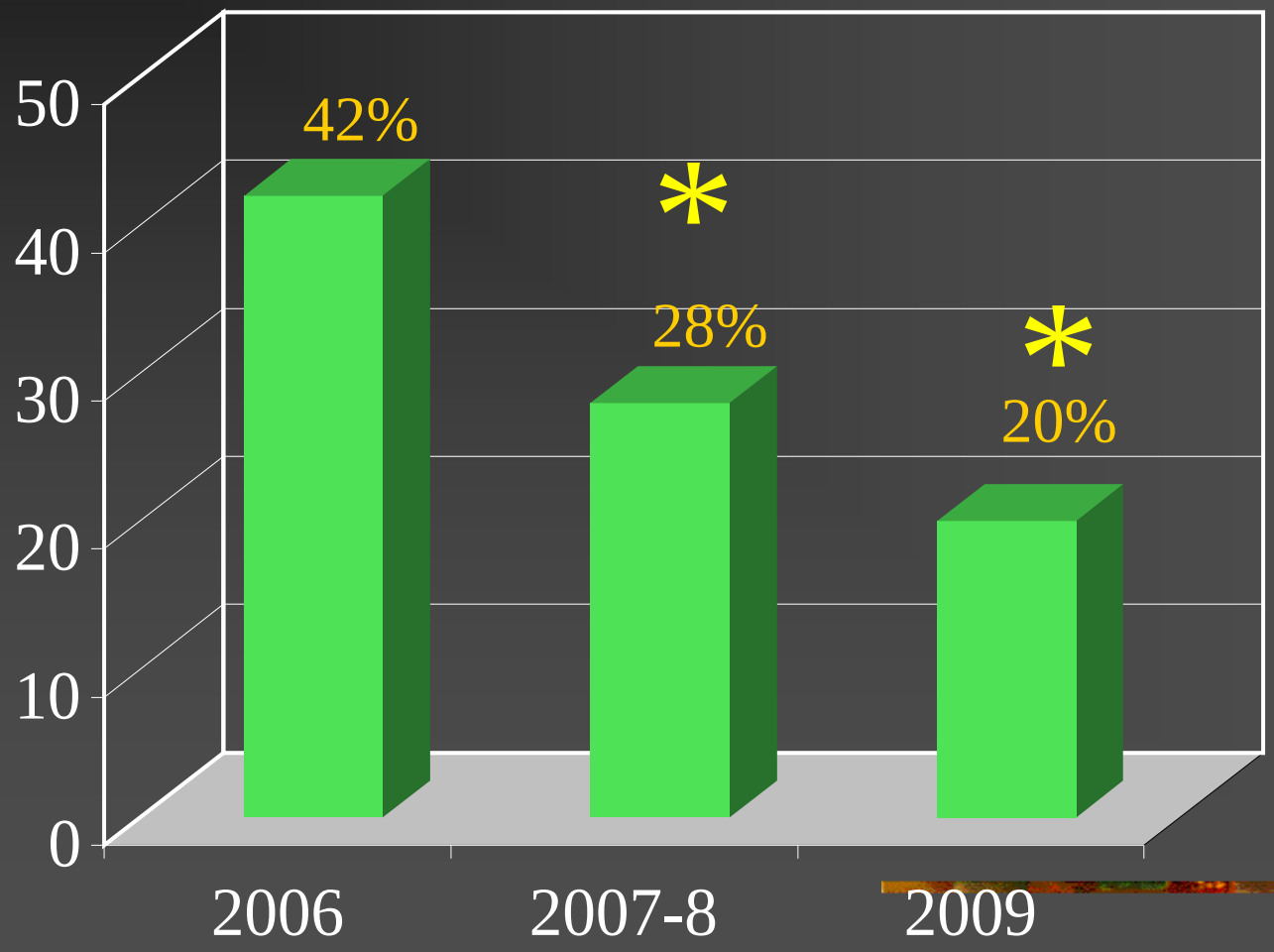
SJMHS SICU Sepsis Outcomes

	2006	2007-2008	2009	p
Mortality	42%	28%	20%	p<0.01
LOS (mean ± days)	38 ± 3	29 ± 36	22 ± 15	p<0.01
DVC (mean ± SD)	$36,756 ± $23,982	$36,568 ± 45,486	$30,428 ± $25,701	n.s.

American Journal of Surgery, Silverman, et al 2011

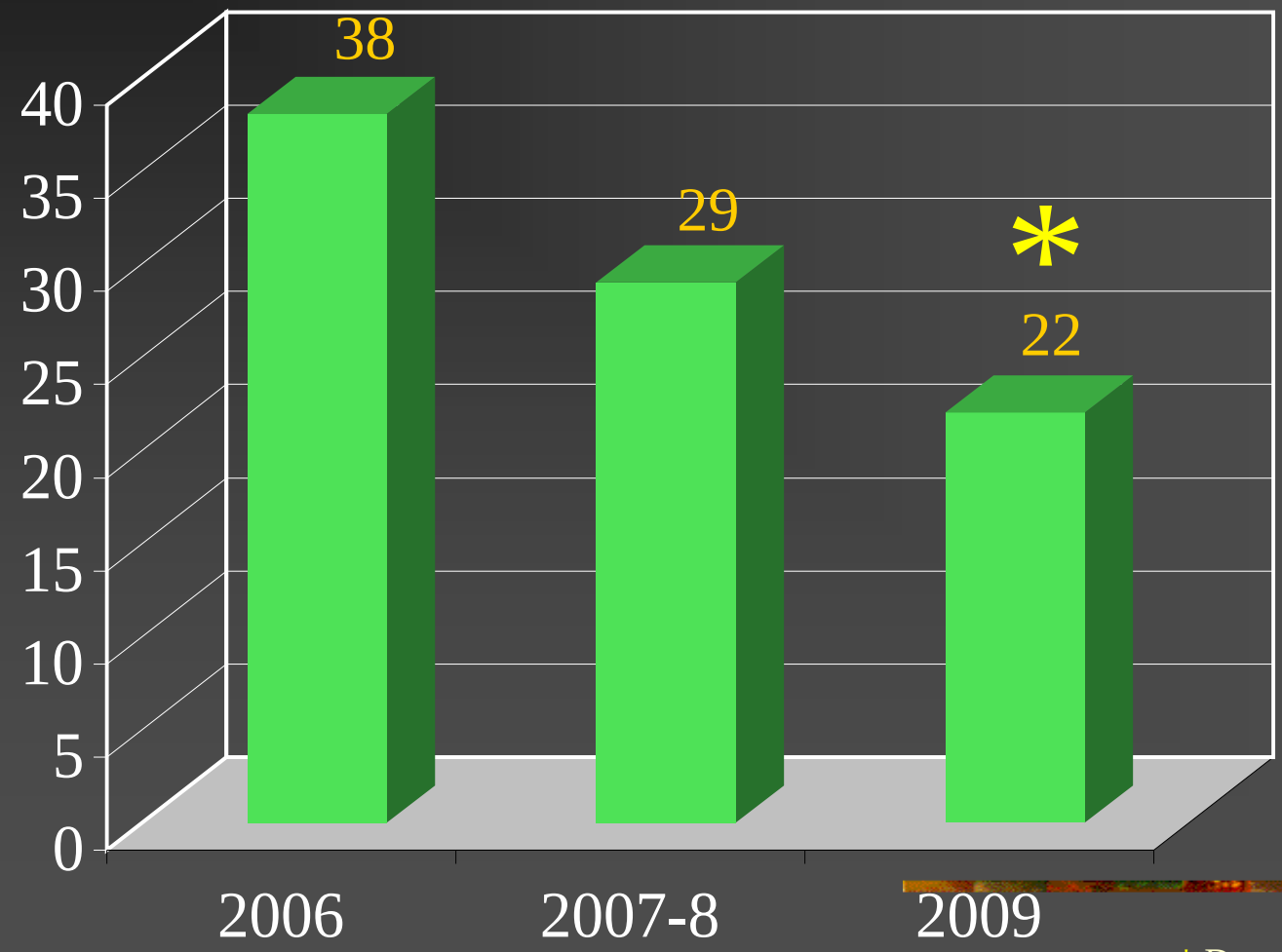
In-Hospital Mortality

* Denotes p <0.01



Average length of stay (LOS)

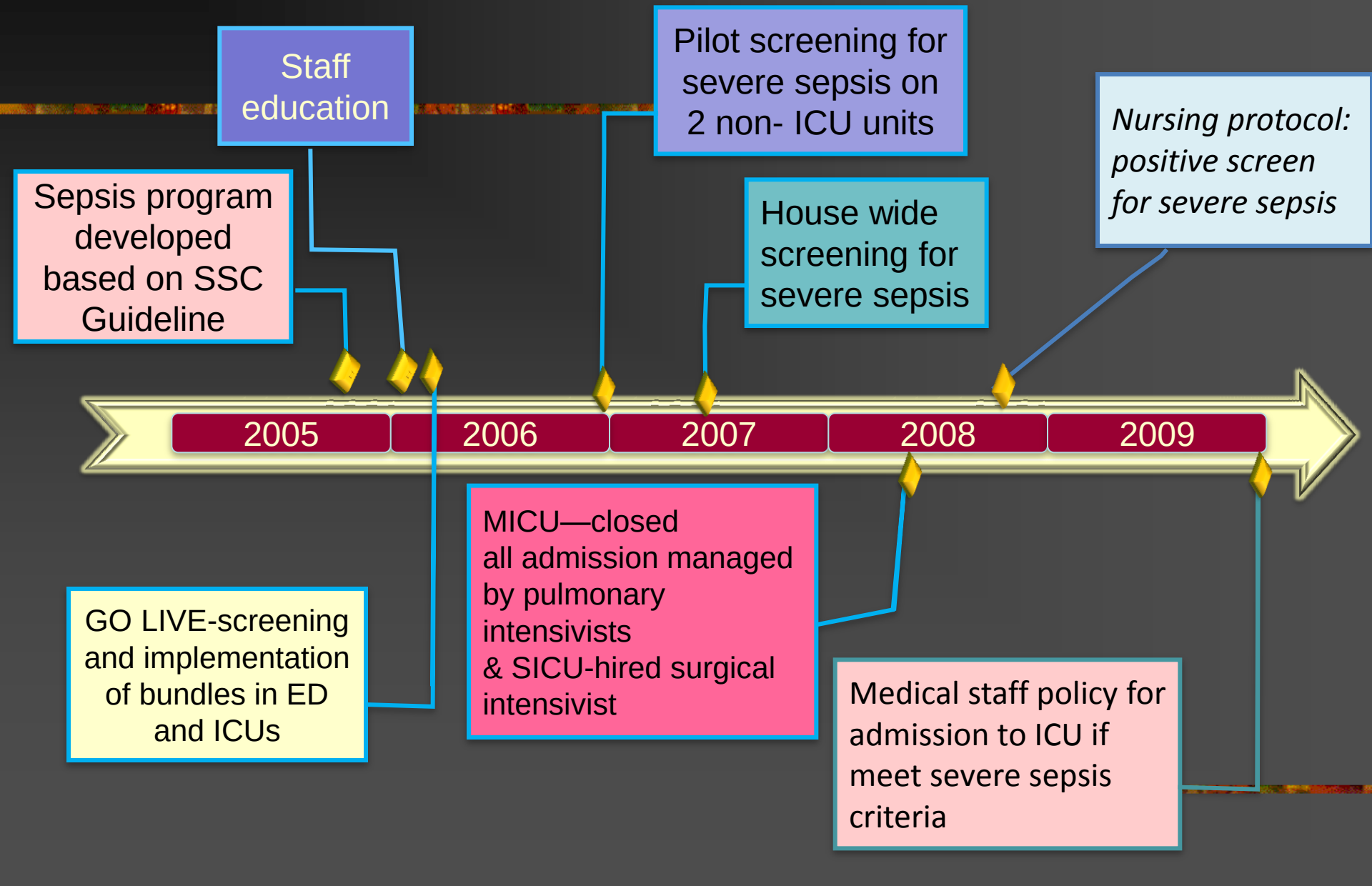
(days)



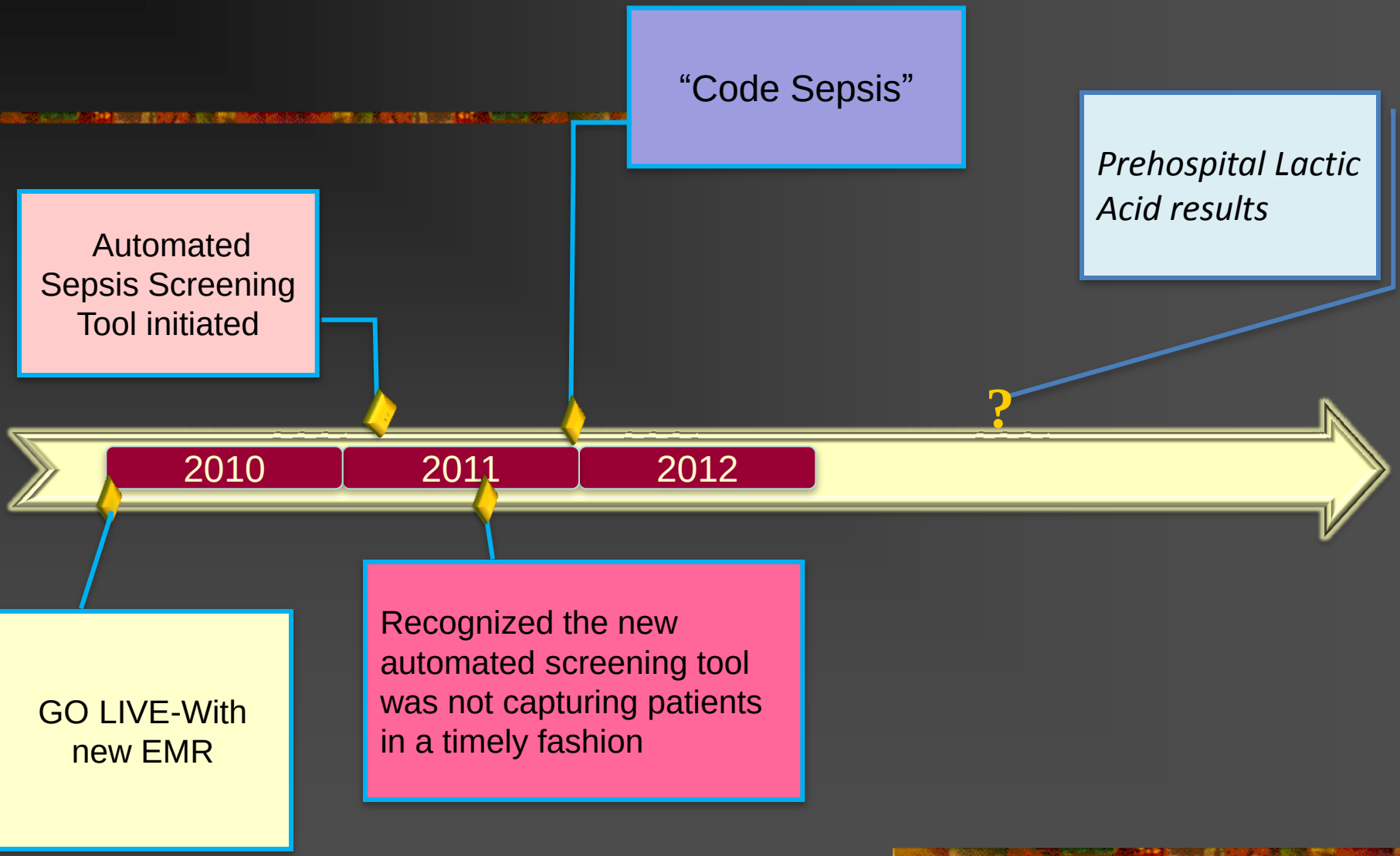
* Denotes p <0.01

Mean Direct Variable Cost

Timeline for the SJMHS Sepsis Journey



Timeline for the SJMHS Sepsis Journey



Compliance Data: Resuscitation Bundle

	Fluid Bolus in first hr	Lactic acid in first 6 hrs	Bld Cultures b/f antibiotic	Antibiotics within 1 hr (mean time to admin) non-ED	% of patients with first 4 interventions completed within one hour
2007 N=209	37%	91%	59%	53% (107 min)	14%
2008 N=323	60%	91%	62%	59% (125 min)	18%
2009 N=389	71%	94%	62%	59% (97 min)	24%
2010 N=286	65%	97%	70%	51% (86 min)	19%
2011 N=169	64%	99%	61%	46% (109 min)	15%

Compliance Data: Resuscitation Bundle

	CVP Placed	CVP to goal in 6 hrs	MAP to goal in 6 hrs	ScvO2 to goal in 6hrs	Median time to meeting all 3 goals	Mortality
2007 N=209	82%	61%	79%	53%	6 hrs	28%
2008 N=323	96%	59%	77%	50%	7 hrs	28%
2009 N=389	96%	78%	83%	61%	4.8 hrs	20%
2010 N=286	83%	74%	91%	50%	5.5 hrs	31%
2011 N=169	85%	67%	89%	67%	5.2 hrs	18%

What do we really think promotes compliance?

- Sepsis Pathway Tool
- Nursing policy to initiate sepsis bundle when patient screens positive for sepsis
- Intensivist leadership / “Nursing Card” /Mulitidisciplinary Critical Care M&M
- Contemporaneous Sepsis Bundle data collection and feedback on performance
- Delirium Control
- Using more decompressive laparotomies
- Early ARDS interventions
- Aggressive hemodynamic monitoring with non-invasive techniques

The Severe Sepsis Bundles: Surviving Sepsis Campaign/IHI

Resuscitation Bundle

(To be accomplished as soon as possible over first 6 hours):

- ✓ **Serum lactate measured.**
- ✓ **Blood cultures obtained prior to antibiotics administered. (1C)**
- ✓ **Perform imaging studies promptly to fine source (1C)**
- ✓ **From the time of presentation, broad- spectrum antibiotics within 3 hours for ED admissions and 1 hour for non-ED ICU admissions. (1D/1B)**
- ✓ **For hypotension and/or lactate > 4 mmol/L:**
  - ✓ **Deliver an initial minimum of 20 mL/kg of crystalloid (or colloid equivalent) (1C)**
  - ✓ **Apply vasopressors for hypotension not responding to initial fluid resuscitation to maintain MAP ≥ 65 mmHg.**
- ✓ **For persistent hypotension despite initial fluid resuscitation (septic shock) and/or lactate > 4 mmol/L: 1C**
  - ✓ **Achieve CVP ≥ 8 mmHg & MAP ≥ 65 mmHg & UO >0.5mL/kg/hr**
  - ✓ **Achieve $ScvO_2$ of ≥ 70% or SvO_2 ≥ 65%.**
  - ✓ **if $ScvO_2$ not ≥ 70% blood or dobutamine (2C)**

Management Bundle

(To be accomplished as soon as possible over first 24 hours):

- ✓ **Low-dose steroids administered for septic shock in accordance with a standardized ICU policy. (Given to patients who respond poorly to fluids or vasopressors) (2C)**
- ✓ **Drotrecogin alfa (activated) administered in accordance with a standardized ICU policy. (Given to patients with sepsis induced organ dysfunction at high risk of death (2B)**
- ✓ **Glucose control maintained to < 150 mg/dL (8.3 mmol/L). (2C)**
- ✓ **Tidal volume 6 ml/kg (1B) Inspiratory plateau pressures < 30 cmH_2O for mechanically ventilated patients. (1C)**

Adapted from the revised guidelines: CCM 2008;36:296-327.

Sepsis Bundle

SAINT JOSEPH MERCY HEALTH SYSTEM
A MEMBER OF TRINITY HEALTH
REMARKABLE MEDICINE. REMARKABLE CARE.

ST. JOSEPH MERCY HOSPITAL
SAINT JOSEPH MERCY LIVINGSTON HOSPITAL
SAINT JOSEPH MERCY SALINE HOSPITAL

SEVERE SEPSIS CLINICAL PATHWAY

Room # _____ ICU admission Date: _____ Time: _____

Please complete the following:

- **Severe sepsis or septic shock* diagnosis: Date:** _____ **Time:** _____
- Patient transferred from (unit or hospital): _____
- Patient was identified as having severe sepsis or septic shock: ❑ ED ❑ Floor ❑ ICU Admission ❑ During ICU Stay
- Decision to move to comfort care in first 24 hours after diagnosis Yes No
- ICU discharge: Date: _____ Time: _____
- Discharge status: Alive Expired

***Septic Shock defined as:**
SBP less than 90mmHg or 40mmHg decrease from baseline or MAP less than 65mmHg after 20ml/kg fluid bolus

****Vasopressor unresponsive defined as:**
Requiring vasopressors after fluid resuscitation completed.

Sepsis Daily Goals	Date _____ to _____ 0-1 Hours	Date _____ to _____ 1-6 Hours	Date _____ to _____ 6-24 Hours	Date _____ to _____ 24-72 Hours
1. Goal directed therapy to achieve increased O2 delivery: CVP 8-12mmHg MAP greater than 65mmHg ScvO2 greater than or equal to 70% 2. Blood Glucose 90-140 mg/dl 3. Urine output greater than 0.5 ml/kg/hour 4. In patients with acute lung injury or ARDS; Are the static or plateau inspiratory pressures less than 30cmH2O in first 24 hours? Yes No Is tidal volume 6ml/kg of ideal body weight in first 24 hours? Yes No 5. 6.	_____ Initial Labs: serum lactate, additional labs as ordered by physician Yes No Serum lactate drawn within 6 hours? Yes No Blood Cultures X 2 Time 1: _____ Time 2: _____ _____ Other Cultures: _____ Establish IV access _____ Volume resuscitate: initial 20ml/kg over 30 minutes then additional boluses as needed per order _____ Time 20 ml/kg bolus infused _____ Broad Spectrum Antibiotic-start after obtain blood culture *(see Infonet under Pharmacy Guide to Antimicrobial Therapy)* _____ Time antibiotic hung _____ Source Control	Refer to Severe Sepsis Resuscitation Algorithm Yes No Was initial lactate greater than 4mmol/L? Yes No Was patient hypotensive after initial fluid bolus? Yes No CVP placed If no, why? _____ _____ Record the first time the following is achieved: _____ CVP 8-12 mmHg on vent 12-15 mmHg _____ MAP greater than or equal to 65 mmHg _____ $SCV0_2$ greater than 70%: mixed venous greater than or equal to 65% _____ Confirm Infectious Source	Yes No Is patient on vasopressor at greater than 6 hours Yes No Was patient assessed for Eligibility for Activated Protein C (Xigris) – *(see Infonet under Pharmacy-Drug Information or speak to pharmacist)* Yes No Was patient eligible for Activated Protein C? _____ If Xigris administered, Start Time: _____ Yes No Considered Hydrocortisone if vasopressor unresponsive** _____ If hydrocortisone administered, provide 50mg every 6 hours Start Time: _____ _____ Consider Vasopressin for refractory septic shock	_____ Confirm Infectious Source _____ Re-assess need for broad spectrum antibiotics based on culture reports. Yes No NA Was the organism that was identified sensitive to the initial antibiotic? _____ Discontinue Vancomycin if appropriate _____ D/C or taper steriods if vasopressors off _____ Re-evaluate need for invasive lines and tubes _____ Nutrition Therapy Support
Signature:				

6011-027 R 3/08 (M)D

SAINT JOSEPH MERCY HEALTH SYSTEM
A MEMBER OF TRINITY HEALTH
REMARKABLE MEDICINE. REMARKABLE CARE.

ST. JOSEPH MERCY HOSPITAL
SAINT JOSEPH MERCY LIVINGSTON HOSPITAL
SAINT JOSEPH MERCY SALINE HOSPITAL

SEVERE SEPSIS CLINICAL PATHWAY

Room # _____ ICU admission Date: _____ Time: _____

Please complete the following:

- **Severe sepsis or septic shock* diagnosis: Date:** _____ **Time:** _____
- Patient transferred from (unit or hospital): _____
- Patient was identified as having severe sepsis or septic shock: ❑ ED ❑ Floor ❑ ICU Admission ❑ During ICU Stay
- Decision to move to comfort care in first 24 hours after diagnosis Yes No
- ICU discharge: Date: _____ Time: _____
- Discharge status: Alive Expired

***Septic Shock defined as:**
SBP less than 90mm… 40mmHg decrease from … MAP less than 65mmHg … olus

**…efined as:
…d

Sepsis Daily Goals	Date _____ to _____ 0-1 Hours	Date _____ to _____ 1-6 Hours	_____ to _____	_____ to _____ 24-72 Hours
1. Goal directed therapy to achieve increased O2 delivery: CVP 8-12mmHg MAP greater than 65mmHg ScvO2 greater than or equal to 70%	_____ Initial Labs: serum lactate, additional labs as ordered by physician	Refer to Sev… Resusci…	…t on …opressor at greater than 6 hours	_____ Confirm Infectious Source
2. Blood Glucose 90-140 mg/dl	Yes No Serum lactate … within 6 h…		Yes No Was patient assessed for Eligibility for Activated Protein C (Xigris) – *(see Infonet under Pharmacy-Drug Information or speak to pharmacist)*	_____ Re-assess need for broad spectrum antibiotics based on culture reports.
3. Urine output greater than … ml/kg/hour	Yes No B…	…ter initial …us?		Yes No NA Was the organism that was identified sensitive to the initial antibiotic?
4. In patients … injur…		…VP placed If no, why? _____ _____ …ss	Yes No Was patient eligible for Activated Protein C?	_____ Discontinue Vancomycin if appropriate
Is … 0ml/kg of ideal bo… …ght in first 24 hours? Yes No	…suscitate: …al 20ml/kg over 30 minutes then additional boluses as needed per order	Record the first time the following is achieved:	_____ If Xigris administered, Start Time: _____	_____ D/C or taper steriods if vasopressors off
5.	_____ Time 20 ml/kg bolus infused	_____ CVP 8-12 mmHg on vent 12-15 mmHg	Yes No Considered Hydrocortisone if vasopressor unresponsive**	_____ Re-evaluate need for invasive lines and tubes
6.	_____ Broad Spectrum Antibiotic-start after obtain blood culture *(see Infonet under Pharmacy Guide to Antimicrobial Therapy)*	_____ MAP greater than or equal to 65 mmHg	_____ If hydrocortisone administered, provide 50mg every 6 hours Start Time: _____	_____ Nutrition Therapy Support
	_____ Time antibiotic hung	_____ $SCV0_2$ greater than 70%: mixed venous greater than or equal to 65%	_____ Consider Vasopressin for refractory septic shock	
	Source Control	_____ Confirm Infectious Source		
Signature:				

6011-027 R 3/08 (M)D

Nursing Policy on Sepsis Screening

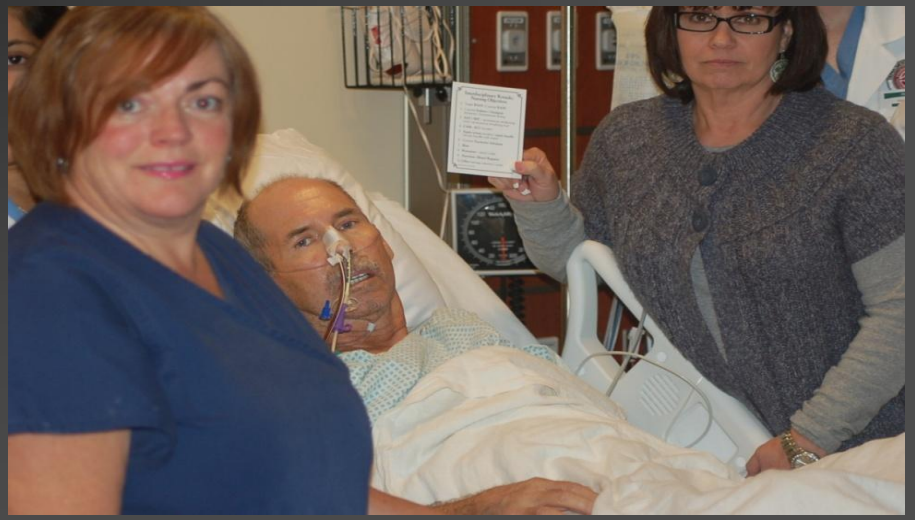
- Complicated
- Frequently misunderstood
- Screening every shift
  - EMR interfered
  - Delayed time to diagnosis
  - Went back to paper
- If you screen positive in our hospital:
  - RRT re-evaluates and verifies
  - Institutes early therapy

- Positive Screen
  - Blood cultures
  - Lactic acid and CBC
  - Fluid bolus
- Instituted by the nurse to assure no delay in care
- Hospital policy allows this in the nursing scope of practice

Accountable Multi-disciplinary Rounds

Who Shows Up?

- Nursing bedside
- Physician Team
- Pharmacy
- Respiratory therapy
- Nutrition
- Family



Accountable Multi-disciplinary Rounds

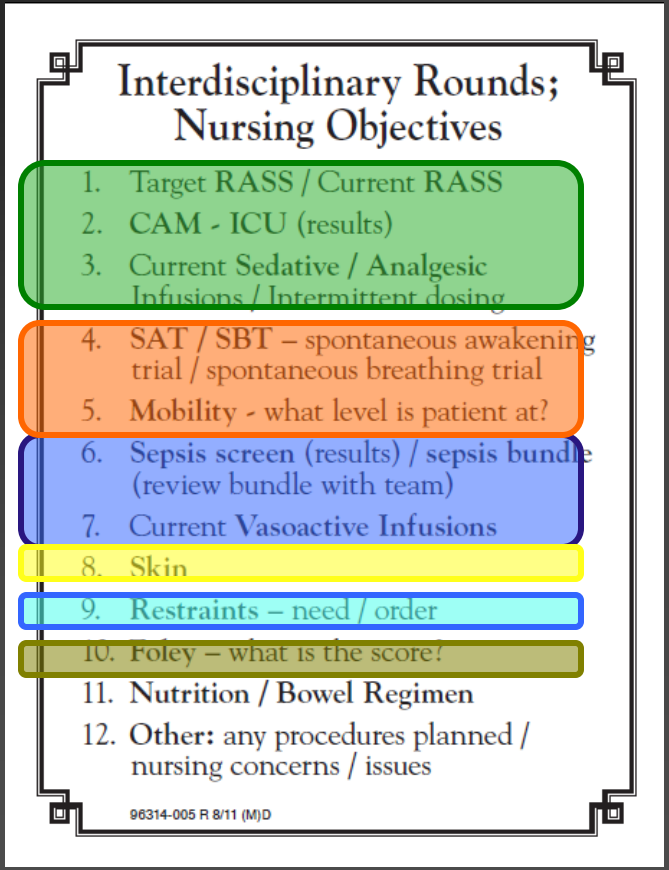
- Pre-defined content
  - Time constrained
  - Presented in specific order
  - Nursing card gone through in detail
  - Plan by systems with goals in each category
    - communicated clearly
    - follow-up defined

Interdisciplinary Rounds Card

Delirium

Sepsis

CaUTI



VAP

JCAHO

"Never Events"

Interdisciplinary Rounds Card

Interdisciplinary Rounds; Nursing Objectives

1. Target **RASS** / Current **RASS**
2. **CAM - ICU** (results)
3. Current **Sedative / Analgesic** Infusions / Intermittent dosing
4. **SAT / SBT –** spontaneous awakening trial / spontaneous breathing trial
5. **Mobility –** what level is patient at?

(Continued on back)

6. **Sepsis screen** (results) / **sepsis bundle** (review bundle with team)
7. Current **Vasoactive Infusions**
8. **Skin**
9. **Restraints –** need / order
10. **Foley –** what is the score?
11. **Nutrition / Bowel Regimen**
12. **Other:** any procedures planned /nursing concerns / issues

Leadership

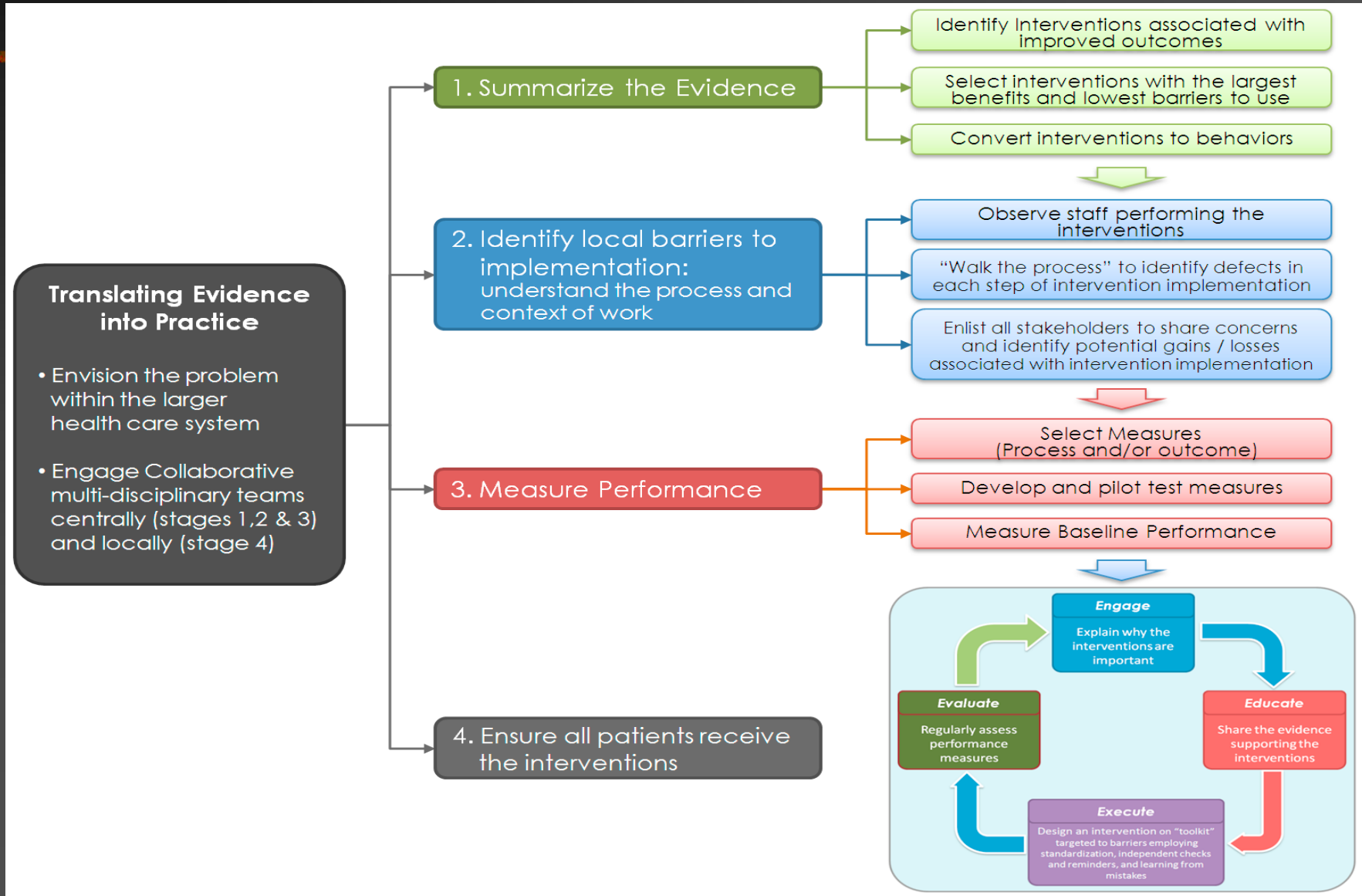
The People (Keystone ICU Group)

- Bedside nursing
- RT
- Pharmacy
- Doctors
- Administrators
- Performance Improvement

The Questions they answer

- Can we change practice through process improvement alone?
- Will successful change require altering the value structure?

Translating Evidence into Standard Practice



Leadership

- Closed SICU
- Multidisciplinary Rounds with “Nursing Card”
- Learn from a defect
- Define/implement Critical Care Standards of Nursing and Medical Practice
- Standardize RN-RN Shift Handoff
- Standardized Physician-to-physician Handoff
- Set protocols for managing common and life threatening diseases
- Enforce evidence based practices

Leadership: Mandatory Admission to the ICU for Severe Sepsis

- Difficult decision
- Because process alone showed non-compliance with evidence based practice
- Vetted through executive management
- All patients are admitted to an ICU if:
  - Suspected or documented infection and
  - Lactic Acid >4
  - We DO NOT require end organ dysfunction

Multidisciplinary Critical Care M&M

- M&M established
  - facilitate hospital-wide communication on issues related to Critical Care.
- Participants:
  - MICU
  - SICU
  - CICU
  - CT-ICU
- Meets Quarterly
  - Tracks all deaths & complications in all adult ICUs

The Insidious Complication

Delirium Control

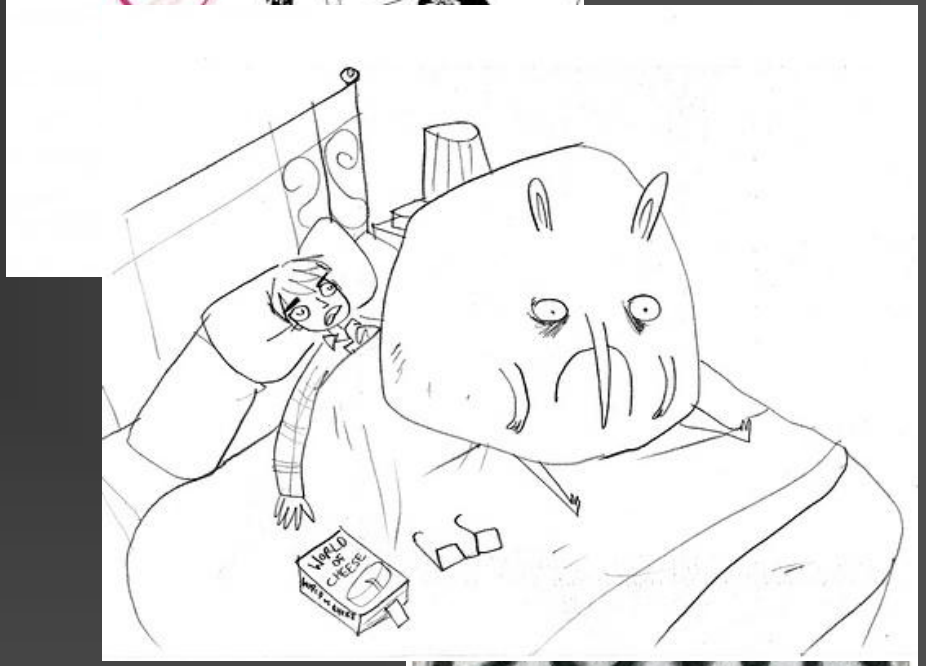
The Problem

- 33% increase in mortality
- 33% increase in ICU LOS and hospital LOS
- Poor quality of life
- PTSD

The Solution (…at least in part)

- Reducing exposure to sedatives
  - No dripped sedatives, PRN only if possible
- Non-pharmacological approaches to delirium control
  - Sleep protocols

Delirium Control



Delirium Education in a Surgical Intensive Care Unit Decreases the Use of Sedation in Critically Ill Patients

Lafond C, Yang A, Leichtle S, Nieman W, Posa P, Bander J, Anderson H, Brandt M, Purtill MA

Purpose: The objective of this study was to investigate the impact of a delirium prevention program on the use of continuous intravenous sedatives and analgesics in a surgical intensive care unit (SICU).

Hypothesis: A delirium prevention program will lead to a decrease in continuous, intravenous sedation (measured as average sedative days, S_{AD}) without an increase in self-extubation or inadvertent line removal.

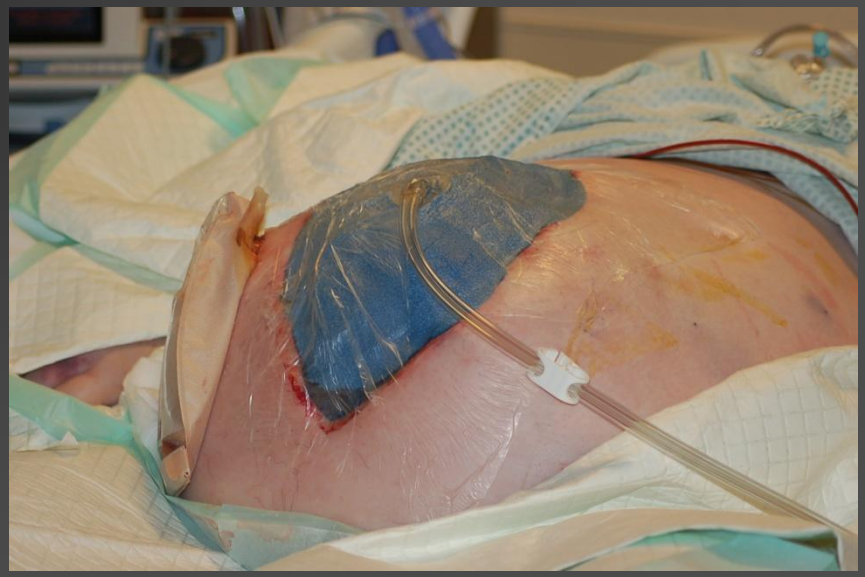
Design: Review of a prospectively collected database including all patients hospitalized in the SICU who were mechanically ventilated and had at least one continuous infusion of a sedative for the year before (Y_0) and after (Y_1) implementation of a delirium prevention program.

Results: One hundred eighty-four patients with a mean APACHE III score of 64 were recorded in the database in Y_0, and two hundred fourteen patients with a mean APACHE III score of 65 were recorded in Y_1. The number of S_{AD} decreased from 3.2 to 2.6 following implementation of the program ($P < .05$). The reduction of average days on propofol was significant (Y_0: 2.8 days, Y_1: 2.0 days; $P < .01$). There was no significant difference between Y_0 and Y_1 in regards to the risk of inadvertent line removal (4% versus 3%, $P > .05$) or self-extubation (3% versus 6%, $P > .05$). Patients did not require an increased amount of analgesic infusions (mean number of days on continuous IV analgesics, Y_0: 4.8, Y_1: 4.0, $P > .05$). There was no statistically significant difference between Y_0 and Y_1 in days of mechanical ventilation, length of stay in the SICU, and hospital length of stay ($P > .05$). Mortality was 14% (26/184 patients) in Y_0, and 15% (33/214 patients) in Y_1 ($P > .05$).

Conclusions: An ongoing delirium prevention program in a SICU significantly reduced the use of continuously infused sedatives. This reduction did not increase the number of adverse events. The program did not change the use of analgesic infusions, days of mechanical ventilation per patient, length of stay in the SICU, hospital length of stay, and mortality.

Decompressive Laparotomies

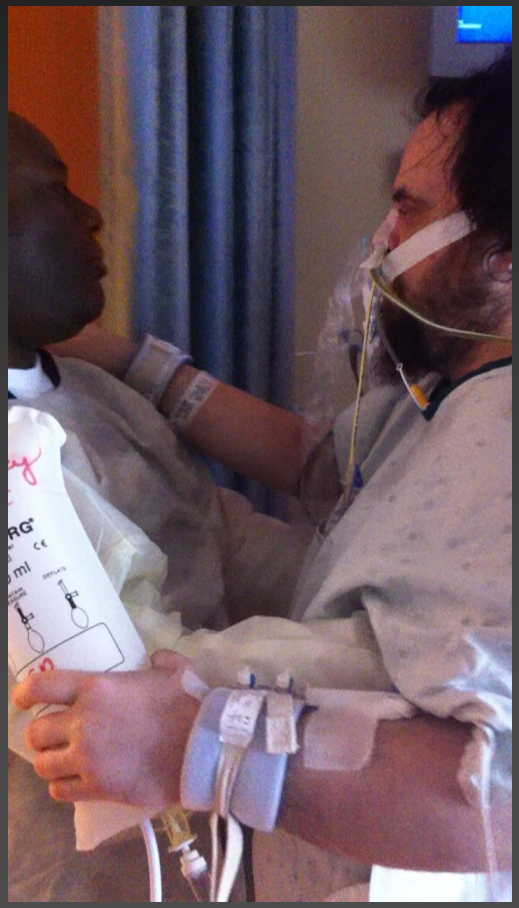
- Screening program
  - identifies people at risk for intra-abdominal hypertension
- Open Abdomens
  - Using more open abdomens for:
    - Sepsis
    - GI complications
    - Trauma



Ventilator Management

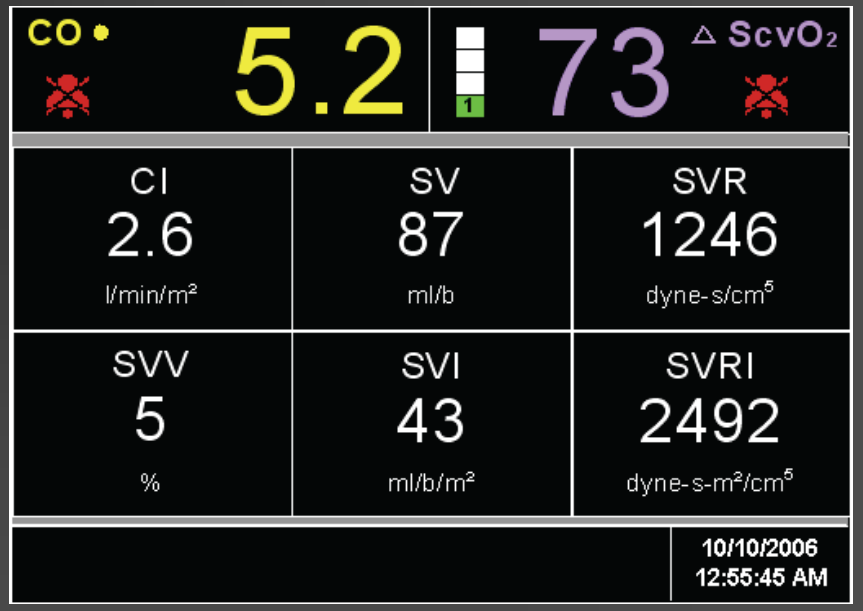
- Low Tidal Volume Ventilation per ARDS net recommendations
  - Start when identified with ALI (PF ratio<300)
- Open Lung Ventilation
  - APRV
- Proning
  - Early and often

Ventilator Management



Aggressive Hemodynamic Monitoring

- Non-invasive technology
- Minimal risk
- Physiology based decisions
  - Fluid management
  - When to start vasoactive agents



Keeping Up the Pace……

- Constant vigilance
- It takes a “bundle” of tools

END

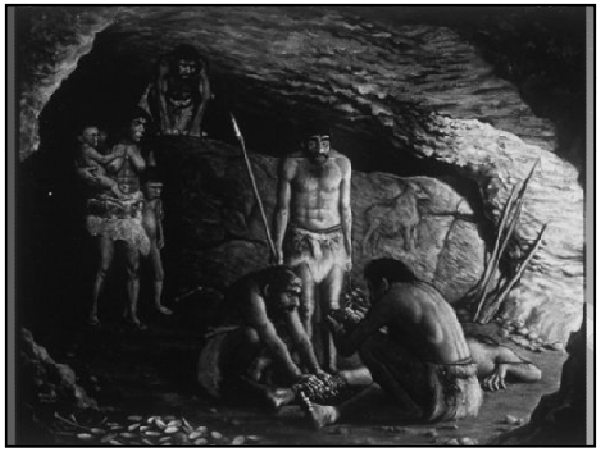
A Disciplined Approach to Implementation of Evidence-Based Practices Decreases ICU and Hospital Length of Stay in Traumatically Injured Patients

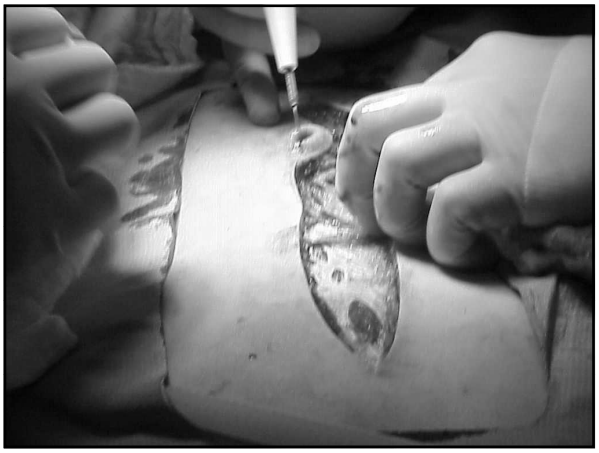
John P. Kepros MD,MBA

Objectives

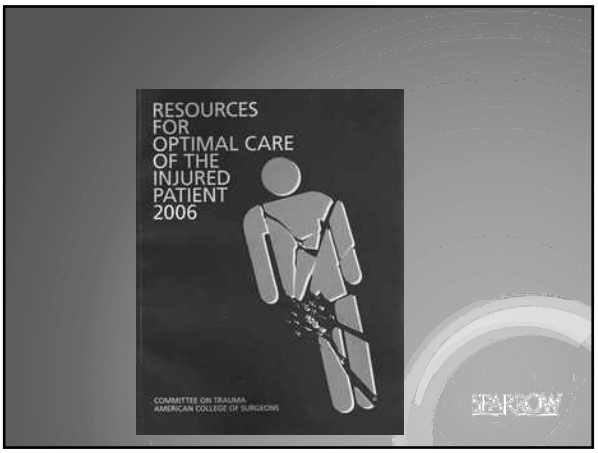
- Outline the performance improvement format used over the last 7 years by the Sparrow trauma service line
- Characterize the depth and extent of the commitment to evidence based practices in our trauma service line
- Explicate the interaction identified between process and outcome in our service line

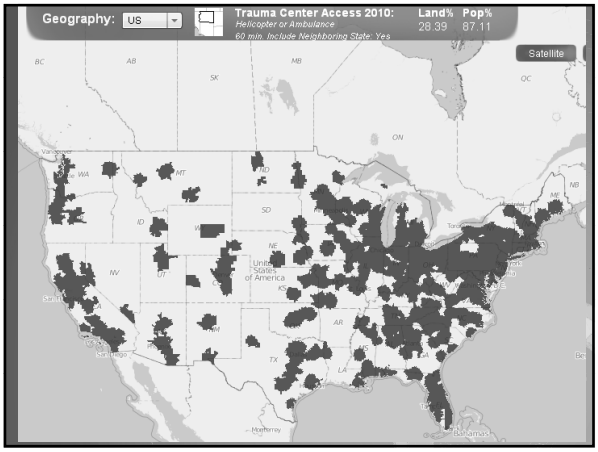
Trauma Overview and Perspective





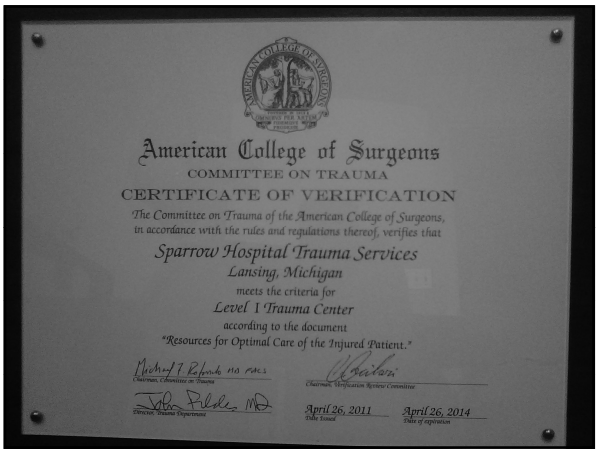
Cook County-1966-First Trauma Center

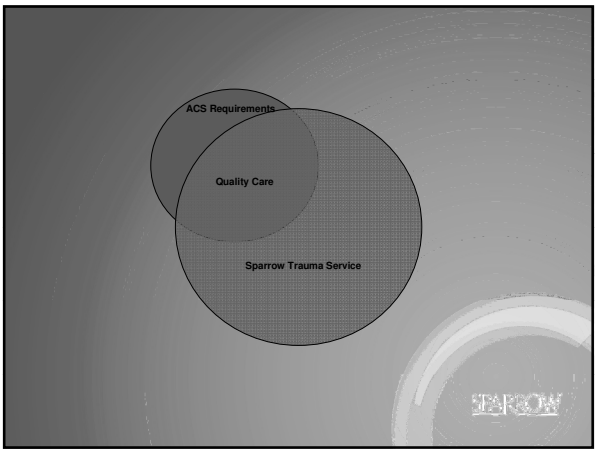




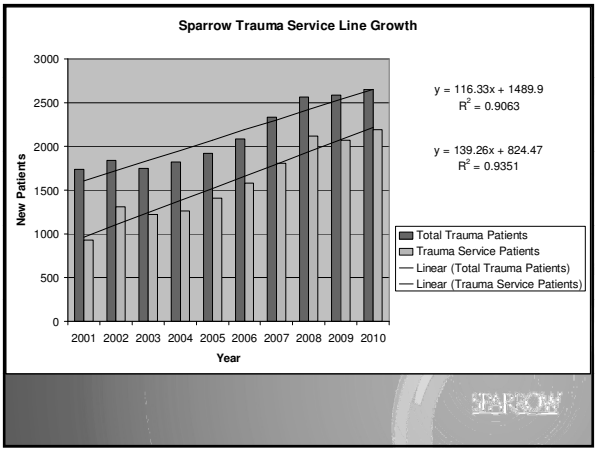
Sparrow Trauma Performance Improvement

Formula Trauma™


American College of Surgeons
COMMITTEE ON TRAUMA
CERTIFICATE OF VERIFICATION
The Committee on Trauma of the American College of Surgeons,
in accordance with the rules and regulations thereof, verifies that
Sparrow Hospital Trauma Services
Lansing, Michigan
meets the criteria for
Level I Trauma Center
according to the document
"Resources for Optimal Care of the Injured Patient."
April 26, 2011
Date Issued
April 26, 2014
Date of expiration


ACS Requirements
Quality Care
Sparrow Trauma Service
SPARROW


Maria Maier
SPARROW


Sparrow Trauma Service Line Growth
New Patients
Year
y = 116.33x + 1489.9
R2 = 0.9063
y = 139.26x + 824.47
R2 = 0.9351
Total Trauma Patients
Trauma Service Patients
Linear (Total Trauma Patients)
Linear (Trauma Service Patients)
SPARROW


PATIENT SAFETY
SPARROW


SAFETY
ERRORS & ADVERSE EVENTS
'Global Trigger Tool' Shows That Adverse Events In Hospitals May Be Ten Times Greater Than Previously Measured
ABSTRACT Identification and measurement of adverse medical events is central to patient safety, forming a foundation for accountability, prioritizing problems to work on, generating ideas for safer care, and testing which interventions work. We compared three methods to detect adverse events in hospitalized patients, using the same patient sample set from three leading hospitals. We found that the adverse event detection methods commonly used to track patient safety in the United States today—voluntary reporting and the Agency for Healthcare Research and Quality's Patient Safety Indicators—fared very poorly compared to other methods and missed 90 percent of the adverse events. The Institute for Healthcare Improvement's Global Trigger Tool found at least ten times more confirmed, serious events than these other methods. Overall, adverse events occurred in one-third of hospital admissions. Reliance on voluntary reporting and the Patient Safety Indicators could produce misleading conclusions about the current safety of care in the US health care system and misdirect efforts to improve patient safety.

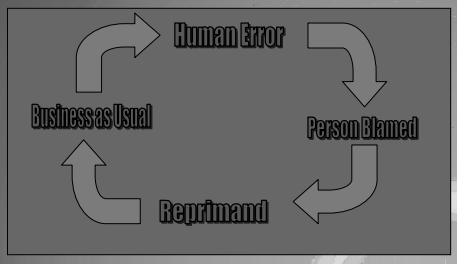
Bad Apple Theory (Old View)

SAFETY

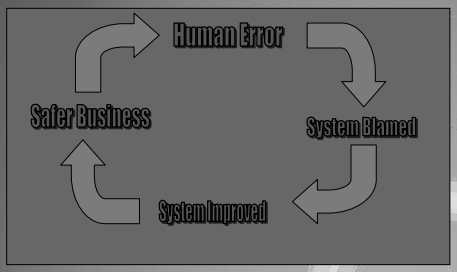
"Blunt end"
Latent
Administrative
Hidden

"Sharp end"
Acute
Provider
Obvious

SAFETY



SAFETY

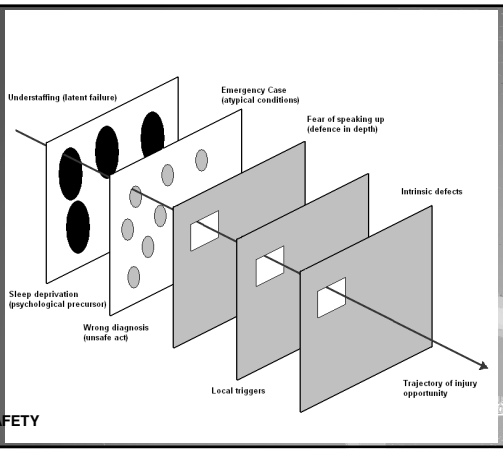


SAFETY

"Small changes can produce big results…but the areas of highest leverage are often the least obvious."

Peter Senge
The Fifth Discipline

SAFETY



SAFETY

STRUCTURE

The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

A National Evaluation of the Effect of Trauma-Center Care on Mortality

Ellen J. MacKenzie, Ph.D., Frederick P. Rivara, M.D., M.P.H., Gregory J. Jurkovich, M.D., Avery B. Nathens, M.D., Ph.D., Katherine P. Frey, M.P.H., Brian L. Egleston, M.P.P., David S. Salkever, Ph.D., and Daniel O. Scharfstein, Sc.D.

CONCLUSIONS

Our findings show that the risk of death is significantly lower when care is provided in a trauma center than in a non–trauma center and argue for continued efforts at regionalization.

N ENGL J MED 354:4 WWW.NEJM.ORG JANUARY 26, 2006

TRAUMA SYSTEMS

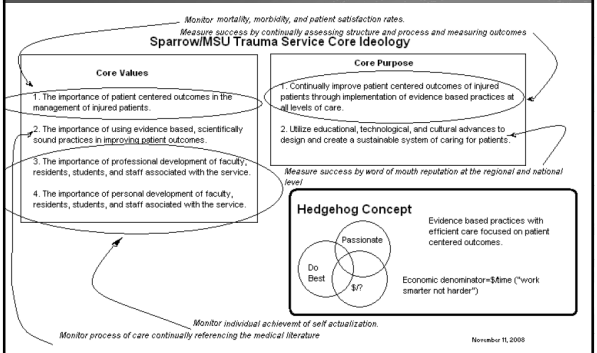
ORIGINAL RESEARCH | IMPROVING PATIENT CARE

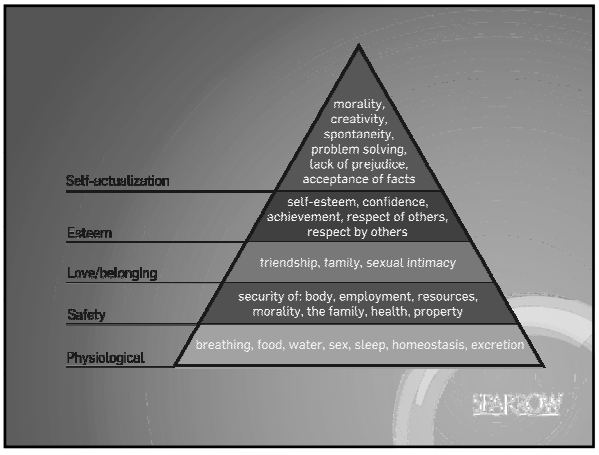
What Distinguishes Top-Performing Hospitals in Acute Myocardial Infarction Mortality Rates?

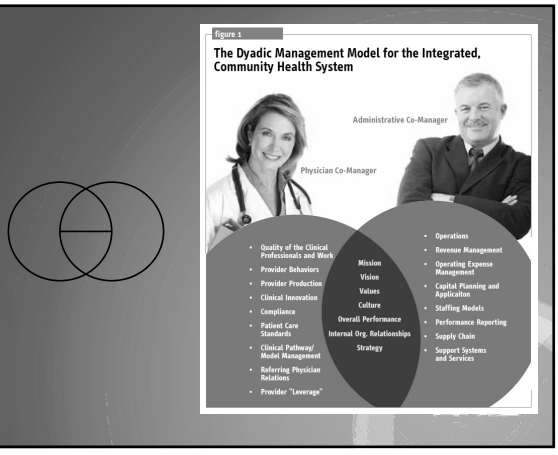
A Qualitative Study

Leslie A. Curry, PhD; Erica Spatz, MD; Emily Cherlin, PhD, MSW; Jennifer W. Thompson, MPP; David Berg, PhD; Henry H. Ting, MD, MBA; Carole Decker, RN, PhD; Harlan M. Krumholz, MD, SM; and Elizabeth H. Bradley, PhD

Conclusion: High-performing hospitals were characterized by an organizational culture that supported efforts to improve AMI care across the hospital. Evidence-based protocols and processes, although important, may not be sufficient for achieving high hospital performance in care for patients with AMI.

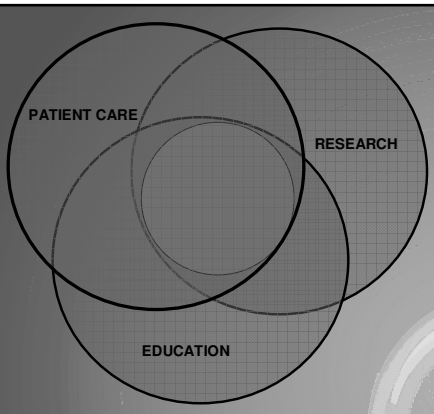




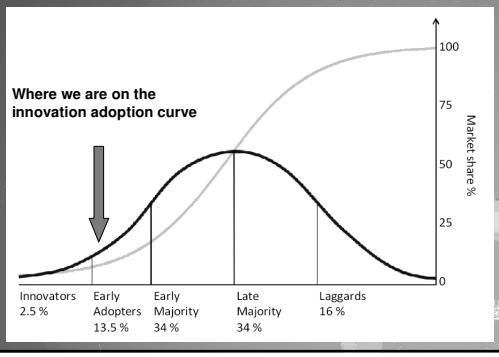


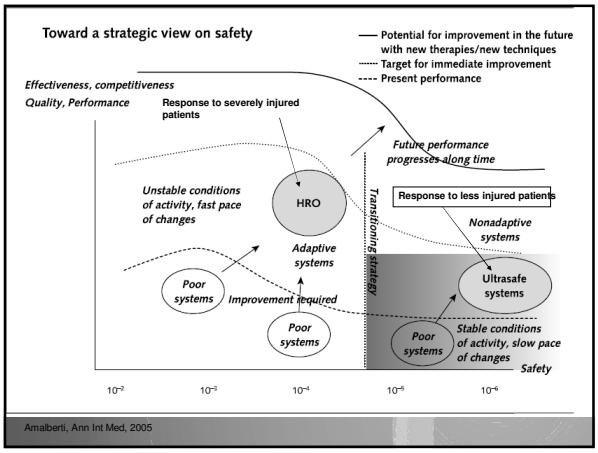
Penny Stevens PhD

John Kepros MD

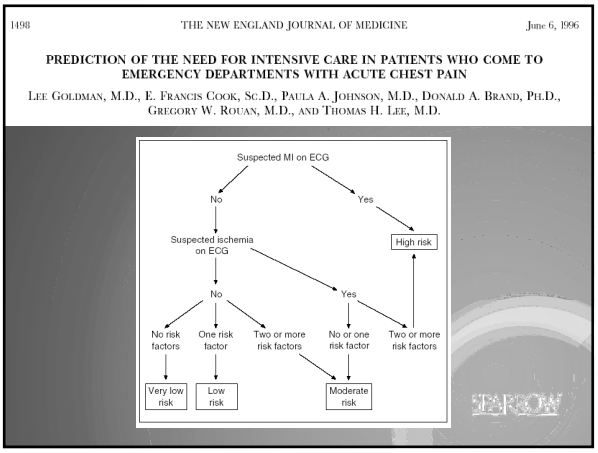


Synergy of Patient Care, Research, and Education





Amalberti, Ann Int Med, 2005



1498 THE NEW ENGLAND JOURNAL OF MEDICINE June 6, 1996

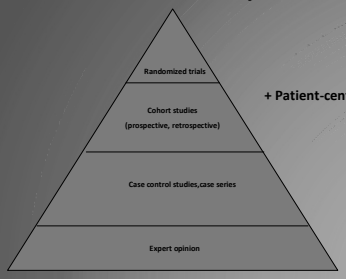
PREDICTION OF THE NEED FOR INTENSIVE CARE IN PATIENTS WHO COME TO EMERGENCY DEPARTMENTS WITH ACUTE CHEST PAIN

LEE GOLDMAN, M.D., E. FRANCIS COOK, SC.D., PAULA A. JOHNSON, M.D., DONALD A. BRAND, PH.D., GREGORY W. ROUAN, M.D., AND THOMAS H. LEE, M.D.

EAST redesigned

Check out our new website and mobile practice management guidelines.

Hierarchy of Evidence



+ Patient-centered outcome

If there is not high-level evidence, we should try to find several sources of supporting evidence.

FACT SHEET

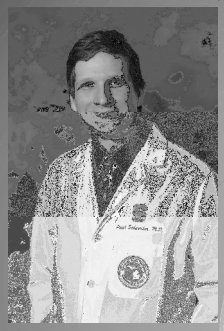
THE LEAPFROG GROUP for Patient Safety
Rewarding Higher Standards
March 2005

- **Computer Physician Order Entry (CPOE)**: With CPOE systems, hospital staff enter medication orders via computer linked to prescribing error prevention software. CPOE has been shown to reduce serious prescribing errors in hospitals by **more than 50%**.
- **Evidence-Based Hospital Referral (EHR)**: Consumers and health care purchasers should choose hospitals with extensive experience and the best results with certain high-risk surgeries and conditions. By referring patients needing certain complex medical procedures to hospitals offering the best survival odds based on scientifically valid criteria — such as the number of times a hospital performs these procedures each year or other process or outcomes data — research indicates that a patient's risk of dying could be reduced by **40%**.
- **ICU Physician Staffing (IPS)**: Staffing ICUs with doctors who have special training in critical care medicine, called 'intensivists', has been shown to reduce the risk of patients dying in the ICU by **40%.**
- **The Leapfrog Safe Practices Score - The National Quality Forum's 27 Safe Practices:** The National Quality Forum-endorsed 30 Safe Practices cover a range of practices that, if utilized, would reduce the risk of harm in certain processes, systems or environments of care. Included in the 30 practices are the original 3 Leapfrog leaps. For this new leap, added in April 2004, hospitals' progress on the remaining 27 safe practices will be assessed.

ICU

Chet Morrison MD

Paul Schneider MD



PROCESS

Technical Knowledge

↓

Adaptive Knowledge

TECHNICAL PROBLEMS VS. ADAPTIVE CHALLENGES

The single biggest failure of leadership is to treat adaptive challenges like technical problems.

TECHNICAL PROBLEMS	ADAPTIVE CHALLENGES
1. Easy to identify	1. Difficult to identify (easy to deny)
2. Often lend themselves to quick and easy (cut-and-dried) solutions	2. Require changes in values, beliefs, roles, relationships, & approaches to work
3. Often can be solved by an authority or expert	3. People with the problem do the work of solving it
4. Require change in just one or a few places; often contained within organizational boundaries	4. Require change in numerous places; usually cross organizational boundaries
5. People are generally receptive to technical solutions	5. People often resist even acknowledging adaptive challenges.
6. Solutions can often be implemented quickly—even by edict	6. "Solutions" require experiments and new discoveries; they can take a long time to implement and cannot be implemented by edict

EXAMPLES

- Take medication to lower blood pressure
- Implement electronic ordering and dispensing of medications in hospitals to reduce errors and drug interactions
- Increase penalty for drunk driving
- Change lifestyle to eat healthy, get more exercise and lower stress
- Encourage nurses and pharmacists to question and even challenge illegible or dangerous prescriptions by physicians
- Raise public awareness of the dangers and effects of drunk driving, targeting teenagers in particular

Adapted from Ronald A. Heifetz & Donald L. Laurie, "The Work of Leadership," Harvard Business Review, January–February 1997, and Ronald A. Heifetz & Marty Linsky, *Leadership on the Line*, Harvard Business School Press, 2002

GROUPSMITH

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

Trauma Team Oversight Improves Efficiency of Care and Augments Clinical and Economic Outcomes

Kimberly A. Davis, MD, FACS, Nicole C. Cabbad, BS, Kevin M. Schuster, MD, Lewis J. Kaplan, MD, Carla Carusone, RN, Tucker Leary, MBA, and Robert Udelsman, MD, MBA

Background: The purpose of this study was to determine whether trauma team oversight of patient management would positively affect efficiency of care as defined by improved patient throughput, with augmentation of both clinical and economic outcomes.

Methods: All patients activating the trauma team at a level I trauma center during two time periods (last 6 months of 2005 and 2006) were reviewed. Trauma team activation criteria remained constant across the two time periods. During period one, patients were admitted to multiple services depending on injury pattern, whereas in period two, most patients were admitted to the trauma service for trauma team oversight of their management. In period two, improved documentation and appropriate coding were encouraged. Data are reported as mean ± SD, and median.

Results: Patient demographics, number of full-time trauma surgeons, and payer mix were similar during the two time periods. Trauma activations increased 150% ($p < 0.05$). The percentage of patients admitted to the trauma service increased (68% vs. 86%, $p < 0.001$). Median injury severity score (ISS) of admitted patients was unchanged, although mean ISS decreased (15 ± 15 vs. 12 ± 11, $p < 0.0001$). Linear regression analysis identified ISS and admission during the later time period as significant predictors of decreased length of stay. Changes in billings and coding practices resulted in statistically significant increases in trauma surgeon work-related relative value units (182% increase), charges (360% increase), and collections (280% increase). The increased system efficiency resulted in significant decreases in the actual hospital costs per patient and led to the generation of an overall net positive hospital contribution margin per patient.

Conclusions: Implementation of trauma team oversight of patient care resulted in increased efficiency of care delivery, with shorter hospital lengths of stay despite increased patient volume. This paradigm change, coupled with improved documentation and coding, resulted in improved reimbursement for the physician, and lower cost per discharge for the hospital.

Key Words: Contribution margin, Remuneration, wRVUs, Outcomes, Trauma systems.

J Trauma. 2008;65:1236–1244.

TRAUMA SYSTEMS

The New England
Journal of Medicine

Volume 331 OCTOBER 27, 1994 Number 17

IMMEDIATE VERSUS DELAYED FLUID RESUSCITATION FOR HYPOTENSIVE PATIENTS WITH PENETRATING TORSO INJURIES

WILLIAM H. BICKELL, M.D., MATTHEW J. WALL, JR., M.D., PAUL E. PEPE, M.D., R. RUSSELL MARTIN, M.D., VICTORIA F. GINGER, M.S.N., MARY K. ALLEN, B.A., AND KENNETH L. MATTOX, M.D.

Abstract *Background.* Fluid resuscitation may be detrimental when given before bleeding is controlled in patients with trauma. The purpose of this study was to determine the effects of delaying fluid resuscitation until the time of operative intervention in hypotensive patients with penetrating injuries to the torso.

Methods. We conducted a prospective trial comparing immediate and delayed fluid resuscitation in 598 adults with penetrating torso injuries who presented with a prehospital systolic blood pressure ≤90 mm Hg. The study setting was a city with a single centralized system of prehospital emergency care and a single receiving facility for patients with major trauma. Patients assigned to the immediate-resuscitation group received standard fluid resuscitation before they reached the hospital and in the trauma center, and those assigned to the delayed-resuscitation group received intravenous cannulation but no fluid resuscitation until they reached the operating room.

Results. Among the 289 patients who received delayed fluid resuscitation, 205 (70 percent) survived and were discharged from the hospital, as compared with 193 of the 309 patients (62 percent) who received immediate fluid resuscitation ($P = 0.04$). The mean estimated intraoperative blood loss was similar in the two groups. Among the 238 patients in the delayed-resuscitation group who survived to the postoperative period, 55 (23 percent) had one or more complications (adult respiratory distress syndrome, sepsis syndrome, acute renal failure, coagulopathy, wound infection, and pneumonia), as compared with 69 of the 227 patients (30 percent) in the immediate-resuscitation group ($P = 0.08$). The duration of hospitalization was shorter in the delayed-resuscitation group.

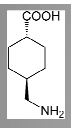
Conclusions. For hypotensive patients with penetrating torso injuries, delay of aggressive fluid resuscitation until operative intervention improves the outcome. (N Engl J Med 1994;331:1105-9.)

PREHOSPITAL

Effects of tranexamic acid on death, vascular occlusive events, and blood transfusion in trauma patients with significant haemorrhage (CRASH-2): a randomised, placebo-controlled trial

*CRASH-2 trial collaborators**

Interpretation Tranexamic acid safely reduced the risk of death in bleeding trauma patients in this study. On the basis of these results, tranexamic acid should be considered for use in bleeding trauma patients.



www.thelancet.com Published online June 15, 2010 DOI:10.1016/S0140-6736(10)60835-5

ED

Effect of whole-body CT during trauma resuscitation on survival: a retrospective, multicentre study

*Stefan Huber-Wagner, Rolf Lefering, Lars-Mikael Qvick, Markus Körner, Michael V Kay, Klaus-Jürgen Pfeifer, Maximilian Reiser, Wolf Mutschler, Karl-Georg Kanz, on behalf of the Working Group on Polytrauma of the German Trauma Society**

Interpretation Integration of whole-body CT into early trauma care significantly increased the probability of survival in patients with polytrauma. Whole-body CT is recommended as a standard diagnostic method during the early resuscitation phase for patients with polytrauma.

www.thelancet.com Published online March 24, 2009 DOI:10.1016/S0140-6736(09)60232-4

ED

The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population

Alex B. Haynes, M.D., M.P.H., Thomas G. Weiser, M.D., M.P.H., William R. Berry, M.D., M.P.H., Stuart R. Lipsitz, Sc.D., Abdel-Hadi S. Breizat, M.D., Ph.D., E. Patchen Dellinger, M.D., Teodoro Herbosa, M.D., Sudhir Joseph, M.S., Pascience L. Kibatala, M.D., Marie Carmela M. Lapitan, M.D., Alan F. Merry, M.B., Ch.B., F.A.N.Z.C.A., F.R.C.A., Krishna Moorthy, M.D., F.R.C.S., Richard K. Reznick, M.D., M.Ed., Bryce Taylor, M.D., and Atul A. Gawande, M.D., M.P.H., for the Safe Surgery Saves Lives Study Group*

CONCLUSIONS

Implementation of the checklist was associated with concomitant reductions in the rates of death and complications among patients at least 16 years of age who were undergoing noncardiac surgery in a diverse group of hospitals.

N ENGL J MED 360;5 NEJM.ORG JANUARY 29, 2009

OR

The American Journal of Surgery (2009) 197, 565–570

The American Journal of Surgery®

The North Pacific Surgical Association

A high ratio of plasma and platelets to packed red blood cells in the first 6 hours of massive transfusion improves outcomes in a large multicenter study

Karen A. Zink, M.D., Chitra N. Sambasivan, M.D., John B. Holcomb, M.D., Gary Chisholm, Ph.D., Martin A. Schreiber, M.D.*

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KEYWORDS:
Traumatic hemorrhage; Hemorrhagic shock; Massive transfusion; Transfusion ratios; Coagulopathy of trauma

Abstract

BACKGROUND: In trauma, most hemorrhagic deaths occur within the first 6 hours. This study examined the effect on survival of high ratios of fresh frozen plasma (FFP) and platelets (PLTs) to packed red blood cells (PRBCs) in the first 6 hours.

METHODS: Records of 466 massive transfusion trauma patients (≥10 U of PRBCs in 24 hours) at 16 level 1 trauma centers were reviewed. Transfusion ratios in the first 6 hours were correlated with outcome.

RESULTS: All groups had similar baseline characteristics. Higher 6-hour ratios of FFP:PRBCs and PLTs:PRBCs lead to improved 6-hour mortality (from 37.3 [in the lowest ratio group] to 15.7 [in the middle ratio group] to 2.0% [in the highest ratio group] and 22.8% to 19.0% to 3.2%, respectively) and in-hospital mortality (from 54.9 to 41.1 to 25.5% and 43.7% to 46.8% to 27.4%, respectively). Initial higher ratios of FFP:PRBCs and PLTs:PRBCs decreased overall PRBC transfusion.

CONCLUSIONS: The early administration of high ratios of FFP and platelets improves survival and decreases overall PRBC need in massively transfused patients. The largest difference in mortality occurs during the first 6 hours after admission, suggesting that the early administration of FFP and platelets is critical.

OR

MHA We Advocate for Hospitals *and the Patients They Serve*

Home | About Us | Collaboratives | Newsroom | Events | MHA Keystone: Team Members Site

MHA Keystone: Surgery

MHA KEYSTONE CENTER FOR PATIENT SAFETY & QUALITY

MHA *Keystone: Surgery*

Background: Michigan hospitals perform approximately 320,000 surgeries each year. National estimates report complications at 3 percent, resulting in up to 16,000 surgical complications. In addition, literature shows that mortality rates as a result of surgical complications are roughly 5 percent (including infections and other post-surgical complications), costing an estimated $250 million.

In fall 2007, the MHA Keystone Center, in partnership with the Johns Hopkins University Quality and Safety Research Group, launched *MHA Keystone: Surgery*. This collaborative now includes more than 100 Michigan hospitals voluntarily participating to improve perioperative patient safety.

MHA Keystone: Surgery aims to eliminate surgical-site infections, prevent mislabeling of specimens, prevent defects in care (including serious adverse events such as wrong-site surgery and retained foreign objects), and improve or reinforce the cultures of safety at participating hospitals.

Collaborative interventions focus on methods to improve communication among members of the surgical team. Briefings are conducted before surgery to confirm the correct patient is in the operating room, to verify the surgical site, to ensure the proper equipment is accessible and to outline possible complications. Debriefings are conducted by the surgical team immediately following the procedure to identify defects and discuss the patient's future needs, ensuring a smooth transition to postoperative care.

Lean/Six Sigma[1] is used to identify process gaps and eliminate the mislabeling of specimens removed during surgery. Proper labeling and transporting of specimens reduces the risk of misdiagnosis and the potential need for repeat surgery.

Results: Since fall 2007, nearly 443,000 surgical briefings and debriefings have been completed by participating hospitals. Briefings and debriefings are occurring for roughly 85 percent of the surgeries in participating hospitals. *MHA Keystone: Surgery* teams have been collecting specimen defect data since fall 2009 and are reviewing and revising the processes used for specimen collection.

A surgeon advisory board has been established to provide in-state guidance for the *MHA Keystone: Surgery* collaborative as it becomes independent of the Johns Hopkins University Quality and Safety Research Group. The board of Michigan physicians will incorporate firsthand knowledge of state-specific issues.

Future: As the data submitted to the MHA PSO becomes aggregately available, it will be used to support the collaborative's efforts in addressing wrong-site surgery and retained foreign objects. Participants will include briefings and debriefings as part of

OR

Guidelines for the Management of Severe Traumatic Brain Injury

3rd Edition

A Joint Project of the

Brain Trauma Foundation
Improving the Outcome of Brain Trauma Patients Worldwide

and

American Association of Neurological Surgeons (AANS)
Congress of Neurological Surgeons (CNS)
AANS/CNS Joint Section on Neurotrauma and Critical Care

Mary Ann Liebert, Inc. *publishers*

ICU

The New England Journal of Medicine

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*

Conclusions In patients with acute lung injury and the acute respiratory distress syndrome, mechanical ventilation with a lower tidal volume than is traditionally used results in decreased mortality and increases the number of days without ventilator use. (N Engl J Med 2000;342:1301-8.)

ICU

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ISSN: 0022-5282
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[Articles]

The Golden Hour and the Silver Day: Detection and Correction of Occult Hypoperfusion within 24 Hours Improves Outcome from Major Trauma

Blow, Osbert MD, PhD; Magliore, Lissa BS; Claridge, Jeffrey A. MD; Butler, Kathy RN; Young, Jeffrey S. MD

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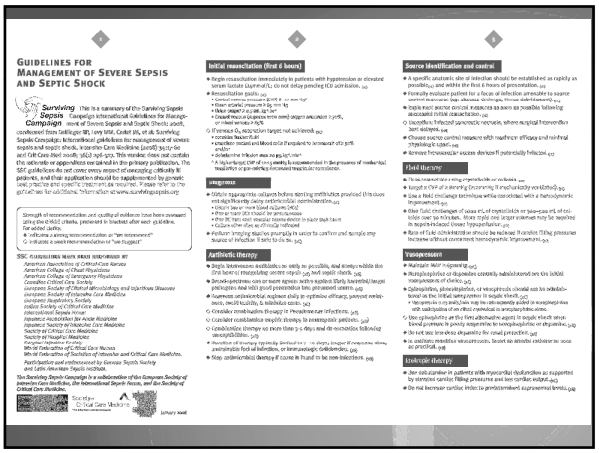
First Place, Resident Trauma Paper Competition, Region III, American College of Surgeons Committee on Trauma, December 6, 1997.

Conclusion: Initial lactic acidosis is associated with lower cardiac performance and higher morbidity and mortality. Persistent OH is associated with higher rates of RC, MSOF, and death after severe trauma. Early identification and aggressive resuscitation aimed at correcting continued elevation in serum lactate improves survival and reduces complications in severely injured trauma patients.

ICU



GUIDELINES FOR MANAGEMENT OF SEVERE SEPSIS AND SEPTIC SHOCK

Surviving Sepsis Campaign

Initial resuscitation (first 6 hours)

Source identification and control

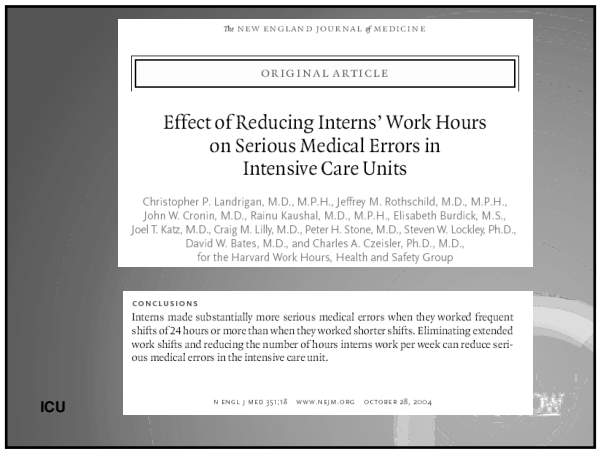
Fluid therapy

Vasopressors

Inotropic therapy

Antibiotic therapy

ICU



The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Effect of Reducing Interns' Work Hours on Serious Medical Errors in Intensive Care Units

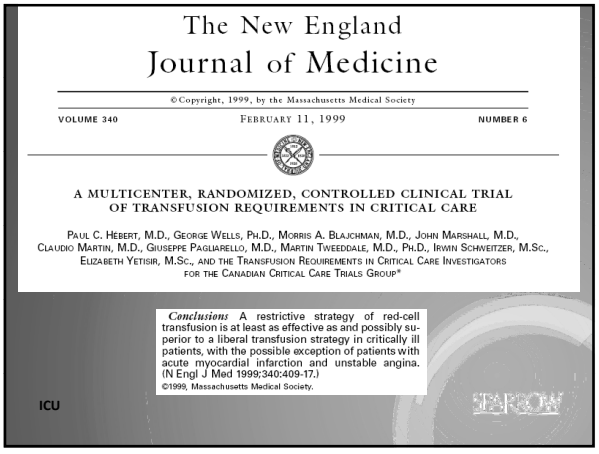
Christopher P. Landrigan, M.D., M.P.H., Jeffrey M. Rothschild, M.D., M.P.H., John W. Cronin, M.D., Rainu Kaushal, M.D., M.P.H., Elisabeth Burdick, M.S., Joel T. Katz, M.D., Craig M. Lilly, M.D., Peter H. Stone, M.D., Steven W. Lockley, Ph.D., David W. Bates, M.D., and Charles A. Czeisler, Ph.D., M.D., for the Harvard Work Hours, Health and Safety Group

CONCLUSIONS

Interns made substantially more serious medical errors when they worked frequent shifts of 24 hours or more than when they worked shorter shifts. Eliminating extended work shifts and reducing the number of hours interns work per week can reduce serious medical errors in the intensive care unit.

N ENGL J MED 351;18 WWW.NEJM.ORG OCTOBER 28, 2004

ICU



The New England Journal of Medicine

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VOLUME 340 FEBRUARY 11, 1999 NUMBER 6

A MULTICENTER, RANDOMIZED, CONTROLLED CLINICAL TRIAL OF TRANSFUSION REQUIREMENTS IN CRITICAL CARE

PAUL C. HÉBERT, M.D., GEORGE WELLS, PH.D., MORRIS A. BLAJCHMAN, M.D., JOHN MARSHALL, M.D., CLAUDIO MARTIN, M.D., GIUSEPPE PAGLIAROLLO, M.D., MARTIN TWEEDDALE, M.D., PH.D., IRWIN SCHWEITZER, M.SC., ELIZABETH YETISIR, M.SC., AND THE TRANSFUSION REQUIREMENTS IN CRITICAL CARE INVESTIGATORS FOR THE CANADIAN CRITICAL CARE TRIALS GROUP*

Conclusions A restrictive strategy of red-cell transfusion is at least as effective as and possibly superior to a liberal transfusion strategy in critically ill patients, with the possible exception of patients with acute myocardial infarction and unstable angina. (N Engl J Med 1999;340:409-17.)

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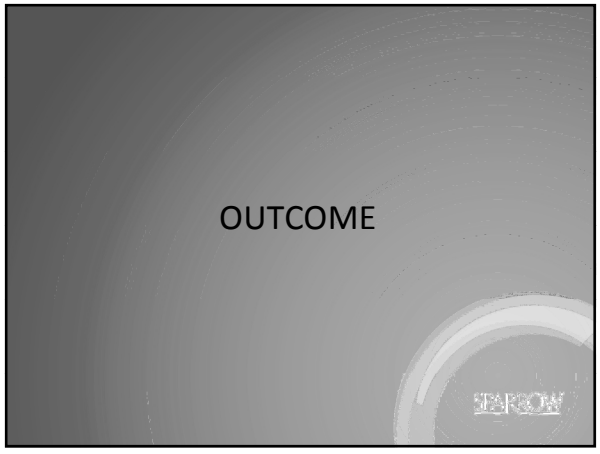
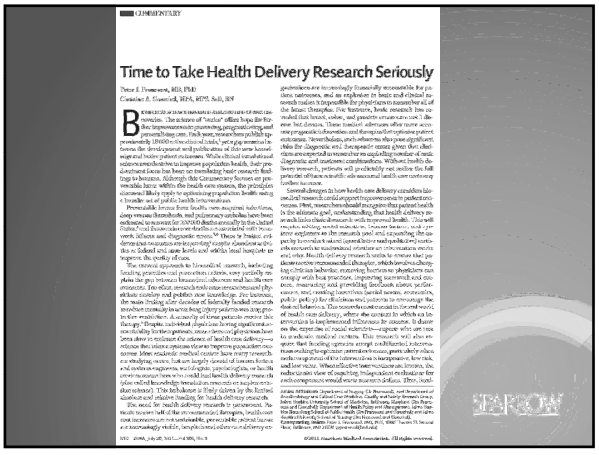


OUTCOME



COMMENTARY

Time to Take Health Delivery Research Seriously

JSR Journal of Surgical Research

Presented at the 5th Annual Academic Surgical Congress, San Antonio, Texas February 3–5, 2010

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ASSOCIATION FOR ACADEMIC SURGERY

A Disciplined Approach to Implementation of Evidence-Based Practices Decreases ICU and Hospital Length of Stay in Traumatically Injured Patients

Benjamin Mosher MD

TABLE 1

Trauma Resuscitation Protocol

Trauma resuscitation
1. Serum lactate measured
2. In the event of hypotension and/or lactate > 2 mmol/L:
a. Deliver an initial minimum of 20 mL/kg of crystalloid
b. Apply vasopressors for hypotension not responding to initial fluid resuscitation to maintain mean arterial (MAP) ≥ 65 mm Hg
3. In the event of persistent hypotension despite fluid resuscitation and/or lactate > 4 mmol/L
a. Achieve central venous pressure (CVP) of ≥ 8 mm Hg
b. Achieve central venous oxygen saturation of ≥ 70%

TABLE 2

Sepsis Bundle

Sepsis bundle (6-h goals)
1. Serum lactate measured
2. Blood cultures obtained prior to antibiotic administration
3. From the time of presentation, broad spectrum antibiotics administered within 3 h for ED admissions and 1 h for non-ED ICU admissions
4. In the event of hypotension and/or lactate > 2 mmol/L:
a. Deliver an initial minimum of 20 mL/kg of crystalloid
b. Apply vasopressors for hypotension not responding to initial fluid resuscitation to maintain mean arterial (MAP) ≥ 65 mm Hg
5. In the event of persistent hypotension despite fluid resuscitation and/or lactate > 4 mmol/L:
a. Achieve central venous pressure (CVP) of ≥8 mm Hg
b. Achieve central venous oxygen saturation of ≥ 70%
Sepsis bundle (24-h goals)
1. Low-dose steroids administered for septic shock in accordance with a standardized ICU policy
2. Drotrecogin alfa (activated) administered in accordance with standardized ICU policy
3. Glucose control maintained ≥ lower limit of normal, but <150 mg/dL
4. Inspiratory plateau pressures maintained <30 cm H_2O for mechanically ventilated patients

TABLE 4

Patient Demographics

	2000-2003	2005-2008	*P*-Value
Mean age (y)	43.9 yrs	45.9 yrs	0.260
Male (%)	66.4%	71.8%	0.610
Mean ISS	29	27	0.250
Blunt trauma (%)	87.1%	89.0%	0.913

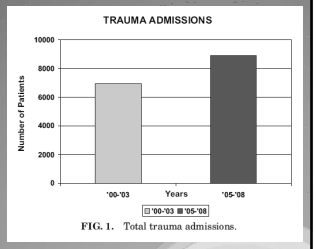


FIG. 1. Total trauma admissions.

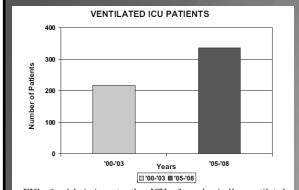


FIG. 2. Admissions to the ICU of mechanically ventilated patients.

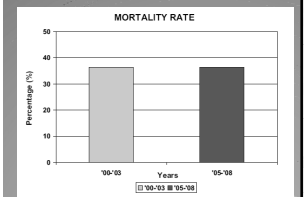


FIG. 3. Mortality rate was 36.4% *versus* 36.5% ($P = 0.944$).

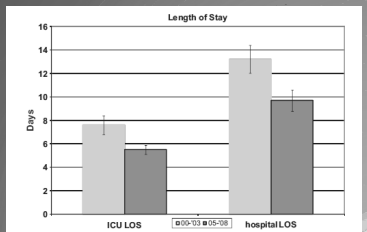
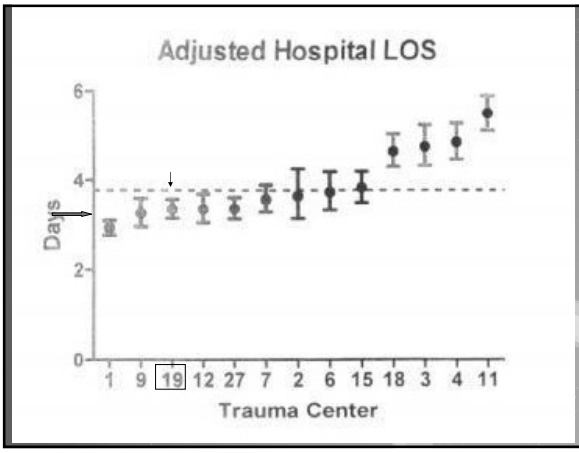
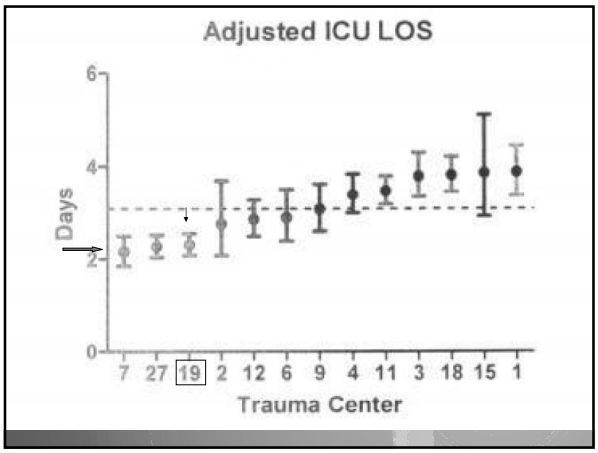


FIG. 4. Duration o ICU and hospital days (error bars ± SEM).





PAPER

Prospective Evaluation of the Safety of Enoxaparin Prophylaxis for Venous Thromboembolism in Patients With Intracranial Hemorrhagic Injuries

Scott H. Norwood, MD; Clyde E. McAuley, MD; John D. Berne, MD; Van L. Vallina, MD; D. Brent Kerns, MD; Thomas W. Grahm, MD; Kevin Short, MD; Jerry W. McLarty, PhD

Background: Patients with traumatic intracranial hemorrhagic injuries (IHIs) are at high risk for venous thromboembolism (VTE). The safety of early anticoagulation for IHI has not been established.

Hypothesis: Enoxaparin can be safely administered to most patients with IHI for VTE prophylaxis.

Setting: Level I trauma center.

Design: Prospective, single-cohort, observational study.

Patients and Methods: One hundred fifty (85%) of 177 patients with blunt IHI received enoxaparin beginning approximately 24 hours after hospital admission until discharge. Brain computed tomographic (CT) scans were performed at admission, 24 hours after admission, and at variable intervals thereafter based on clinical course. Patients were excluded for coagulopathy, heparin allergy, expected brain death or discharge within 48 hours, and age younger than 14 years. Complications of enoxaparin prophylaxis were defined as Marshall CT grade progression of IHI, expansion of an existing IHI, or development of a new hemorrhagic lesion on follow-up CT after beginning enoxaparin use.

Results: Thirty-four patients (23%) had CT progression of IHI. Twenty-eight CT scans (19%) worsened before enoxaparin therapy and 6 (4%) worsened after beginning enoxaparin use. No differences between operative patient (2/24, 8%) and nonoperative patient (4/126, 3%) complications were identified ($P = .23$). Study group mortality was 7% (10/150). All 6 patients who developed progression of IHI after initiation of enoxaparin therapy survived hospitalization. A deep vein thrombosis was identified in 2 (2%) of 106 patients.

Conclusion: Enoxaparin can be safely used for VTE prophylaxis in trauma patients with IHI when started 24 hours after hospital admission or after craniotomy.

Arch Surg. 2002;137:696-702

ICU

CHEMICAL VENOUS THROMBOEMBOLIC PROPHYLAXIS IS SAFE AND EFFECTIVE IN PATIENTS WITH TRAUMATIC INTRACRANIAL HEMORRHAGE WHEN STARTED 24 HOURS AFTER ABSENCE OF PROGRESSION OF HEMORRHAGE ON BRAIN CT

Objectives:
Venous thromboembolic disease (VTE) continues to be an important complication in trauma patients, including patients with intracranial hemorrhage. We implemented a protocol starting chemical prophylaxis 24 hours after absence of progression of hemorrhage on CT to increase consistency with the use of chemical VTE prophylaxis in this population.

Methods:
Two hundred and five patients with intracranial hemorrhage admitted to a level 1 trauma center over an 18-month period were reviewed with respect to demographics, type of intracranial injury, need for surgery, injury severity, and progression of injury on brain CT. Patients with a hospital length of stay <3 days were excluded in the analysis of administration of chemical prophylaxis. Time to chemical prophylaxis in relation to absence of progression on brain CT was examined as well as the subsequent risk of progression of hemorrhage and risk of VTE events. The overall rate of VTE was compared to matched historical controls.

Results:
All patients received mechanical prophylaxis in the form of sequential compression devices. Two hundred and sixty one intracranial hemorrhages were identified with 101 subdural hematomas, eight epidural hematomas, 86 subarachnoid hematomas and 66 intraparenchymal hemorrhages.

Six point eight percent required emergent craniotomy and 4.9% required other emergent surgery. Eighty six point three percent of patients had a follow-up CT performed the day after admission and of these 12.2% showed progression.

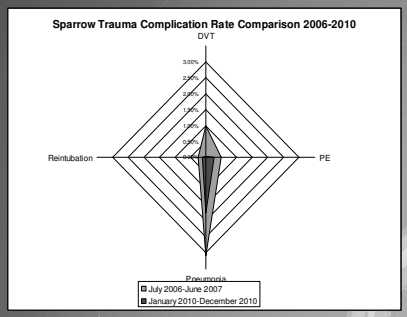
Of the patients who did not have progression of hemorrhage on follow-up CT, 60.4% received chemical prophylaxis at some point during their stay. Of the patients who received chemical prophylaxis, 35.8% had chemical prophylaxis given within 36 hours of the follow-up CT, 43.2% within 48 hours, 60.5% within 72 hours, and 71.6% within 96 hours.

No patients in this sample had progression of intracranial hemorrhage after initiation of chemical VTE prophylaxis and no patients developed VTE. The overall rate of VTE in all trauma patients decreased from 0.99% to 0.04% over the same time period. No other complications related to chemical VTE prophylaxis were identified.

Conclusions:
A protocol based on early use of chemical VTE prophylaxis after absence of progression of traumatic intracranial hemorrhage does not result in increased progression of intracranial hemorrhage and reduced the rate of VTE in our institution.

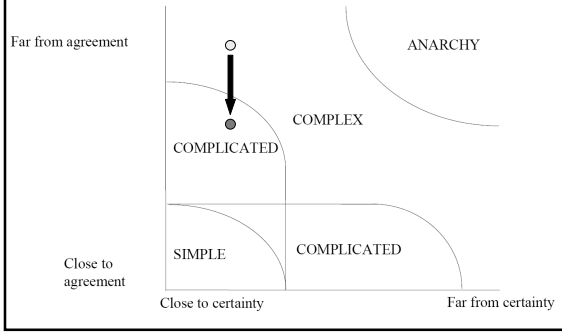
STARROW

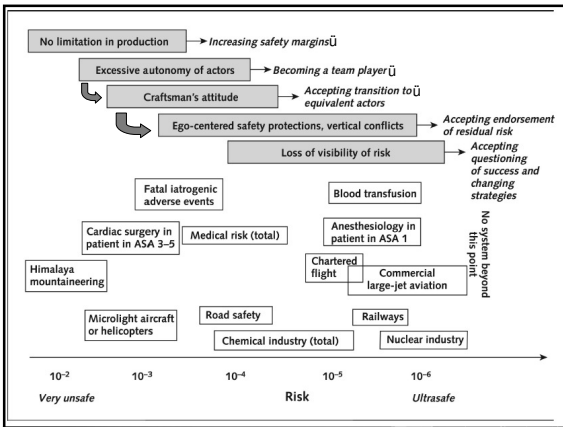
Trauma Complication Rate



STARROW

Stacey Matrix



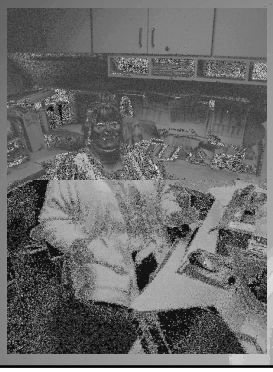


Amalberti, Ann Int Med, 2005

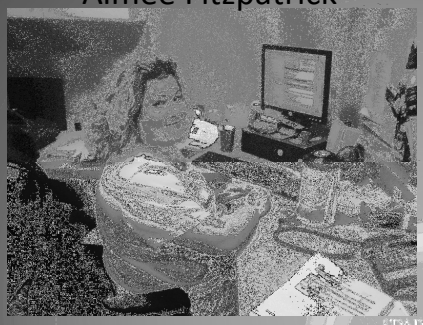
"….simplicity on the other side of complexity."

Oliver Wendell Holmes

Mickie Kreft



Aimee Fitzpatrick



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