Trauma Resuscitation: What Works, What Doesn't

MTQIP Members
Judy Mikhail, PhD
Mark Hemmila, MD

Background

- MTQIP Site Visits
  - Check out ED's/Trauma Bays
- U of M
  - Multifunction
  - Difficulty with equipment
  - Lots of people
  - Lots of new equipment

Trauma Cart

- Spectrum
- Bronson

- Standardized Equipment
- One place
- Efficient
- Mass/Multiple Casualty

- Change is hard

Let’s Learn From Each Other

- What works
- What doesn't

- Surveys

- Discussion

- Let’s have fun

MTQIP Meeting 10.08.19 Resuscitation Slides

Ascension Borgess

Trauma Cart

- William Curtiss MD
- Sally Ossewaarde MSN

Ascension Borgess

The Problem

Supplies not restocked.

Missing or outdated.

Deleted from stock.

Variable Supplies in each Trauma Bay.

Resolution

- Devised a Trauma Cart
- Carts are stocked identically.
- Lidocaine and needles are in the cart.
- Carts are locked.
- RN responsible for the room is responsible to restock and lock.
- Laminated cards are on each cart with pictures of each row and quantity of supplies.

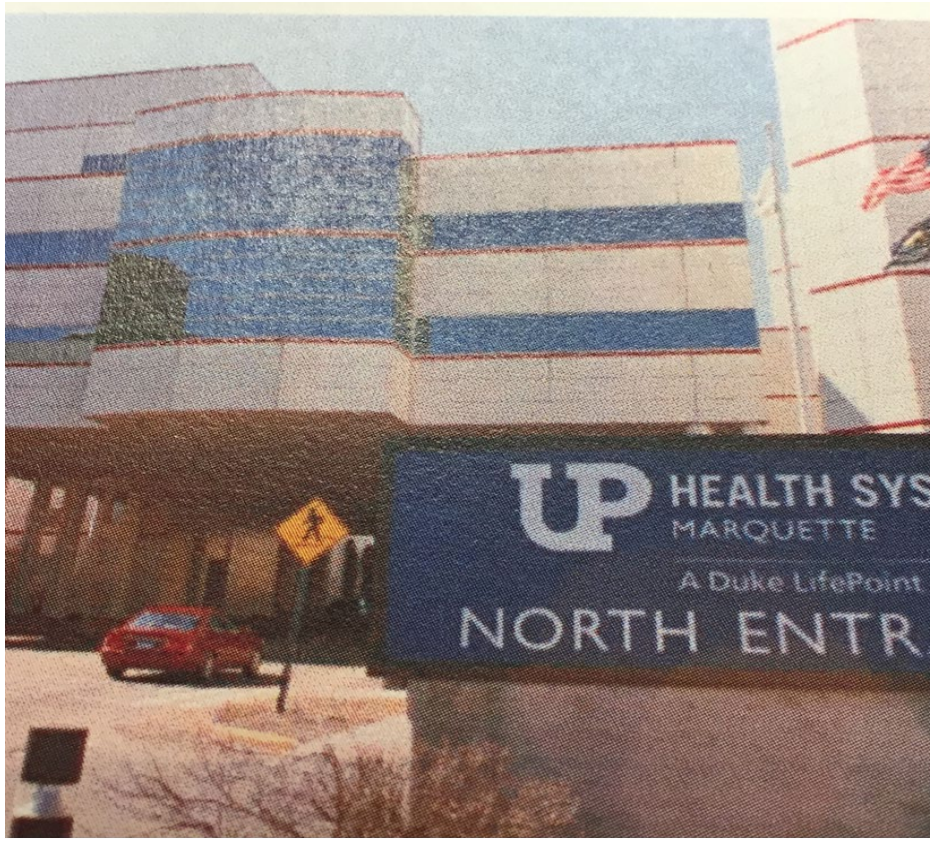

PEDIGO


Product No. AK-09807-AG
Percutaneous Sheath Introducer Kit
with ARROWgard Blue® Sheath
and Integral Hemostasis Valve/Side Port
for use with 7–7.5 Fr. Catheters
ARROW
Product No. AK-09807-AG
8.5 Fr.
10 cm catheter length
.025 inch dia spring wire guide
Percutaneous Sheath Introducer Kit with ARROWgard Blue® Sheath
Product of Mexico
Packaged in Mexico
Pericardiocentesis
HALYARD
ULTRA Fabric-Reinforced Surgical Gown, X-Large with Towel
REF 95241
XL
HALYARD
Transverse Laparotomy Drape
REF 89281
AAMI Level 4
EN 13795:2011
High Performance


Tracheostomy – 002
PV.270.10
0020C&F
BMCRepro
TRA25660
CS
6/21/2015
LLB
10035-002
Tractomy – 002
Cutdown CS Tray – 001
JAL
PV.270.10
0020C&F03
BMCRepro
TRA00142
CS
6/18/2015
CutdwnCS – 001

UPHS Marquette

June 2, 2019



580 W Magnetic

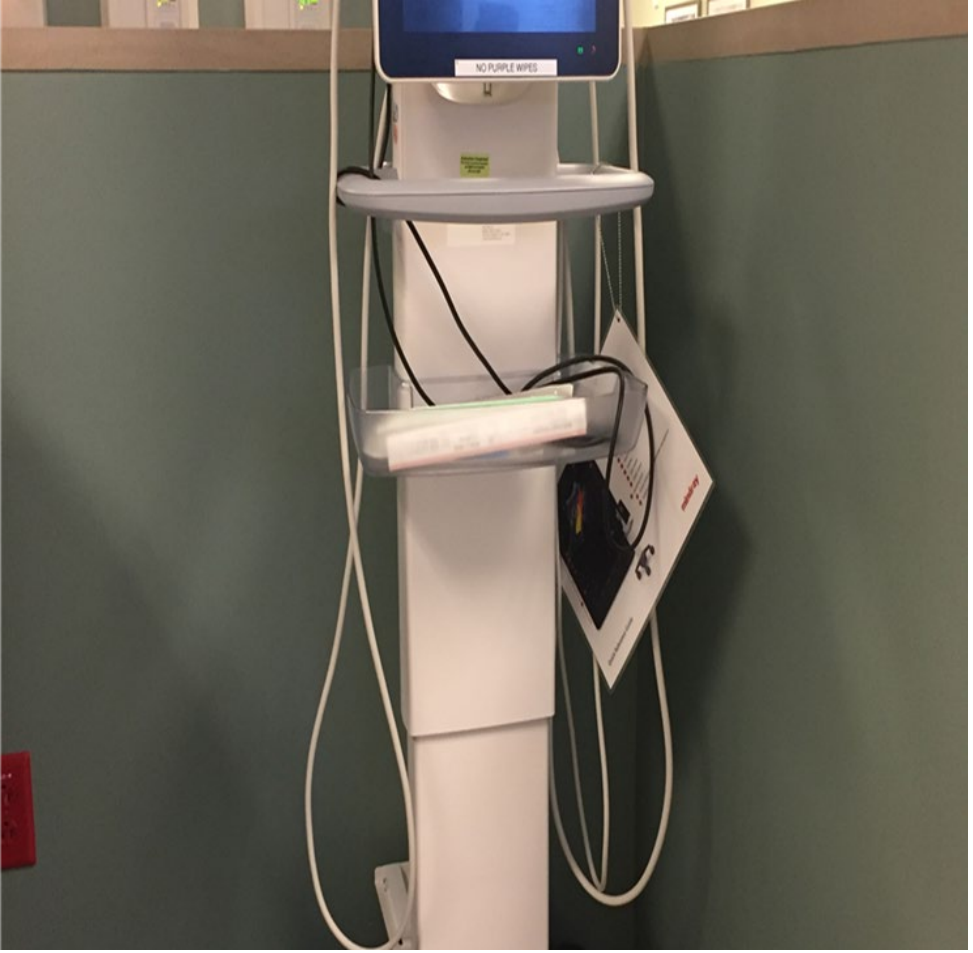
850 W Baraga

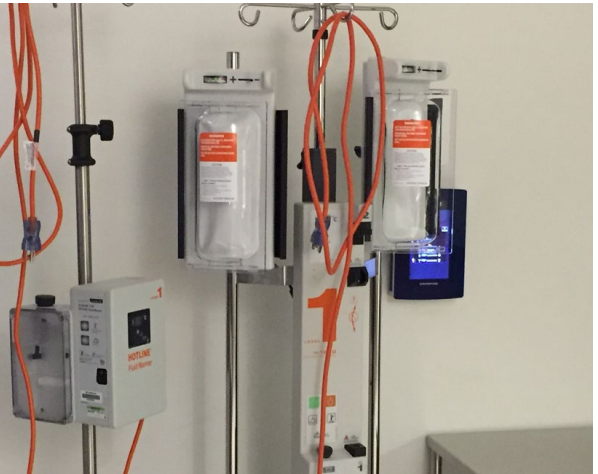
Last patient to leave

Attempted to keep familiar items

But no one could find them

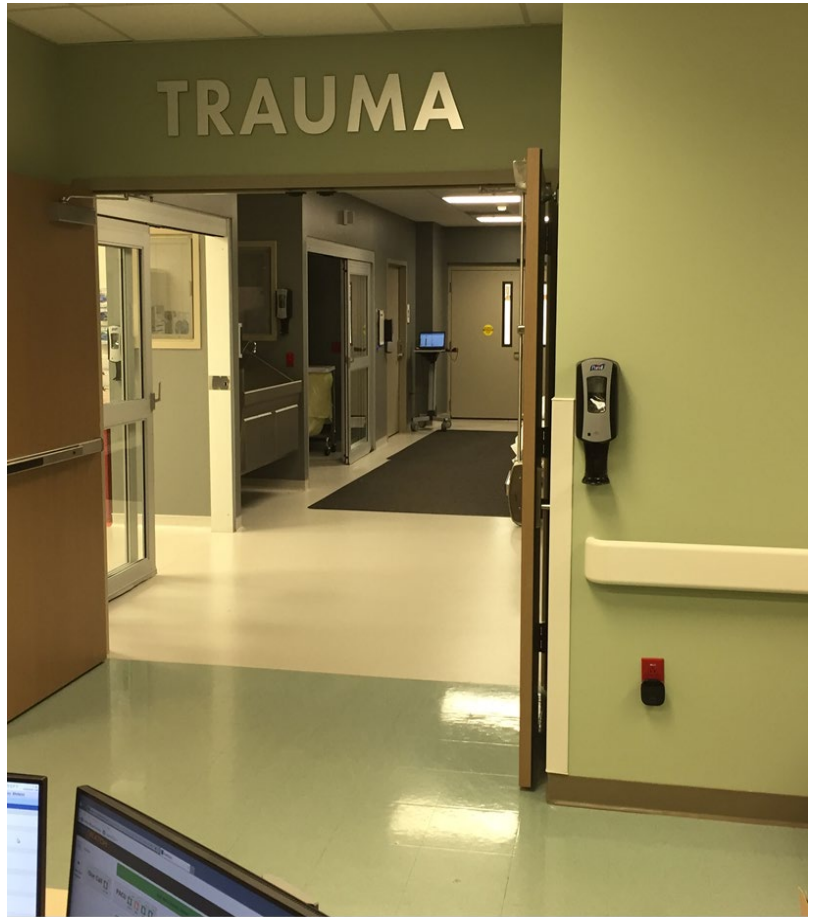
Still looking for chest tubes





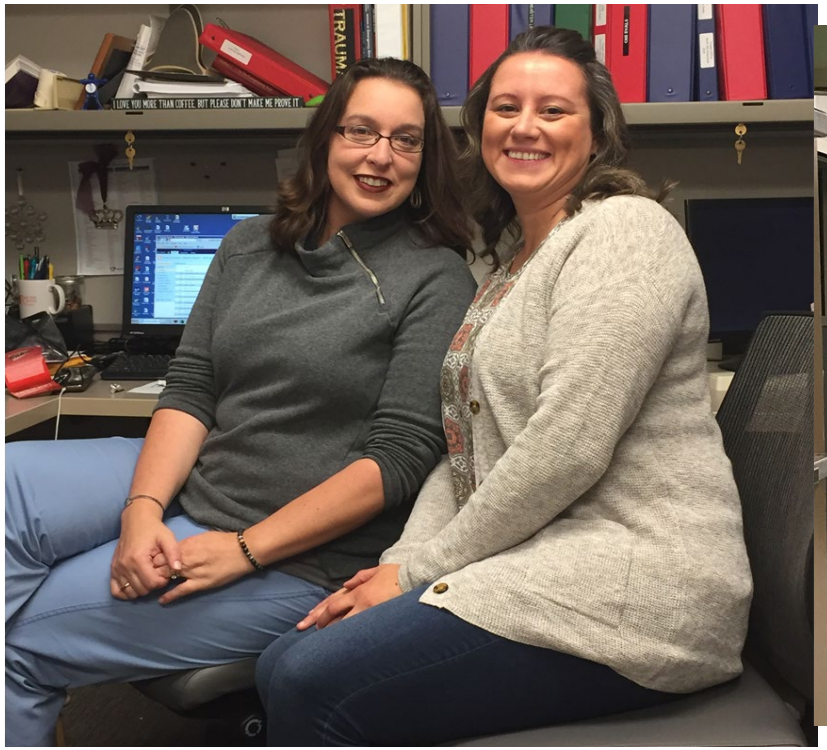
Some new equipment

Curious planning



New Helipad on the same block!!!

Same great friends



Mercy Health Muskegon

MERCY HEALTH

MUSKEGON

Michelle Kucera, Trauma Program Manager

Lanae Kelley, MCR

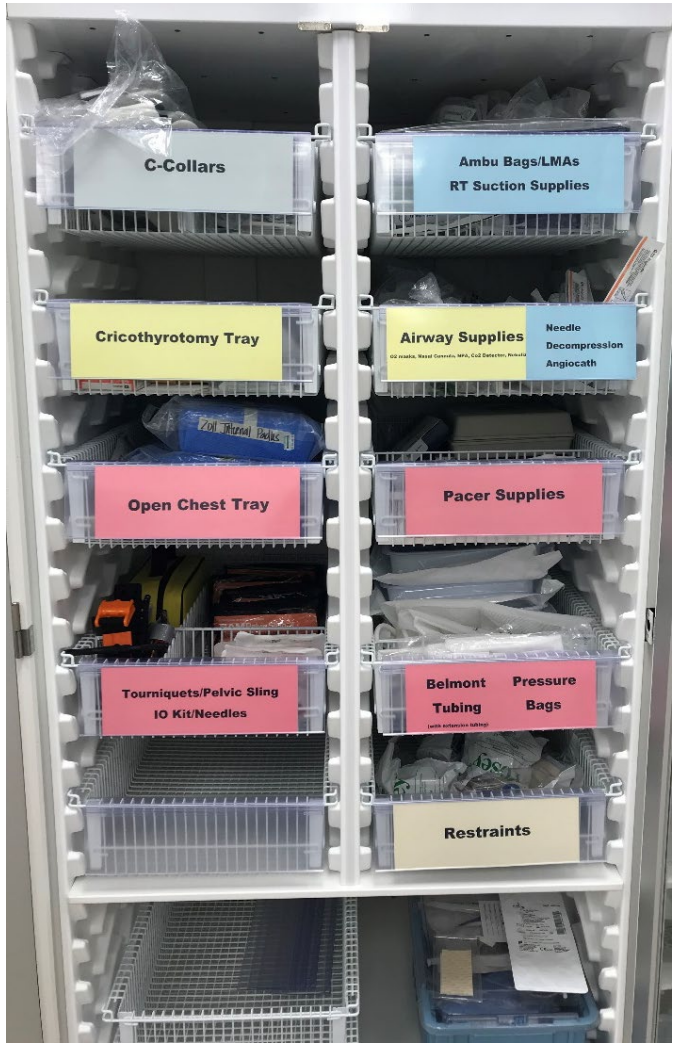
Trauma Bay

- New trauma/resuscitation bays built last year at Mercy campus
  - Campus consolidation 2020
  - Built with Trauma Department/Staff input
  - Pros/Cons to both resuscitation bays
  - Run simulations in new resuscitation bays

Current Trauma Bay

Future Resuscitation Bay

Current Supply Cabinets



Future Supply Cabinets

What works well…

Blood products are automatically delivered with each Trauma Code Activation.

- 2 units PRBC
- 2 units FFP
- Uncrossmatched
- Quicker utilization of blood product resuscitation
- Helps maintain a 1:1 ratio right from the beginning

What works well…

- Role badges
- Laminated
- Badge clips
- Stickers did not work

Trauma Simulations

- Utilize high fidelity manikin
- Adult and pediatric simulation
- Scenarios written based on real trauma patients
- ED Attendings and Trauma Surgeon required to attend 1/year
- Combined staff from both campuses in anticipation of consolidation
- Multidisciplinary

Room for improvement…

- Resuscitation hand-off
  - Specifically – MTP to OR staff
- Frequency of simulations
- Trauma room staffing
  - Assigning trauma RN each shift
- Crowd control
- Trauma Provider arrival time documentation

Detroit Receiving Hospital

Detroit Receiving Hospital Major Resuscitation Activation

Deployment of Blood Cooler by Communication Specialist

Dr Anna Ledgerwood

Major Resuscitation Activation

Definition:

Communication Specialist – personnel who manage the incoming call from pre-hospital provider, transferring facility, activation of trauma pager, arrange patient transfer in and out of the hospital, activate the trauma pager, pick up blood/cooler for major trauma activation

Process after Major Resuscitation is activated

1. Communication specialist will pick the blood cooler from the blood bank and take it to resuscitation.
2. If the patient is hemodynamically stable, the communication specialist will the take the cooler back to the blood bank..
3. If the patient requires blood products, the physician will activate the massive blood transfusion protocol.
4. First cooler contains 4 units of **O** Negative red blood cells
5. Blood specimen send to the stat lab for processing

Benefits of Deploying Blood Cooler for Major Resuscitation

- Expedites timely blood product administration
- Designated person to obtain the blood cooler

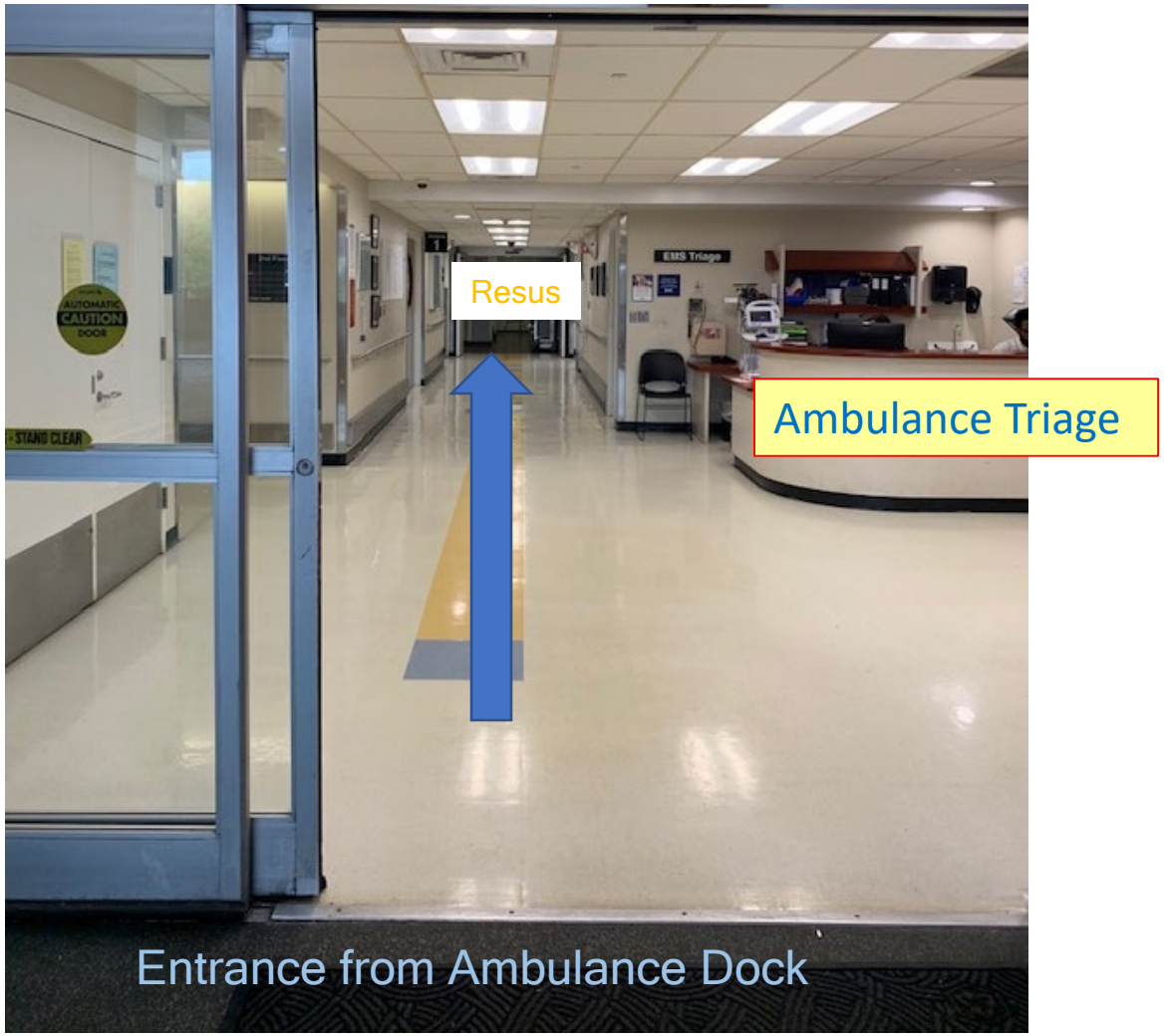
Challenges

Location of our Communication Center is in the Main ED

Ideally it needs to be at the front of the ED close to the ambulance entrance/triage

Proximity of ambulance entrance to resuscitation

Across ambulance triage
There is a room that
Can be use for the
Communication Center
Replace the wall with
Glass window for better
Visibility of the in coming
Ambulance traffic.
Trauma code will be
Updated timely



Hurley Medical Center

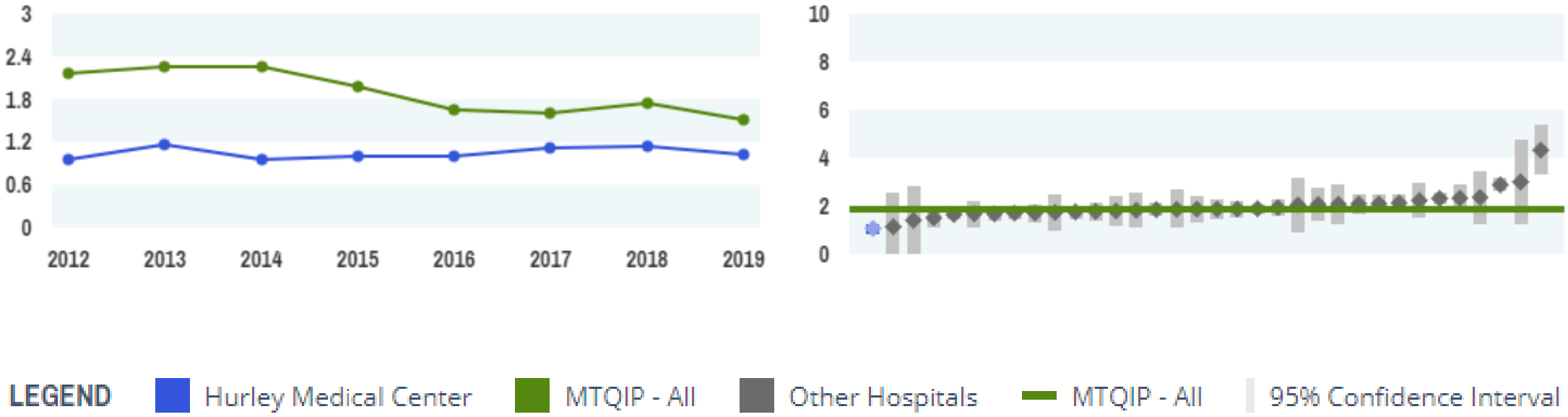
Massive Transfusion and Blood Utilization

Michelle Maxson, RN, MSN

Senior Manager of Trauma Operations

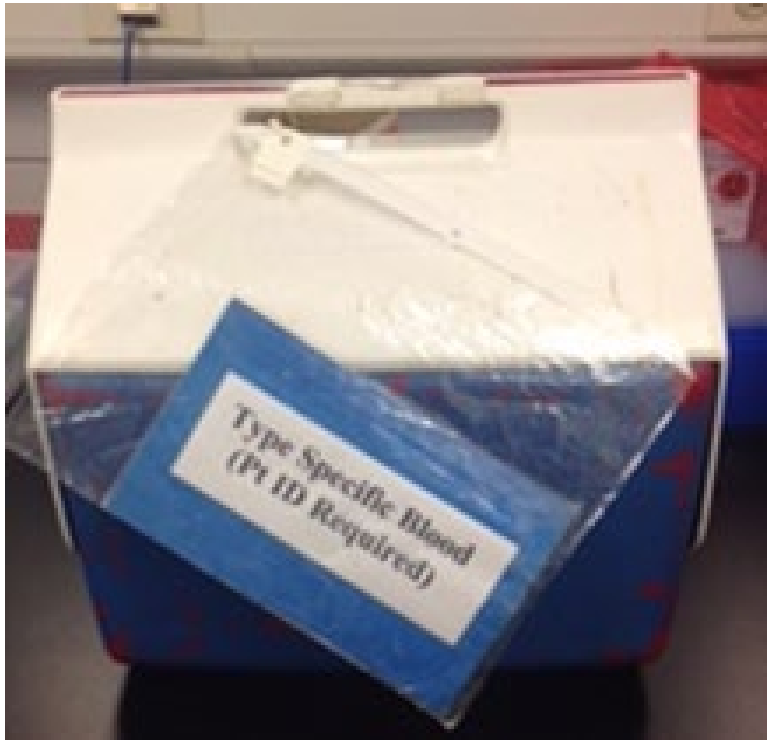
Hurley Medical Center

Mean Ratio PRBC/FFP 4 Hrs



Blood Release

- Blood chest automatically released for all Class I traumas
  - Brought to ED by runner
  - Time of arrival documented in EMR
- MTP activated via trauma radio
  - Activated by Trauma Attending



ED Notes

Blood chest at bedside

MTP

- Blood chest contains 3 O-/O+ PRBC and 3 A FFP (AB for pediatrics)
- Every odd chest beginning with chest 3 contains jumbo PLT
- Every even number beginning with chest 4 contains 2 units of cryo
- Blood Bank staff keep track of MTP
    - Essential for success of MTP
    - Utilize Massive Transfusion Tracking Sheet

Massive Transfusion Tracking Sheet

Suggested use of this sheet: Cross off units as you given. Volume transfused must be charted under the I&O flow sheet as intake in the "Blood- MTP only" row

Chest Shipment		Thawed Plasma	PRBCs	Platelets (1 jumbo apheresis unit)	Cryo 10 units
	Chest #1 ***	1 3 5	2 4 6		
	Chest #2	7 9 11	8 10 12		
Massive Transfusion	Chest #3	14 16 18	15 17 19	13	
	Chest #4	22 24 26	23 25 27		20, 21
	Chest #5	29 31 33	30 32 34	28	
	Chest #6	37 39 41	38 40 42		35, 36
	Chest #7	44 46 48	45 47 49	43	
	Chest #8	52 54 56	53 55 57		50, 51
	Chest #9	59 61 63	60 62 64	58	
	Chest #10	67 69 71	68 70 72		65, 66
Continue MTP as necessary Remember to deactivate the massive transfusion over the trauma radio/phone when MTP is terminated					

MTP

- Tranexamic acid is given as soon as need for MTP is identified
- Rapid TEG is included in standard labs for all Class I traumas
- Rapid TEG drawn every 20 minutes during active MTP to guide further transfusion
- All unused products returned to Blood Bank ASAP

Blood Usage and Wastage

July 2019

	Discarded	Transfused
Packed Red Blood Cells	11	442
Fresh Frozen Plasma	9	166
Platelet Pheresis	2	35
Cryoprecepitate	0	0

August 2019

	Discarded	Transfused
Packed Red Blood Cells	6	400
Fresh Frozen Plasma	6	130
Platelet Pheresis	4	70
Cryoprecepitate	2	16

How Did We Get Here?

- Review of all MTPs
    - Identify where the process broke down
- Education to key stakeholders
    - Dedicated ED nurses
    - Anesthesia
- Blood Bank Staff

Thank You!

HURLEY
MEDICAL CENTER

Ascension St John Detroit

Blood Product Availability

Ascension St. John Hospital

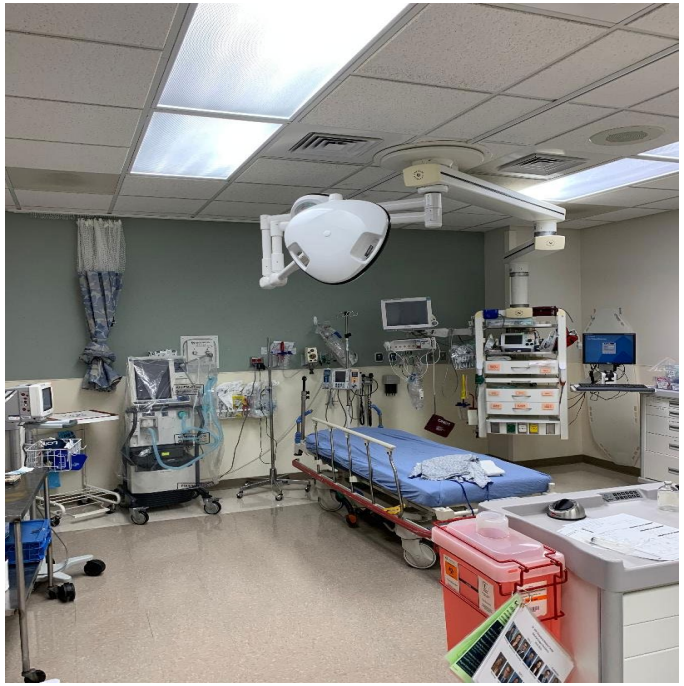
- Karrie Brown, MSN, RN - Trauma Program Manager
- Melissa Cunningham, MSN, RN, CEN, TCRN – MTQIP Clinical Reviewer

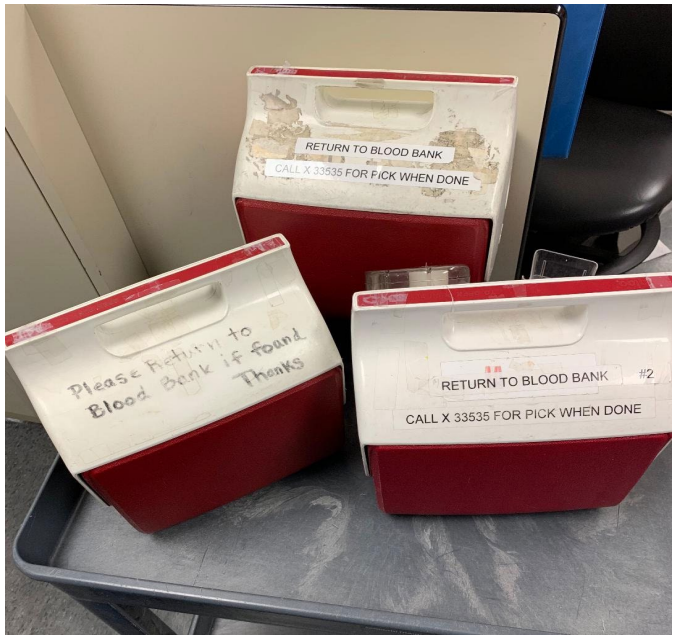
ASCENSION

About Us

Ascension St. John Hospital

- Detroit, Michigan
  - East Side
- Serve Wayne, Macomb, and St. Clair Counties
- ACS Verified Level I Adult and Level II Pediatric Center
- ED Volume 120,000 annually
- Trauma registry volume 2500 annually
  - Blunt: 80%
  - Penetrating: 18%
  - Burn: 2%





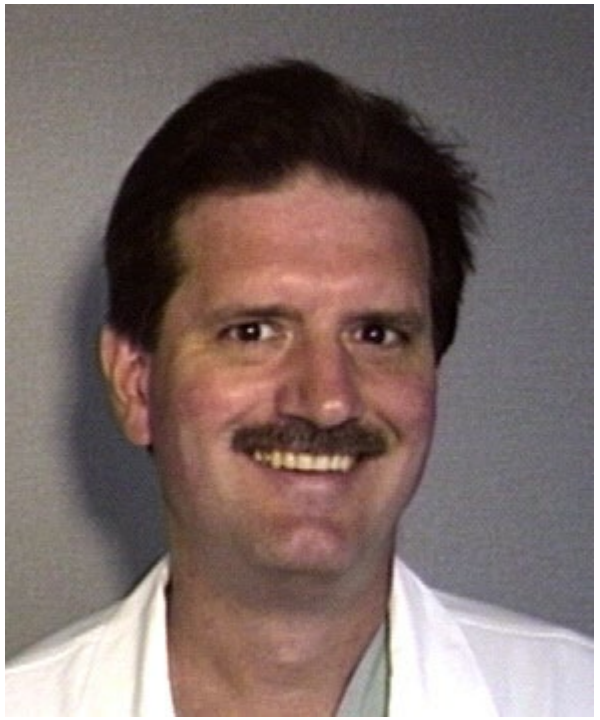
What Works

- Logistics
  - Blood Bank below ED, OR, SICU
  - Dedicated tube system from Blood Bank to ED
  - Blood Refrigerator in the OR

Blood Product Availability

What Works

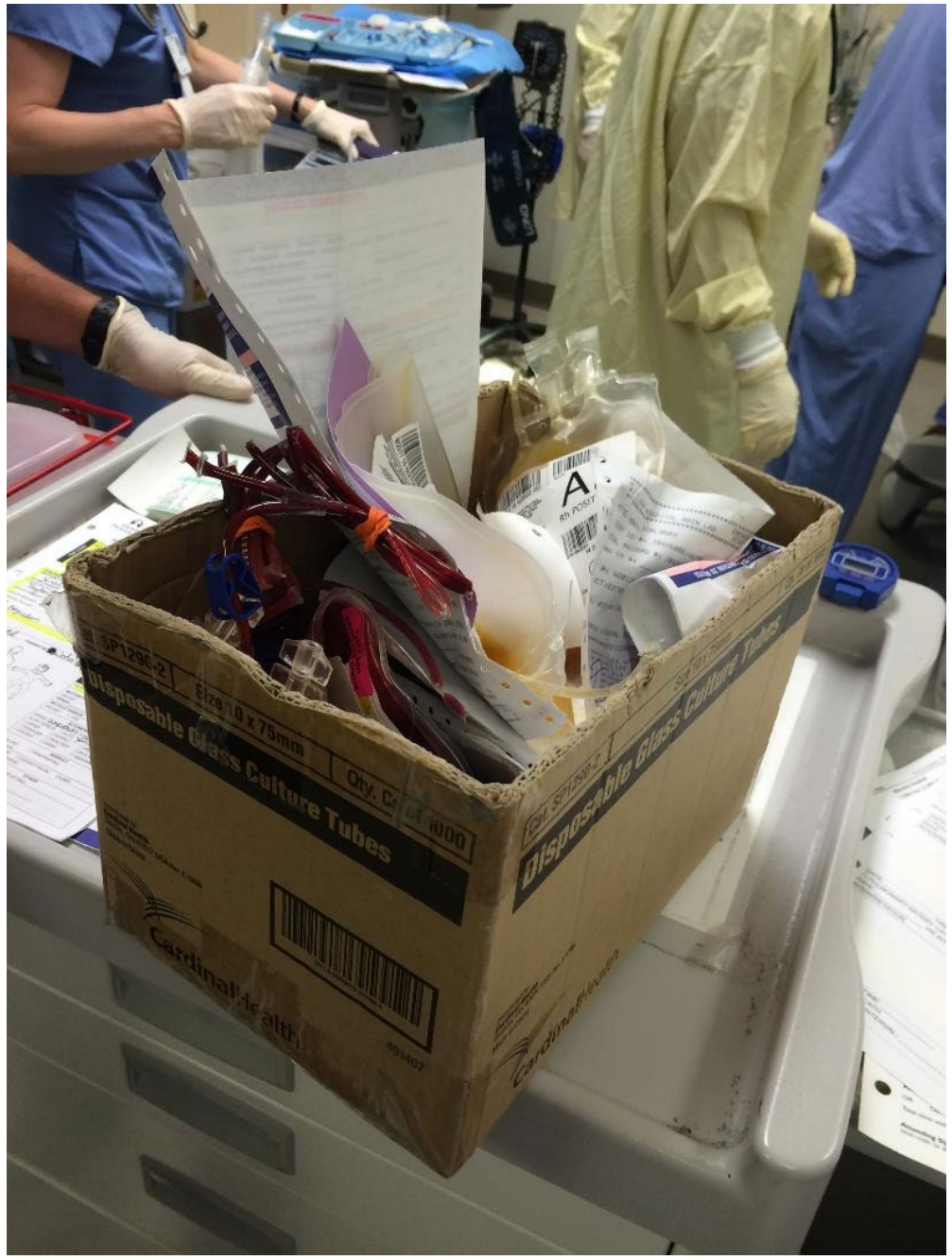
- Lots of Practice!
  - 2018: 55 Trauma MTPs
  - 2019: 45 Trauma MTPs
    (Through 10/4/2019)
- Average time of activation to first unit hung
  - **15 minutes** (2019)
  - 6 minutes - 29 minutes
- RBC to Plasma Ratio: 1.8



Dr. Van Beek, MDA,
Anesthesia Liaison

What Works

- Great PI process
- All MTP cases reviewed at Tertiary Level
  - Activated appropriately and timely
  - Utilized appropriately
  - Blood product wastage
  - Crystalloid usage
- MTP product usage reported monthly at Trauma Systems Committee



Blood Product Availability

Success Story

- Male s/p GSW to abdomen (mid epigastrium)
  - Private auto
  - Level I activated
    - BP 192/56, P 82, RR 21, GCS 15
  - MTP
    - BP 85/53, P 80, RR 28, GCS 15
  - To OR

Success Story

- 1st Unit Hung in OR (18 minutes)
  - Spleen, Grade V kidney laceration, retroperitoneal hematoma, small bowel injury, fundus, pancreas, diaphragm
- 24 hours
  - 62 PRBC, 61 Plasma, 65 Platelets, 10 Cryoprecipitate
  - 13L Crystalloid
- Discharged home with Home Health Care

Blood Product Availability

Opportunities for improvement

- Blood refrigerator in ED Resuscitation module
  - Currently housed in Trauma Office Lobby
- Crystalloid Fluid Usage

MidMichigan-Midland

MidMichigan Medical Center Midland

Asha Shah- Trauma Medical Director

Shari Meredith- Trauma Program Manager

Michelle Abedrabo- MCR

ED Trauma Bay

- Trauma registry: 1,125 patients
- Annual ED visits: 41,725
- 25 ED rooms
- 2 primary trauma/critical care resuscitation bays
  - 8 additional flex trauma/critical care resuscitation rooms.

What Works Well: Code 1 Blood Availability

The process…

- Code 1 trauma patients are pre-registered as Jane/ John Doe to expedite release of blood products.
- Blood bank receives Code 1 page/ automatically prepares cooler with 2 units O-neg PRBCs/ 2 units liquid plasma
- Security automatically responds to bloodbank and transports cooler to ED resuscitation bay.
  - Blood products are delivered < 5 minutes.

What Works Well: Nurse Driven Trauma Activations

The problem: We were seeing increasing under-triage rates: 5-6%!

- **WHY???** ED physicians were not activating traumas based on pre-defined criteria
  - Nurses were suggesting activation based off EMS report- physician declining to activate.

- **What did we do?**
  - Worked with ED leadership and decided to move towards nurse driven trauma activations
  - Education blitz with activation quizzes for all ED nurses. Online learning via Connect modules
  - Annual competency/education on activation criteria

What Works Well: Nurse Driven Trauma Activations

Under-triage rate-physician driven activations	Under-triage rates- Nurse Driven Trauma Activation
>5%	1%

Continued education and PI feedback for any under-triage case with ED nurse/ ED physician/ trauma service.

What Works Well: Coordinated RN Response for Massive Transfusion Protocol

The Problem: MTP is resource intensive- felt like there wasn't enough "man power" to effectively run the MTP.

What did we do? Starting 4/2019 "Code Massive Transfusion Protocol" paged overhead- additional response from 3 MTP trained RNs.

- Roles assigned: RN scribe/Transfusionist/ Rapid Infuser

What Works Well: Coordinated RN Response for Massive Transfusion Protocol

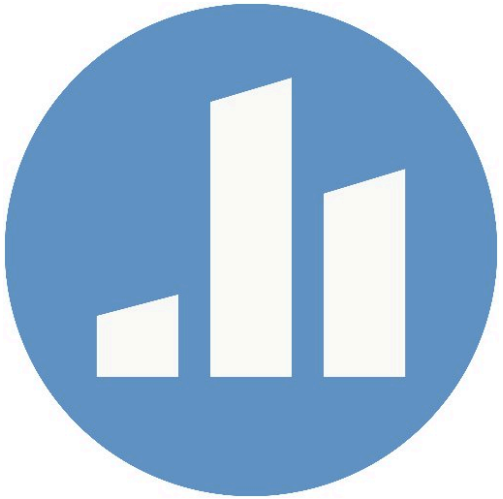
Feedback:

- Departments love the coordinated response! Allows ED RNs to focus on caring for trauma patient.
- Builds teamwork between departments
- More exposure to the MTP process

What Works Well: Coordinated RN Response for Massive Transfusion Protocol

Test Poll

- Web browser
  - PollEv.com
  - Enter your name
- App PollEverywhere
- Text message
  - Number =
  - Text =



What condition was historically treated with plombage?

Diphtheria

Plague

Tuberculosis

Rickets

What's the best restaurant in the state?

Top

How dedicated is your ED resuscitation room?

Solely used for trauma

Primarily used for trauma

Shared and used for many kinds of resuscitations other than trauma

Comments - How dedicated is your ED resuscitation room?

Top

Who has primary responsibility for the layout of and equipment available in your ED resuscitation room?

Emergency Medicine

Trauma Surgery

Jointly shared between Emergency Medicine and Trauma Surgery

Comments - Who has primary responsibility for the layout of and equipment available in your ED resuscitation room?

Top

Are you satisfied with the physical layout of your trauma resuscitation room?

Yes

No

Comments - Are you satisfied with the physical layout of your trauma resuscitation room?

Top

Are you satisfied with the equipment available and location of equipment in your resuscitation room?

Yes

No

Comments - Are you satisfied with the equipment available and location of equipment in your resuscitation room?

Top

Do you have a standardized layout with defined equipment (e.g. tape on floor) and people positions?

Yes

No

Comments - Do you have a standardized layout with defined equipment and people positions?

Top

Do you utilize a trauma cart or pre-made bins for procedure related equipment?

Yes

No

Comments - Do you utilize a trauma cart or pre-made bins for procedure related equipment?

Top

Do you utilize video recording of trauma resuscitations?

Yes

No

Beaumont Dearborn

BH- Dearborn Trauma Activation Documentation

Cara Sequin & Josh Chernich

2 Opportunities:

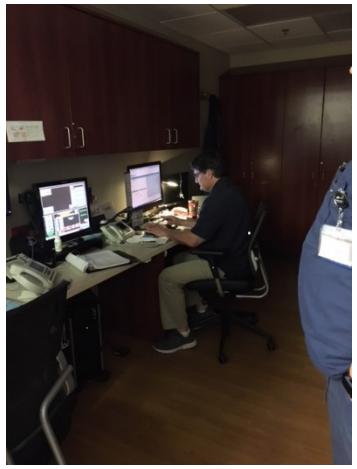
Improve timeliness of Radio calls & completeness of Scribe RN documentation on flow sheet

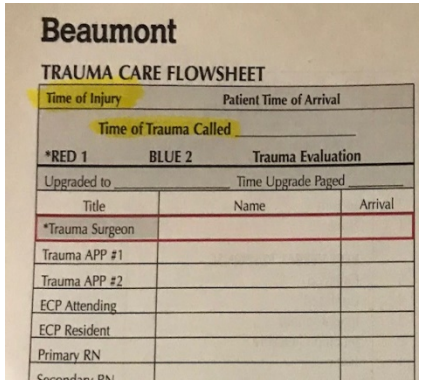
Kaizen Summary:

AREA: Emergency Center | DATE: 5/16/18

NAMES: Jessica Wallace, Jessica Diccico, Daniel Waderlow

1.) OBSERVATION:





Beaumont

TRAUMA CARE FLOWSHEET

Time of Injury | Patient Time of Arrival

Time of Trauma Called

*RED 1 | BLUE 2 | Trauma Evaluation

Upgraded to | Time Upgrade Paged

Title	Name	Arrival
*Trauma Surgeon		
Trauma APP #1		
Trauma APP #2		
ECP Attending		
ECP Resident		
Primary RN		

2.) PROBLEM:

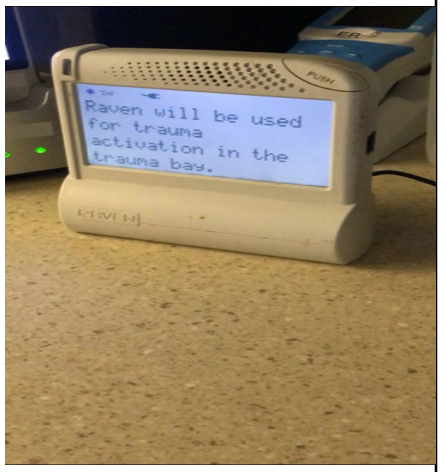
- It was found in trauma flow sheet audits that nursing staff is missing “time of injury & time of trauma called” consistently.
- Dispatch receives multiple phone calls regarding activations.
- Trauma team frequently had to display pager times for scribe to document activation time.

3.) KAIZEN:

Create an easy and efficient way for the trauma nurse to receive a reliable activation time for the trauma patient coming in when heard overhead in department.

4.) RESULT:

- We implemented the Raven to be used in the trauma bay so that activation information and times will be readily available for scribe nurses.



Trauma Activations
What's the data telling us?

RECENT PERSONNEL CHANGE in PROCESS:

1. Experienced dispatchers moved to corporate office as part of bed management team

EC specialists now answering the radio…

2. Typing too much delaying relay of information prior to patient's arrival

3. Page trauma last after paging overhead in department

EC Meeting: Feedback on Trauma Activation Process

- March data- 15% compliance rate with pre-notification when patients brought by ambulance- *this is a major change*.
  - Timing of activation is going out as patient is arriving/has arrived- too late
  - Trauma needs to be paged **as soon as call comes in** to have the team be present on arrival
  - Don't need detail, just need to be called before overhead

Process change:

- 1- Immediately page "RLT/BLT" once radio call is taken
- 2- EDS notifies charge nurse & completes ED overhead page
- 3- Follow up page with relevant MOI/VS/Age specific information as time permits

Re-evaluation of Trauma Activations

Before & After Process Change

15% Prenotification Page for Trauma Activations

Mar-20-2013 22:15	Red Level, 24yo male drive hit by large truck, unresponsive, posturing noted Trauma Bay 2 Dr leischner		EMS
Mar-22-2013 16:35	BLT 32F MVC, Does not speak English, unable to obtain info Trauma Bay 1		EMS
Mar-22-2013 23:45	BLT 16M MVC > 60mph head lac unknown loc trauma bay 2		EMS
Mar-23-2013 03:45	RLT-Approx 30 yo M, GSW, unresponsive, 3 wounds	drop off	EMS
Mar-23-2013 13:01	BLT MVA 38M 45 mph, rear ended, +LOC, back pain with loss of sensation to bilateral legs		EMS
Mar-23-2013 13:05	BLT upgraded to RLT per physician	Upgraded	EMS
Mar-23-2013 16:18	RLT TB1 Approx 33yo male. Traumatic CPR s/t motorcycle accident. EMS still on scene	eta will be paged out	EMS
Mar-23-2013 16:19	RLT TB1 33yo male traumatic cpr rt motorcycle accident.	ETA 2 min	EMS
Mar-23-2013 21:43	BLT TB1 35yo male head injury post assault. facial trauma. AMS. +etoh combative		EMS
Mar-23-2013 21:51	RLT TB1-Upgraded from BLT. 35yo male assault, facial trauma, AMS, +etoh, combative.		EMS
Mar-24-2013 18:04	RLT TB1 GSW to the head unknown age, unresponsive, breathing spontaneously, poor w's		EMS
Mar-26-2013 16:48	BLT 1 month old female PT--fall from 3ft- +hematoma to head--HR 150 TB1		EMS
Mar-26-2013 19:54	RLT 25M Head Trauma. Hit multiple times on head with baseball bat. GCS15 Trauma Bay 1		EMS
Mar-27-2013 04:34	BLT*80 y/o fall unknown amount of stairs*-Loc*blood thinners unknown*Head/neck pain *(English barrier)		EMS
Mar-27-2013 14:46	RLT TB1	is here now	EMS

97% Prenotification Page for Trauma Activations

9/16/19 11:38 9/16/19 11:55	RLT RED 41 yo F GSW abdomen evisceration; bp 130-90; fent given	ETA 5
9/16/19 20:50 9/16/19 20:52	Blue Blue to TB 1 from triage: 72m fall from standing with altered mental status	Here now from triage
9/16/19 22:08 9/16/19 22:10	Red RED to TB1: 50f, 5-6 GSW to body, 3 to chest, here now	ETA 2
9/17/19 01:30 9/17/19 01:33	RED RED 19m gsw back of head, gcs 15, vss, here now	ETA 3
9/17/19 15:12 9/17/19 15:15	Blue Blue for TB1: 28 yo MCC 50mph + helmet	ETA 3
9/17/19 22:17 9/17/19 22:24	BLT Blt 30m assault with bb gun	ETA 5
9/18/19 13:15 9/18/19 13:18	BLT 5 min ETA 43 F tboned 45mph, unrestrained, lac to head, stable vs	ETA 5
9/18/19 17:53 9/18/19 17:54	BLT BLT 41m motorcycle vs car, 25mph, back pain TB1, GCS 15	ETA 2
9/18/19 21:28 9/18/19 21:29	BLT BLT 26F rollover MVC 70+mph, TB 1	ETA 2
9/19/19 04:08 9/19/19 04:11	Red* RLT TB 1 35 yo m GSW to L upper thigh, GCS 15	ETA 5

QTR 1 vs. QTR 2 Stats

Sending out RLT/BLT page <u>first</u> in the trauma activation process should help to increase % of surgeons present on arrival vs. in 15 mins.

Quarter 1	Trauma Pt Count	409
	Red Level	35
	% TS in ED at arrive	34.3% (14)
	% TS in ED <= 15 min	97.1% (34)
	% TS in ED <= 30 min	97.1% (34)

Quarter 2	Trauma Pt Count	504
	Red Level	55
	% TS in ED at arrive	44% (24)
	% TS in ED <= 15 min	100% (55)
	% TS in ED <= 30 min	100% (55)

Covenant HealthCare

REBOA in Trauma Resuscitation

Sujal Patel, MD, FACS

Trauma Medical Director

Covenant HealthCare

COVENANT HealthCare

Extraordinary care for every generation.

OUR PATIENTS

Best Aspect of current resuscitation room

Location & Accessibility

COVENANT HealthCare

Extraordinary care for every generation.

OUR PATIENTS

What does not work well?

-Need for ultrasound guided placement before REBOA catheter inserted

-Artline placement by ED in timely fashion

- Identifying early enough to place

How would you propose changing it?

-Work with residents and physicians
-Training-arranged with rep.
-Ongoing training with simulation and continues work with ED physicians and residents

What positive resuscitation change have you implemented, and how?

REBOA

-Development of guideline and order set

-Ability to control bleeding with the catheter

-Allowing time to get to OR for repair

-PI measures to monitor compliance

-REBOA Nursing Education for ECC & NTICU

COVENANT HealthCare

Extraordinary care for every generation.

OUR PATIENTS

Resources:

- REBOA Tip Sheet
- REBOA protocol
- ER-REBOA Learning Module
- REBOA & Sheath Management Powerpoint

Spectrum Health

Spectrum Health
Trauma resuscitation: Introduction of REBOA as a resource

Alistair Chapman, MD

Gaby Iskander, MD

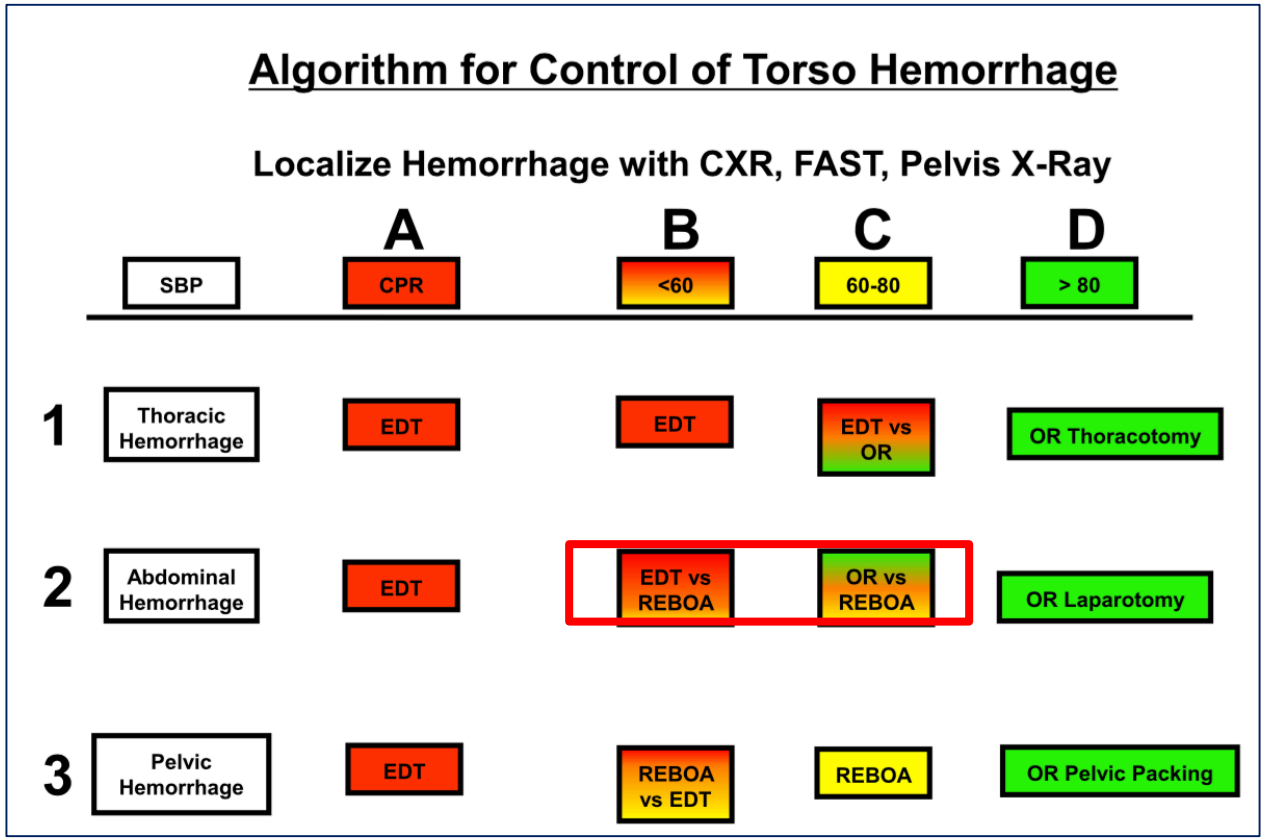
Amy Koestner, RN

Introduction

- 2017 stakeholder team investigated REBOA
- Literature review
- Trauma registry data
- Equipment
- Credentialing process

The role of REBOA in the control of exsanguinating torso hemorrhage

Walter L. Biffl, MD, Charles J. Fox, MD, *and* **Ernest E. Moore, MD,** *Denver, Colorado*



Internal Credentialing

- Technique Review
- Online PowerPoint Review
- Hands-on Demonstration
  - Repeat in 6 months

} **Certificate**

- Each case will be reviewed in TPC to evaluate technique and indications

Inclusion Criteria

- Greater than or equal to 18 years old
- Hypotensive (SBP < 90) and partial/non-responder to resuscitation
- Truncal hemorrhage (abdomen or pelvis)
- Penetrating lower extremity injury

- **BOTTOM LINE: Reserved for sick patients in hemorrhagic shock, not responsive to traditional therapy.**

Implementation

- Education plan and skill sessions for trauma surgeons
- Policy (all inclusive), detailed steps
- Simulation scenario for training
- PI process that includes structured review and evaluation process

Implementation

Department Area: Emergency department; Surgical Services; Adult Critical Care; Interventional radiology

1. **Purpose:** To outline the steps for the care and management of the patient with resuscitative endovascular balloon occlusion of the aorta (REBOA). This is an alternative treatment to resuscitative ED thoracotomy with aortic clamping. REBOA minimizes hemorrhage by supporting proximal aortic pressure until definitive hemorrhage control and hemostasis are obtained.
2. **Responsibility:** Registered Nurse, Provider
3. **Equipment Needed:**

- Femoral Art Line Lawson #704904 needed prior to REBOA (Pull from Central Line Cart in Trauma Bay)
- 7 Fr Sheath Avanti Lawson #31147
- ER-REBOA™ Catheter tote:
- (1) REBOA Lawson #500113
- (4) 10 ml Syringe Saline Flush Lawson #550066
- (1) Towel Sterile 4 pack Lawson #3011
- (1) Sheet Drape 40x58 Sterile Lawson 651273
- (1) Set Cath 8.5FR Emergency Infus Lawson 650901
- (2) Dead End Cap IV Lawson #650110
- (1) Marker ASPEN Skin Sterile w/ ruler Lawson #650868

Spectrum Health ER-REBOA Review & Updates

Alistair J Chapman, MD
Gaby Iskander, MD
June 17th, 2017

Spectrum Health Trauma Program
Michigan State University College of Human Medicine
Grand Rapids, MI

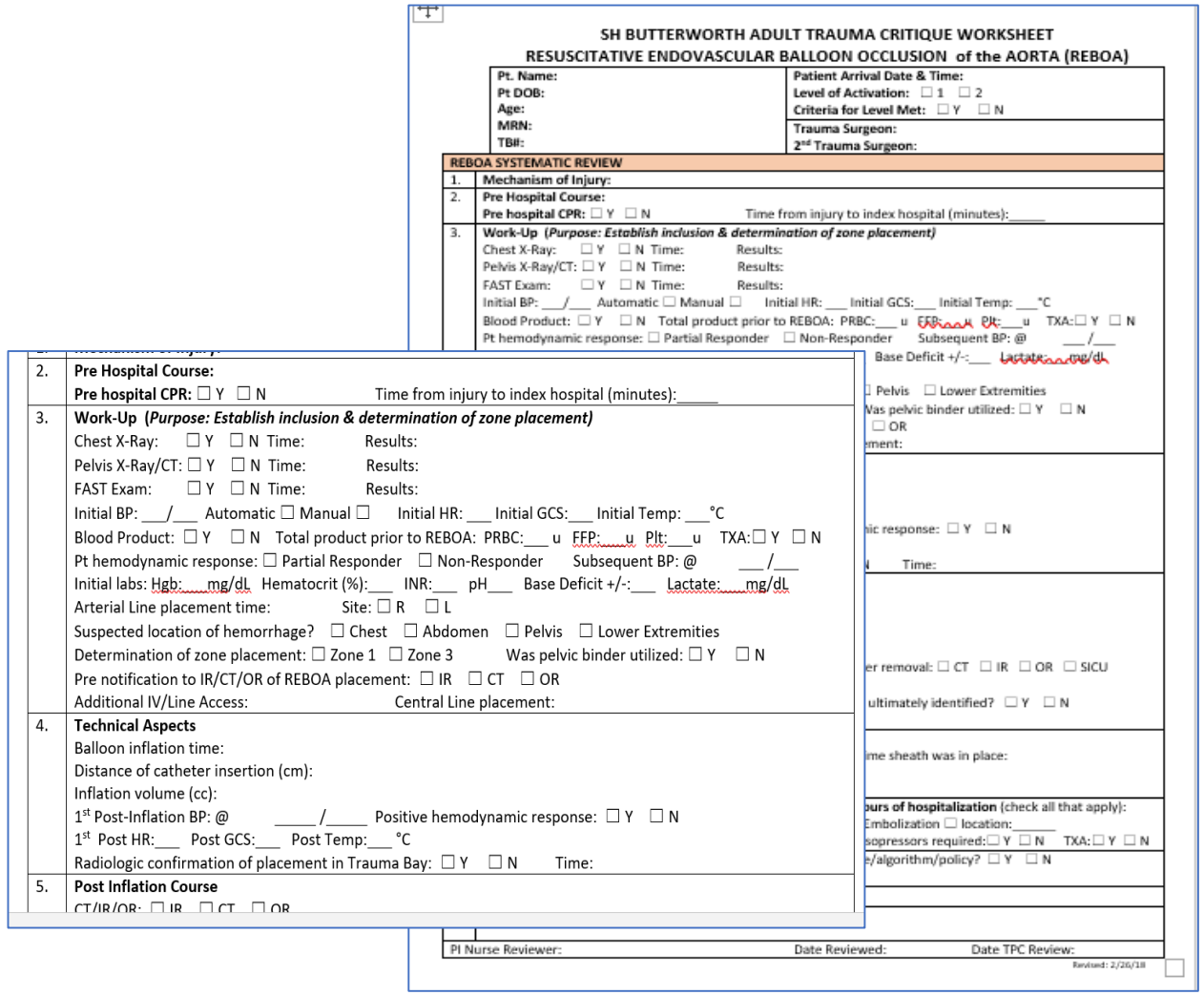
SPECTRUM HEALTH

College of Human Medicine
MICHIGAN STATE UNIVERSITY

REBOA PI Tool

Components:

- Pre-arrival
- Work up
- Technical
- Post inflation
- Sheath removal
- Other post procedures
- Dispo



SH BUTTERWORTH ADULT TRAUMA CRITIQUE WORKSHEET
RESUSCITATIVE ENDOVASCULAR BALLOON OCCLUSION of the AORTA (REBOA)

Pt. Name: Pt DOB: Age: MRN: TBI#:	Patient Arrival Date & Time: Level of Activation: ☐ 1 ☐ 2 Criteria for Level Met: ☐ Y ☐ N Trauma Surgeon: 2nd Trauma Surgeon:

REBOA SYSTEMATIC REVIEW

1. **Mechanism of Injury:**
2. **Pre Hospital Course:**
   Pre hospital CPR: ☐ Y ☐ N Time from injury to index hospital (minutes):_____
3. **Work-Up** ***(Purpose: Establish inclusion & determination of zone placement)***
   Chest X-Ray: ☐ Y ☐ N Time: Results:
   Pelvis X-Ray/CT: ☐ Y ☐ N Time: Results:
   FAST Exam: ☐ Y ☐ N Time: Results:
   Initial BP: ___/___ Automatic ☐ Manual ☐ Initial HR: ___ Initial GCS:___ Initial Temp: ___°C
   Blood Product: ☐ Y ☐ N Total product prior to REBOA: PRBC:___ u FFP:___u Plt:___u TXA:☐ Y ☐ N
   Pt hemodynamic response: ☐ Partial Responder ☐ Non-Responder Subsequent BP: @ ___/___
   Initial labs: Hgb:___mg/dL Hematocrit (%):___ INR:___ pH___ Base Deficit +/-:___ Lactate:___mg/dL
   Arterial Line placement time: Site: ☐ R ☐ L
   Suspected location of hemorrhage? ☐ Chest ☐ Abdomen ☐ Pelvis ☐ Lower Extremities
   Determination of zone placement: ☐ Zone 1 ☐ Zone 3 Was pelvic binder utilized: ☐ Y ☐ N
   Pre notification to IR/CT/OR of REBOA placement: ☐ IR ☐ CT ☐ OR
   Additional IV/Line Access: Central Line placement:
4. **Technical Aspects**
   Balloon inflation time:
   Distance of catheter insertion (cm):
   Inflation volume (cc):
   1st Post-Inflation BP: @ _____/_____ Positive hemodynamic response: ☐ Y ☐ N
   1st Post HR:___ Post GCS:___ Post Temp:___ °C
   Radiologic confirmation of placement in Trauma Bay: ☐ Y ☐ N Time:
5. **Post Inflation Course**
   CT/IR/OR: ☐ IR ☐ CT ☐ OR

PI Nurse Reviewer: Date Reviewed: Date TPC Review:

Lessons Learned

- Educational efforts were focused on Trauma Surgical team, ED physician and nurses.
- SICU & OR received education for post placement care
- Keep on track with 3-6 month education through simulation scenarios
- All REBOA cases on Peer Review agenda


SPECTRUM HEALTH

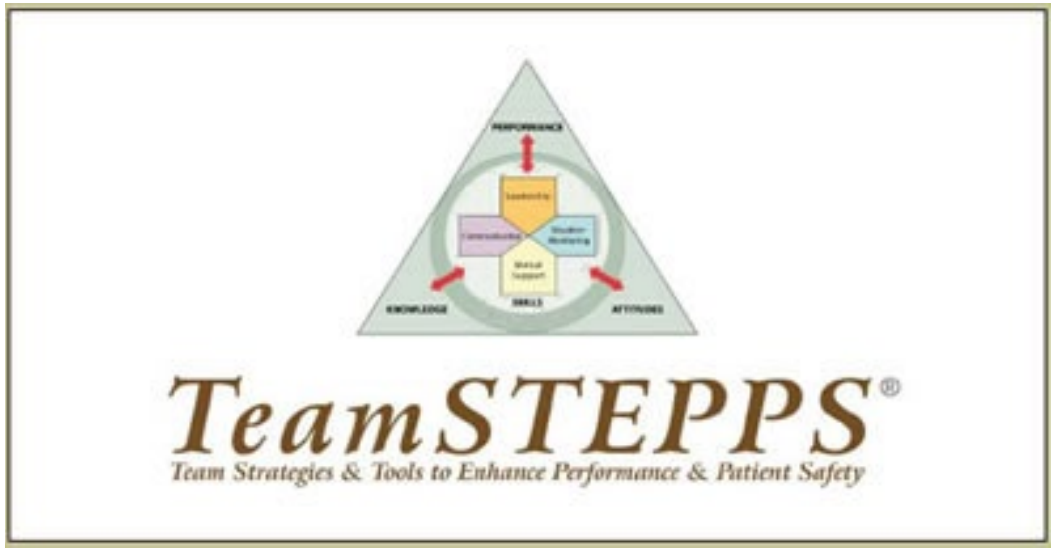
Beaumont Troy

Beaumont Health - Troy

Dr. Peter Perakis, TMD
Kayela Voss, TPM
Erin Driscoll, MCR

Trauma Room Staffing

- Improvement of patient care during trauma activations since implementation of TeamSTEPPS
  - Assigned Team Member Roles and Responsibilities
  - Communication Techniques and Processes
  - Brief and Debrief



Teamwork Challenges

- Excess amount of people, clogging resus area and creating extra noise
- Undefined roles: multiple people doing the same thing, assumptions that certain tasks are being completed when they're not, no one knows what other people are doing

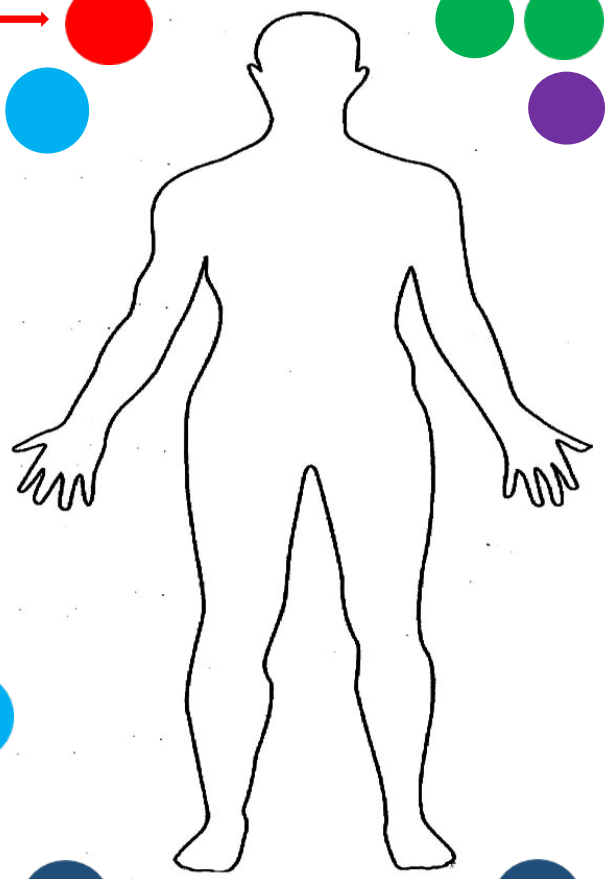
- Communication problems: pertinent information not getting to the people who need it
- Leadership conflict: is trauma or emergency in charge?

Why TeamSTEPPS?

- Developed by The Department of Defense, managed by AHRQ
- TeamSTEPPS was implemented in the Baghdad Combat Support Hospital (CHS), a fixed facility for a 13-month deployment (November 2007 to December 2008).
- The study reported significant decreases in the rates of communication-related errors, medication and transfusion errors, and needle stick incidents reported after implementation

MRTC (Medical Readiness Training Command) training at the Mayo Clinic in 2014

Troy Trauma Team Roles



Trauma PA

EC Resident

ED RN 2

Trauma Surgeon

ECP

ED RN 1 (Scribe)

MDA/CRNA

Respiratory Tech

ED RN 3

ED Tech

Charge RN

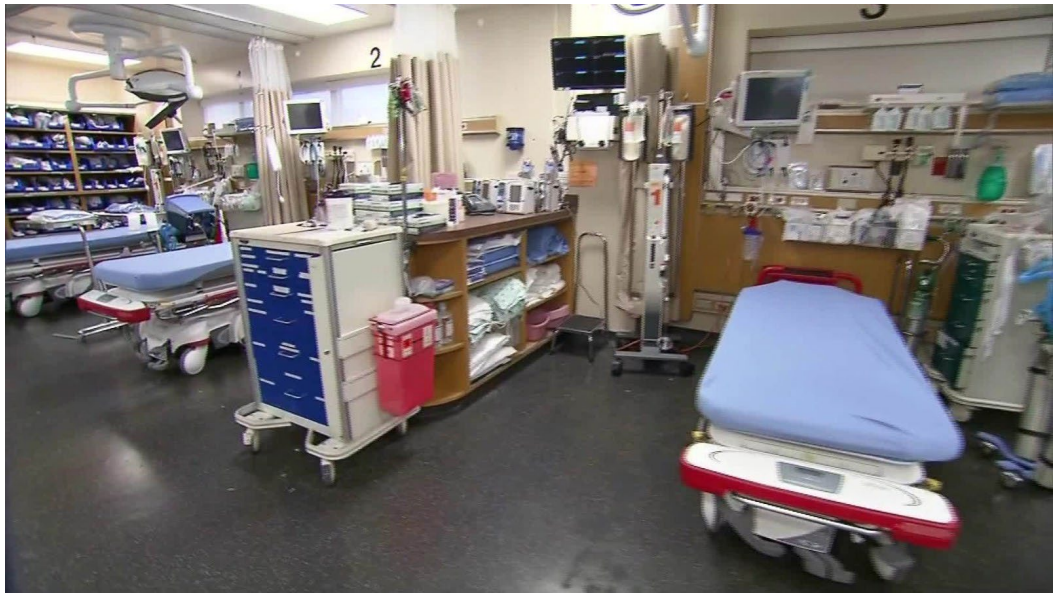
Unit Secretary

Outside of Room:

- Teach Aide
- Radiology Tech
- Social Work
- Registration
- EC Scribe
- Security

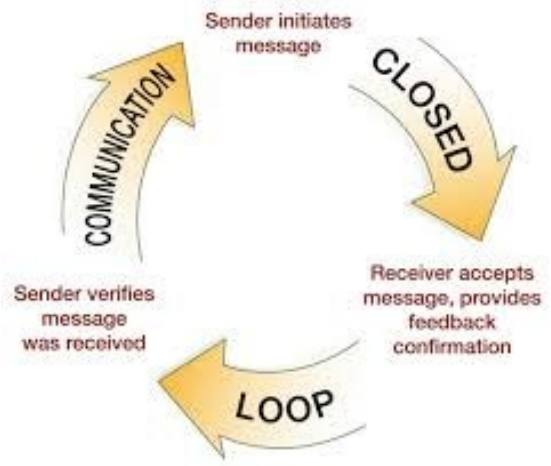
Brief

- Physician lead
- Team members present
- Assign roles
- Resources available

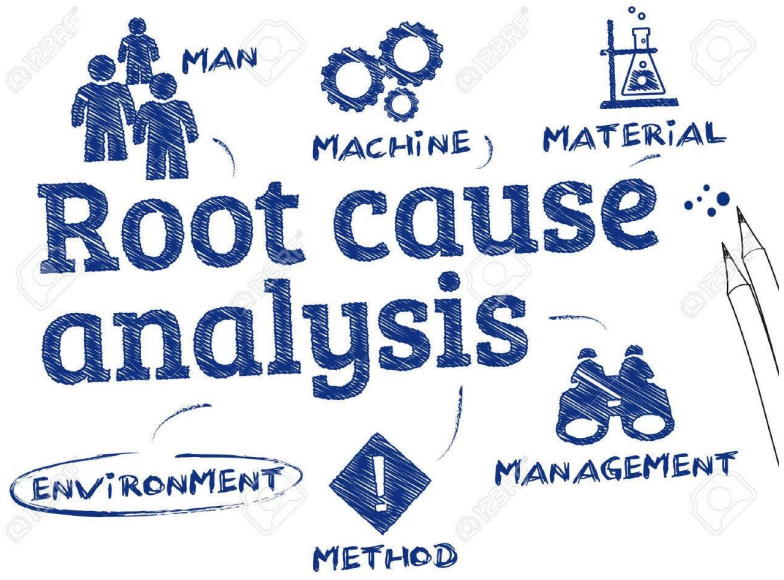


Our Biggest Improvement: **Communication**

- Clear, defined roles
- Time-out for EMS report
- Closed-loop communication (check-back)
- “Moment of Clarity”



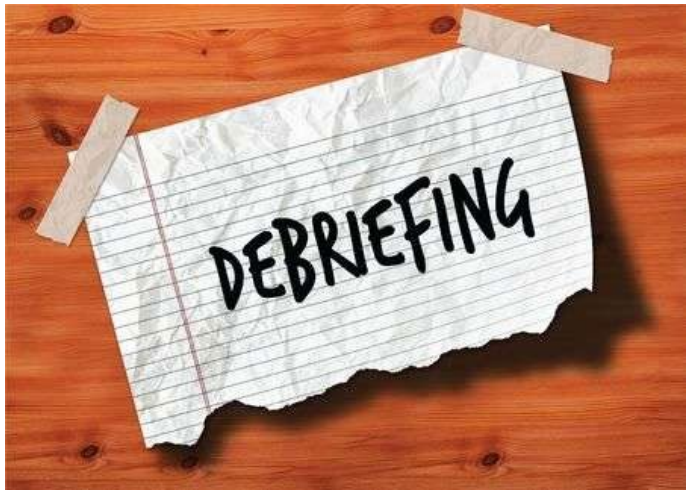
Joint Commission: Root Causes for Sentinel Events



Most frequently identified root causes for Sentinel Events January 1-December 31, 2014 (2,378 total)	
Human factors (ex: staff supervision issues)	547
Leadership (ex: organizational planning)	517
Communication (ex: with patients or administration)	489
Assessment (includes timing or scope of assessments)	392
Physical environment (ex: fire safety)	115
Information management (ex: medical records)	72
Care planning (planning and/or interdisciplinary collaboration)	72
Health information technology-related (ex: incompatibility between devices)	59
Operative care (ex: blood use or patient monitoring)	58
Continuum of care (includes transfer and/or discharge of patient)	57

Something New: Debrief

- Summary of key events
- What went well?
- Where are our opportunities for improvement?
- Planning



Summary

- Implementation of TeamSTEPPS at Beaumont Troy for trauma activations has:
  - Improved communication
  - Decreased potential for medical errors
  - Increased staff confidence
  - Created an environment of teamwork
  - Improved organization
  - Decreased staff stress during emergent situations
  - Improved patient care

References

- Agency for Healthcare Research and Quality. (2015, May 21). *TeamSTEPPS 2.0 Fundamentals*. Retrieved October 3, 2019, from https://www.ahrq.gov/teamstepps/instructor/fundamentals/index.html
- Deering, S., et al. (2011). On the Front Lines of Patient Safety: Implementation and Evaluation of Team Training in Iraq. *The Joint Commission Journal on Quality and Patient Safety*, *37*(8), 350. doi:10.1016/S1553-7250(11)37045-6
- Joint Commission Online. (2015, April 29). *Sentinel event statistics released for 2014.* Retrieved October 3, 2019, from https://www.jointcommission.org/assets/1/23/jconline_April_29_15.pdf

Henry Ford Hospital

Detroit

Trauma Bay Resuscitation: What Works, What Doesn't

Henry Ford Hospital

Nadia M. Obeid, MD – MTQIP Champion

Success Story

- Male, level 1 trauma activation. Arrived by private vehicle
- GSW x18
- Exam: 36.4°C, HR 110, BP 86/56, RR 32. Diaphoretic & agitated. GCS 15. Intact pulses
- 2 large bore IVs, 2U PRBC
- Labs/ABG
- FAST– no pericardial effusion; CXR– no hemo/pneumothorax
- To OR

Henry Ford Health System

Success Story

- Right IJ cordis, arterial line, & Foley placed intraop
- Injuries:
  - Left iliac wing fx, left tibia fx, left humerus fx
  - Diaphragm, L liver, anterior & posterior stomach, sigmoid colon, jejunal & transverse colon mesentery
- Emergent ex lap: primary repair diaphragm, stomach, & colon; SBR (discontinuity); repair mesocolon; hepatorraphy; abdomen packed, Abthera VAC
- Total 6 PRBC, 6 FFP, 1 pack platelets
- To SICU postop
- POD#2 return to OR for re-exploration, small bowel anastomosis, abdominal closure
- D/C home

Henry Ford Health System

Success Story

- Short time in ER resusc room prior to OR
- Resuscitation with blood early
- Balanced hemostatic resuscitation
- Teamwork and effective communication

Henry Ford Health System

Positive Changes

- Improved teamwork
  - Cross-supervision & teaching for FAST, chest tubes, lines
  - Communication between trauma chief & ER chief team leader
  - Continuous education on standard resuscitation roles
- Debrief sessions
- Surgery & ER attendance at each other's M&M
- Mock drills, simulations
- Improved hemostatic resuscitation
- TEG implementation
- EMS outreach

Henry Ford Health System

Opportunities for Improvement

- Additional mock resuscitation drills
- Interchangeable resuscitation roles between ER & Surgery
- Pre-hospital notification
- Combined lectures/grand rounds

Henry Ford Health System

Future Directions

- Improved workspace for pre-hospital providers
- Develop drill/simulation curriculum
- Standardized transfusion triggers for TEG
- Map/revise trauma intake process

Henry Ford Health System

McLaren Oakland

Trauma Team Leader (TTL) Caps

Courtney Berry, TPM
Megan Wright, MCR
Dr. Jason Pasley, TMD

McLaren
OAKLAND

The Problem

- Confusion on team lead, no Captain of the Ship!
- Nursing was hearing multiple orders
- Unsafe for patient

What we did;

Who is the TTL?

- Trauma Team Leader –the Trauma Surgery Attending or ED Attending with serve this role.

- The Trauma Team Leader initiates the resuscitation and assumes responsibility for life saving procedures, delegating and assisting with procedures including surgical airway, emergent chest tube placement, and ED thoracotomy. The trauma team leader is responsible for most of the communication during the resuscitation.

Where are we now?

- TTL clearly identifiable
- Improved effective communication with team
- Orders, instructions, and roles are clear
- Overall improved process

Sparrow Hospital

Crowd Control in Trauma Resuscitation

Sparrow Hospital

Benjamin Mosher MD

Penny Stevens DNP, RN

Christopher Stimson RN

Performance Improvement Nurse

Problem

- Too many staff members responding to Level 1 activations
- Staff complaints
  - Communication
  - Inability to access supplies
  - Difficulty assessing the patient

Contributing Factors

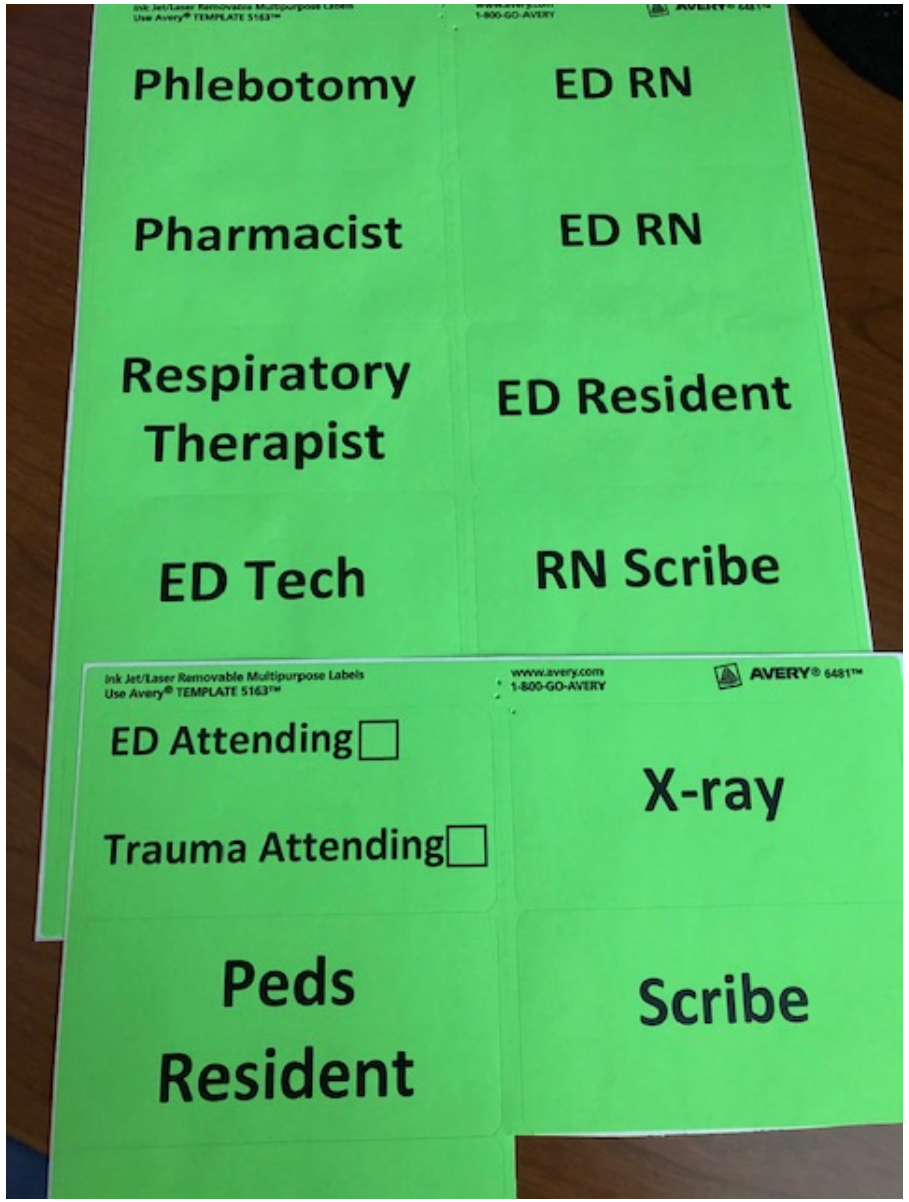
- Number of staff who receive trauma pages
- Overhead paging
- Students/orientees
  - Nursing
  - Medical
  - EMS
  - PA/NP
  - Respiratory therapy
  - Radiology
  - Phlebotomy
- “P” Factor
  - Pregnant, penetrating trauma, pediatric

Proposed Solution

Identification of Appropriate Staff

Stickers

- Staff without an orange lanyard/badge pull given a sticker
- Monitored by a Charge RN stationed at the door of the resuscitation room



Survey

- Pre and Post implementation of Stickers/Lanyards
- N = 141 respondents pre-implementation
- N = 96 respondents post-implementation

- ED physicians and RNs, Trauma surgeons and APs

Results

- Staff perceived less noise (**p** = .009)
- Staff perceived more efficient communication (**p** = .005)
- Observation of number of people in the room decreased
  - not statistically significant
  - smaller range

Project is on-going

St Joseph Mercy Oakland

HIGH RISK, LOW FREQUENCY:THE INJURED OB PATIENT

- MICHIGAN QUALITY IMPROVEMENT
- OCTOBER 8, 2019

- ALICIA KIENINGER, MD, FACS,TRAUMA MEDICAL DIRECTOR
- MICHELE HUNT, BSN, RN, MTQIP CLINICAL REVIEWER

CASE REVIEW

- Female, pregnant, 25.2 wga, MVC
  - High speed single car vs pole, prolonged extrication, pregnancy identified after extrication
- Tier 2 activation- trauma attending home call
- Injuries:
  - Pelvic Fracture
  - Distal Radial fx right
- Patient initially hemodynamically stable, with normal FHT
  - Trauma attending notified of patient condition and additional work up
- Transported to CT scan with trauma team
- Fetal monitoring with signs of decelerations after return to resuscitation bay
- Trauma team reviewing CT scans
- Patient taken emergently to OB delivery room for C-section.

ALL THAT WAS RIGHT ABOUT CASE

- EMS pre-activation
- Multidisciplinary team present on arrival
- Appropriate Equipment

PERFORMANCE IMPROVEMENT/OFI

- COMMUNICATION
  - Tunnel vision
- SILOS OF CARE
  - OB/Trauma
- RESUSCITATION/SURGERY
    - Where is the patient best managed?
    - Who should be present?
- COLLABORATIVE LEARNING
    - M&M
    - SIMULATION LAB
- TEAM BUILDING ACROSS DISCIPLINES

MAINTAINING GROWTH AND BEST PRACTICES

- Policy and Procedures
  - OB to be notified and will respond to all Alpha and Bravo- existing policy
  - Notification of trauma attending for any urgent c-section in a trauma patient
- Schedule one multidisciplinary OB simulation annually
- Include OB in educational review of Trauma OB cases
- Collaborate with ED and Critical Care/Trauma RN (CCTRN) education
- Present cases at appropriate educational events

OUTCOMES

- Transfer for orthopedic trauma care
- Strong collaboration with OB
- Shared learning between multidisciplinary team

FOUR MONTHS LATER

- MVC, four vehicle, High Speed
  - Female 36 wga,
    - unrestrained driver, 50-70 mph, air bags deployed, extricated from vehicle,
    - Tier 2 Trauma/OB activation; open ankle fracture
  - FHT decelerations in Trauma Bay
    - To main OR for c-section delivery due to possible placental abruption, trauma team immediately available
      - Baby with some respiratory difficult, transferred to NICU with CPAP

Summary

- Providers tend to focus on their area of expertise
- Communication between specialties is key
- High risk uncommon scenarios benefit from a collaborative approach BEFORE they occur
- Maintenance of skills and knowledge are key

Comments - Do you utilize video recording of trauma resuscitations?

Top

Do you encounter crowd control problems during a highest level trauma resuscitation?

Yes

No

Comments - Do you encounter crowd control problems during a highest level trauma resuscitation?

Top

Where is you CT scanner located relative to the trauma resuscitation room?

In ED or next to room/ED (<50 ft)

Down hall on same floor (50-100 ft)

Down hall on same floor (>100 ft)

On separate floor

Comments - Where is you CT scanner located relative to the trauma resuscitation room?

Top

Where are blood products located?

In the trauma resuscitation room

In the ED

In the Blood Bank

Other

Comments - Where are blood products located?

Top

Who restocks?

Top

Staff training?

Top

Trauma room staffing?

Top

Road trips? Nursing staff, anesthesia.

Top

Who is responsible for trauma team activation?

ED Physician

ED Nurse

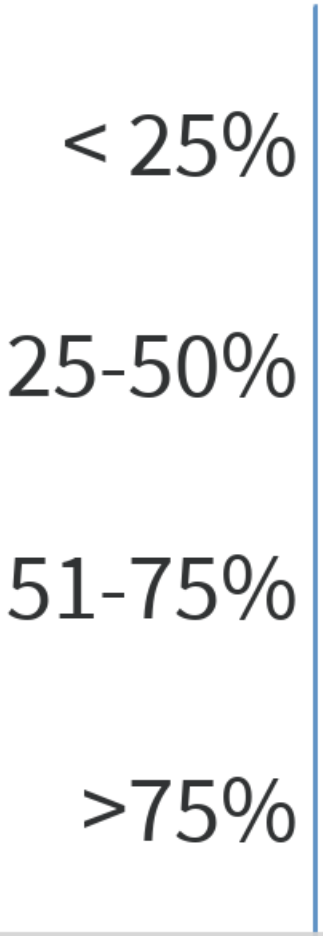
Trauma Surgeon

Other

Comments - Who is responsible for trauma team activation?

Top

What percentage of time trauma team activated prior to patient arrival?



Comments - What percentage of time trauma team activated prior to patient arrival?

Top