



Big Sky Medical Center Trauma Program

Kevin Sullivan, MD Trauma Medical Director
Chaney Byrd, BSN, RN, CCRN, CEN Trauma Program Coordinator
Bozeman Health Trauma Service

Bozeman Health

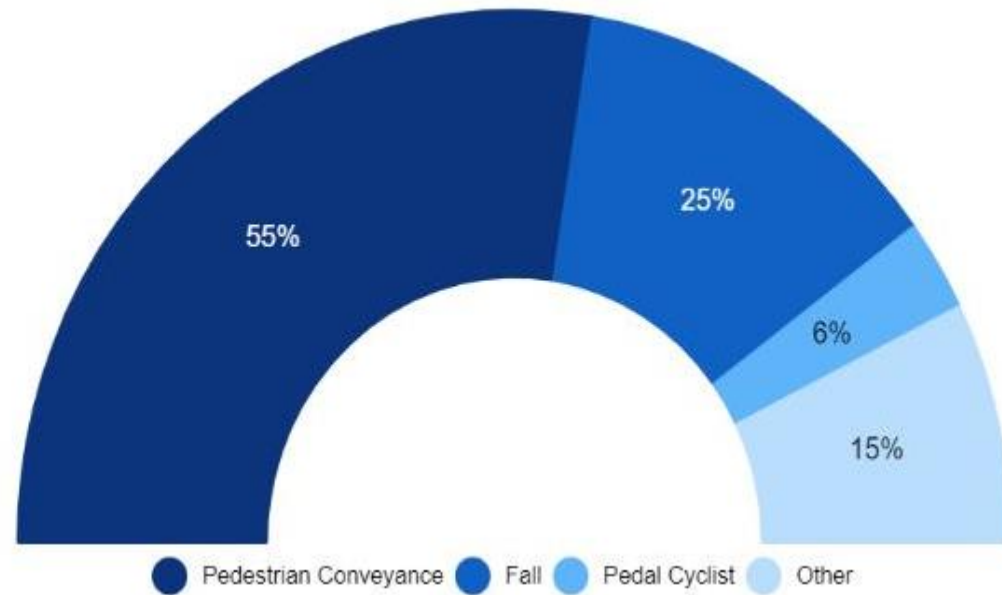
Big Sky Medical Center



Trauma Review Timeframe March 2022-February 2023:

- **Emergency Department patients: 5,572**
- **State Inclusion Trauma Patients: 90**
- **Traumatic deaths: 0**

Mechanism of Injury



Prehospital Providers

EMS

- Big Sky Fire Department
- Hebgen Basin Rural Fire District
- Yellowstone Mountain Club Rural Fire District
- Yellowstone National Park Emergency Medical Services
- AMR- IFT

Air Medical

- Billings Clinic MedFlight
- Air Idaho
- LifeFlight Network

Ski Patrol and Search and Rescue

- Big Sky Ski Patrol
- Yellowstone Club Ski Patrol
- Big Sky Search and Rescue
- Gallatin County Sheriff Search and Rescue- Heli-team

Prehospital Provider Communication

- **BSFD**- Monthly meetings
- **HBRFD**- Monthly data reviewing bypass compliance
- **Big Sky Ski Patrol**- Presentation at their annual refresher and trauma reviews
- **BSSAR**- Participation at trainings/presentations
- **County EMS**- Quarterly meetings
- **Air Medical**- Quarterly meetings

Trauma Team Activation



- EMS
- Registration
- Emergency Department Physician
- Primary RN
- Secondary RN
- Emergency Department Technician
- Lab
- Radiology Technician
- Pharmacist
- Spiritual Care
- Trauma Program Coordinator
- Director of Nursing
- Nurse Manager

Performance Improvement



BSMC Trauma #:

CONFIDENTIAL TRAUMA PERFORMANCE IMPROVEMENT REVIEW

DATE OF SERVICE	MT REGISTRY #	MRN	AGE	SEX

MECHANISM OF INJURY:
COMORBID FACTORS:
INJURIES:

EMS RESPONSE

INJURY	DISPATCH	EN ROUTE	ARRIVAL	AT PATIENT	DEPARTURE	AT BSMC	SCENE TIME

EMS VITALS

TIME	SBP	HR	RR	O2 SAT	GCS	AVPU

EMS TREATMENT:

INITIAL ED VITALS

TIME	SBP	HR	RR	O2 SAT	GCS	PUPILS

TIME	ED RESUSCITATION INTERVENTIONS



BSMC Trauma #:

CONFIDENTIAL TRAUMA PERFORMANCE IMPROVEMENT REVIEW

CLINICAL TRAUMA INDICATORS	YES	NO	N/A	COMMENTS
EMS RUN REPORT AVAILABLE				<u>Imagetrend</u>
TRAUMA TEAM ACTIVATION				
APPROPRIATE ACTIVATION				
TRAUMA NARRATOR				
TIMELY ARRIVAL OF PROVIDER				Provider in ED
DOOR TO PORTABLE CXR/PELVIS W/IN 10 MIN				
DOOR TO CT SCAN W/IN 30 MIN				
EKG FOR CHEST WALL TRAUMA PATIENT				
OXYGENATION ≥ 94%				96-100% on room air
ABX GIVEN w/in 60 MIN FOR OPEN FRACTURES				
WARMING MEASURES				warm blankets provided
Q30 MIN VITALS				
BARRIERS TO TRANSPORT				

Outcome: Pt

Performance Improvement

BSMC Trauma #:



CONFIDENTIAL TRAUMA PERFORMANCE IMPROVEMENT REVIEW

2023 STCC/ERTAC QI INDICATORS	YES	NO	N/A	COMMENTS
ED LOS >2h w/ ISS >15				
GCS <8 WITHOUT ADVANCED AIRWAY (doc. # of attempts)				
No TTA but met MT physiologic criteria				
TRAUMA CT C/A/P w/o CONTRAST				
REPEAT IMAGING REQUIRED (due to poor image quality)				
USE OF VASOPRESSORS (outside of ATLS protocols)				
ISS > 25 w/o TTA				
≥65 yo w/o TTA				
No TTA but met criteria				
>2 Intubation attempts				
Air medical transfer DC'd from ED				
Use of tourniquet				
No TTA age >65 yr & emphasis on BP <110 and GCS <13				
No prehospital TTA from the field that met criteria				
>1L of Fluid Resuscitation				
Out of Region Transfer				
Delay in Transfer (>2 h and/or >1 h to decision to transfer)				

DATE COMPLETED:

COMPLETED BY: Chaney Byrd, RN

TRAUMA DIRECTOR REVIEW:

PEER REVIEW:

MULTIDISCIPLINARY TRAUMA COMMITTEE REVIEW:

ERTAC REVIEW:

BSMC Trauma #:



CONFIDENTIAL TRAUMA PERFORMANCE IMPROVEMENT REVIEW

PI ISSUE:

CONCLUSION:

ACTION PLAN:

IMPLEMENTATION:

EVALUATION:

PI ISSUE:

CONCLUSION:

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Performance Improvement

Trauma Activation EPIC Audit											
RN Name: Percentage: Date of Visit: Trauma #: ISS:				Activation: Triage Accuracy: Mechanism: ED Disposition:							
Documentation			Yes	No	N/A	Documentation			Yes	No	N/A
Trauma Activation						Past Med/Surg history					
Activation Time						Home Meds					
Appropriate Activation						Healthcare Directive					
Trauma Team Response						FAST exam					
Initial Vitals including pain & GCS						EKG for chest wall trauma					
Initial Temp/source (w/in 30 mins of arrival)						Q 30 min vitals					
Primary Survey (A, B, C, D, E)						Abx w/in 60 min w/ open fxs					
Secondary Survey *must have neuro, resp, cardiac						Re-assessment of Pain *POSS/Rating every 15-60 mins					
Cardiac Monitor						Time of Decision to Transfer					
Warming Measures						Transport Agency					
Procedures						Disposition Navigator					
Height						Discharge Vitals, temp/source					
Weight						RN Report given (transfers)					
Back board/C collar removed						I/O Documented					
Hourly primary & secondary survey						Discharge GCS					
PIV Insertion/Removal						ED dwell time < 2 hours					
<p>The purpose of the audit is to recognize what you missed so you can improve your charting for the next trauma patient you care for.</p> <p>If you need more assistance with documentation there is a great video on the Trauma MIND site- MIND > Circles > BH Trauma Program > Trauma education > Trauma Narrator (right hand side). There is also the scribe sheet that lists the charting requirements.</p>											

Performance Improvement Process

Investigation- Current state mapping

- Hypothesis of what could be improved

Research evidence based practice-

- What are other facilities doing/adapt to our facility

Implementation of change- Future state mapping, educate

Optimization- Is everyone following the change

Evaluation- Did the hypothesis and implemented interventions make an improvement in patient care.



Standardize Field Triage & Decrease ED LOS for Transport Needs

Bozeman Health Big Sky Medical Center, Big Sky, MT



Background

All trauma patients are being triaged to Big Sky Medical Center (BSMC) regardless of severity of injury to the patient. Once the trauma patient is stabilized at BSMC, lack of transport capabilities and weather can prolong the emergency department (ED) length of stay (LOS) for critically injured patients increasing morbidity and mortality for this population.

A retrospective review shows that 83 trauma patients were cared for at BSMC during baseline data review period of December 2021- April 2022. Of those 83 patients, 44 of these patients had delays to definitive care because of lack of transport and/or weather or are classified as a critical care transport. Eleven patients had an Injury Severity Score (ISS) greater than 15 (major trauma). The overall ED LOS for patients with an ISS > 15 was 135.75 minutes.

Project Aim

Within one ski season:

1. 90% of patients will be correctly triaged in the field defined by the Gallatin County Trauma Field Triage Job Aid during 2022-2023 ski season
2. Reduce EMS arrival trauma patients ISS by one ISS point by 2022-2023 ski season
3. Reduce the number of patients with ISS > 15 by 50%.
4. Decrease the ED LOS to a 120-minute average for state inclusion trauma patients by July 2023

Project Design/Methods

We formed a team with representation from key services impacted (below) and the hospital staff (right):

- Big Sky Medical Center Trauma Program
- Big Sky Ski Patrol
- Big Sky Fire Department (BSFD)
- Hebgen Basin Rural Fire District
- Yellowstone Mountain Club Rural Fire District
- Eastern Idaho Regional Medical Center (Level II Trauma Center)
- Bozeman Health Deaconess Regional Medical Center (Level III Trauma Center)

Root Causes and Interventions:

- Majority of trauma patients being triaged to BSMC
 - Collaborate with stakeholders and develop a Gallatin County Trauma Field Triage Job Aid that aligns with the Montana State Trauma EMS Field Triage Tool but identifies local resources.
- Implement initial and reoccurring ski patrol and EMS educational offerings
- Prolonged ED LOS for trauma patients that need transfer to definitive care:
 - BSFD increasing capabilities for ground transport within their scope of practice
 - BSFD developing a critical care service
 - Life Flight Network contract review and termination
 - Monthly meetings with BSFD
 - Quarterly meetings with air medical agencies

Results

- 95% correctly bypass triaged in the field defined by the Gallatin County Trauma Field Triage Job Aid during 2022-2023 ski season.
- Reduced the number of patients with ISS > 15 by 54%.
- Decrease the ED LOS from 135.75 to 134 minutes. ED LOS has several variables such as type of transport need, arrival of transport agency and ED trauma workup. We will continue to work on these areas to decrease overall ED LOS.

	2021-2022	2022-2023
Total Trauma Patients	83	62
Total Patients with ISS >15 at BSMC	11	4
Percentage of BSMC patients with ISS > 15	13%	6%
ED LOS @ BSMC with ISS >15	135.75	134
Percentage of Field Triage Accuracy	n/a	95%
Totals Patient with ISS >15 that Bypassed	n/a	4

Conclusion

We met the goal of correctly bypass triaged in the field defined by the Gallatin County Trauma Field Triage Job Aid during 2022-2023 ski season. We continue to have longer than desired length of stay (los) for our patients to be transferred to a higher level of care. This is often attributed to the limited critical care transport availability in our rural location.

With the Montana State Field Triage Tool, EMS can efficiently match an individual's patient's needs with the most appropriate trauma facility, based on resources and proximity. The most severely injured would be either transported directly or transferred to the highest-level trauma care facilities. *American College of Surgeons. (2018). Advanced Trauma Life Support (10th ed.). Chicago, IL: American College of Surgeons.*

Project Team

- Chaney Byrd, RN, BSMC Trauma Program Coordinator
- Heather Wicks, RN, Bozeman Health Trauma Services Manager
- Chris Grimes, RN, Bozeman Health Deaconess Regional Medical Center (BHDRMC) Emergency Department Manager
- Kelly Reynolds, RN, BSMC Director of Nursing
- Bret Birrer, MD, Gallatin County EMS Medical Director
- Jesse Coil, DO, Big Sky Ski Patrol Medical Director
- Kevin Sullivan, MD, BSMC Trauma Medical Director
- Jeremy Mitchell, DO, BSMC Emergency Dept Medical Director



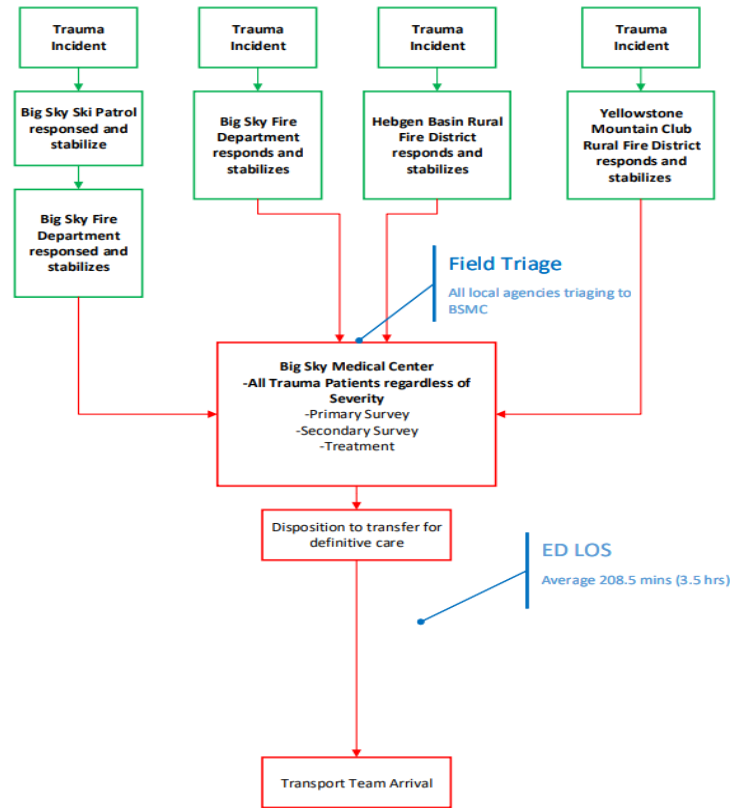
PIN QUALITY AWARD WINNING PROJECT!

The Montana PIN Quality Award was developed by the MT Performance Improvement Network (PIN) to recognize MT Critical Access Hospitals (CAH) and their efforts in improving quality within their organization. By meeting award criteria MT CAHs demonstrate leadership, community, willingness to share with peers, and a commitment to improvement.

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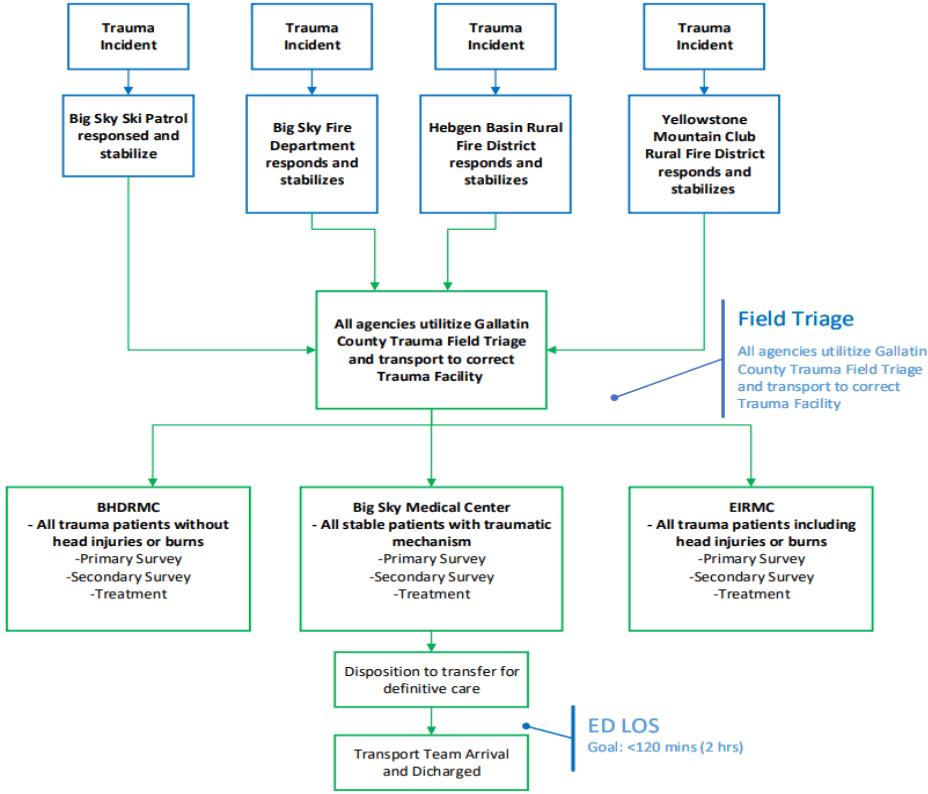
Transport/Triage CI Project



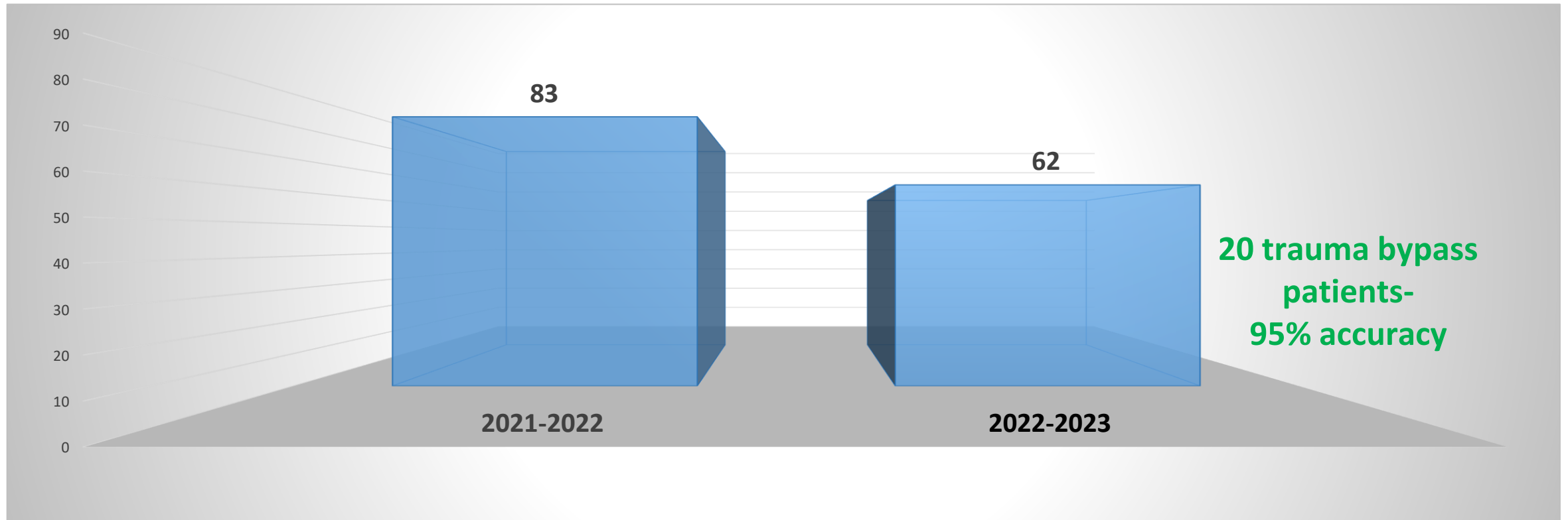
Trauma Field Triage Job Aid

Priority 1	Priority 2	Priority 3
STEP 1: Traumatic mechanism with unstable vital signs / altered mental status/ noted injuries	STEP 2: Traumatic mechanism with isolated injury and stable vital signs	STEP 3: Traumatic mechanism with stable vital signs and no noted injury / single orthopedic injury
Activate helicopter and transport to the closest Level 3 or higher facility	Bypass Big Sky Medical Center — can be ground	Transport to Big Sky Medical Center
<p><u>Airway</u>: unable to maintain airway or need for vent <u>Breathing</u>: RR<10 or >29, SpO2<88% despite supp. O2 <u>Circulation</u>: confirmed reading at any time</p> <ul style="list-style-type: none"> Age 0-9 <70mmHg + (2 x age in years) Age 10-64 ≤90mmHg Age 65+ <110mmHg <p><u>Disability</u>: GCS <9</p> <p>Post-arrest with ROSC</p> <p>Injury Patterns</p> <ul style="list-style-type: none"> -Skull deformity, suspected skull fracture -Suspected spinal injury with motor or sensory loss -Significant penetrating injuries to head, neck, chest, abdomen, back, groin, buttocks or extremities proximal to elbow or knee -Chest wall instability, deformity or suspected flail chest -Unstable pelvic fracture (unable to ambulate) -Suspected fracture of two or more proximal long bones -Crushed, degloved, mangled or pulseless extremity -Amputation proximal to wrist or ankle -Active bleeding requiring a tourniquet or wound packing with continuous pressure -Burns >20% TBSA COMBINED with other injury and trauma -Chest wall injury with suspected pneumothorax -Blunt abdominal trauma with significant firmness, distention or tenderness -High voltage electrical injury with or without significant injury <p>Transport to nearest Level 2 facility</p> <ul style="list-style-type: none"> -Isolated neurological injury -Isolated burns >20% TBSA with no associated trauma 	<p>-Pregnancy >20 weeks with stable vital signs and without priority 1 injuries</p> <p>-Geriatric (>65) with SBP >110 with multiple body regions injured</p> <p>Injury Patterns</p> <ul style="list-style-type: none"> -Suspected hip fracture -Orthopedic injury needing OR: Obvious femur fracture, obvious tib/fib fracture, open fractures, etc. <p>Provider Judgement</p>	<p>Mechanism of Injury</p> <ul style="list-style-type: none"> -High-risk auto crash <ul style="list-style-type: none"> • Partial or complete ejection • Death in passenger compartment • Significant intrusion (including roof) <ul style="list-style-type: none"> • >12 inches occupant site OR • >18 inches any site • Child (age 0-9) unrestrained or in unsecured child safety seat -Pedestrian/bicycle rider thrown, run over or with significant impact -Fall from height >10ft (all ages) -Rider separated from transport vehicle with significant impact (motorcycle, ATV, horse, snowmobile etc.) -High energy dissipation/rapid deceleration incidences striking fixed object with momentum (Skier, mountain biker, etc.) <p>Injury Patterns</p> <ul style="list-style-type: none"> -Orthopedic injury with neurovascular compromise for relocation -Stable, isolated orthopedic injury; upper extremity fractures, ankle fractures, etc. -GCS 10-13 (suspected concussion) -Penetrating injury to hand or foot

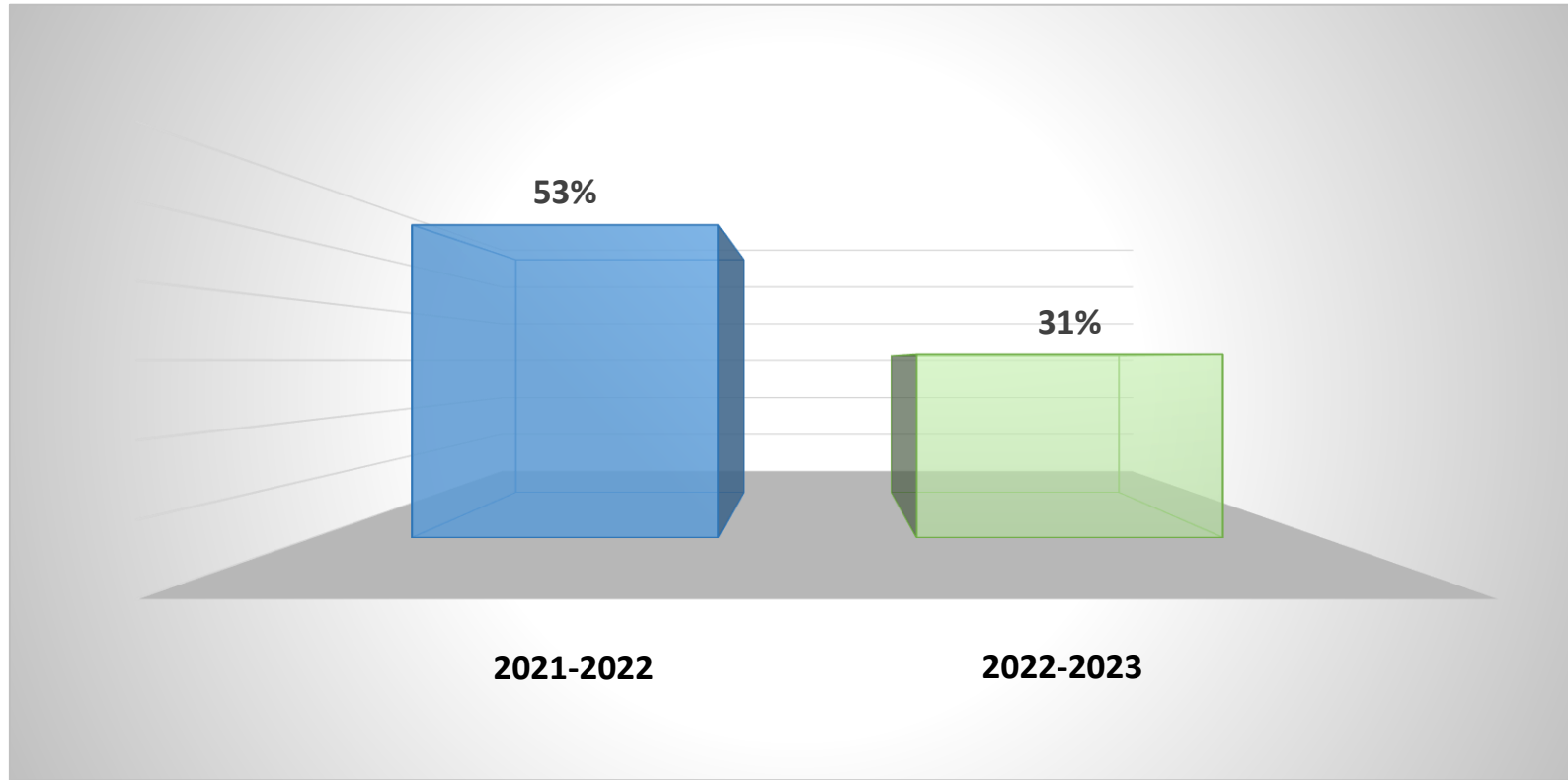
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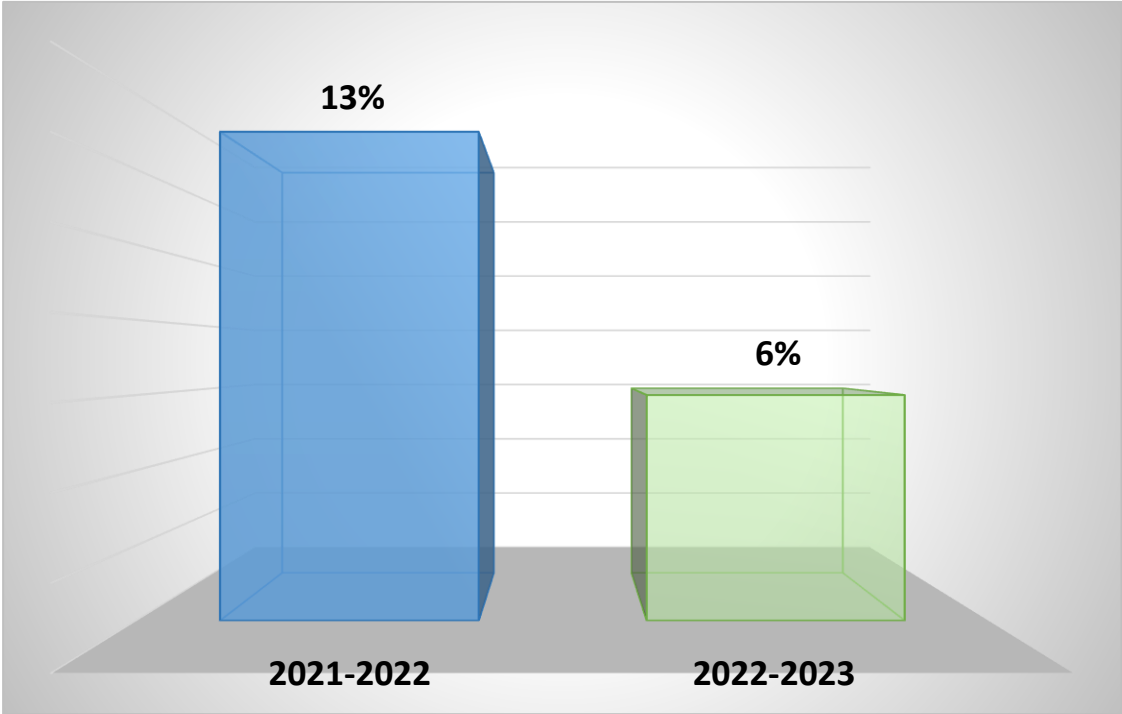
Total State Inclusion Trauma Patients



Total Trauma Patients with Critical Care and Difficult Transfers Out



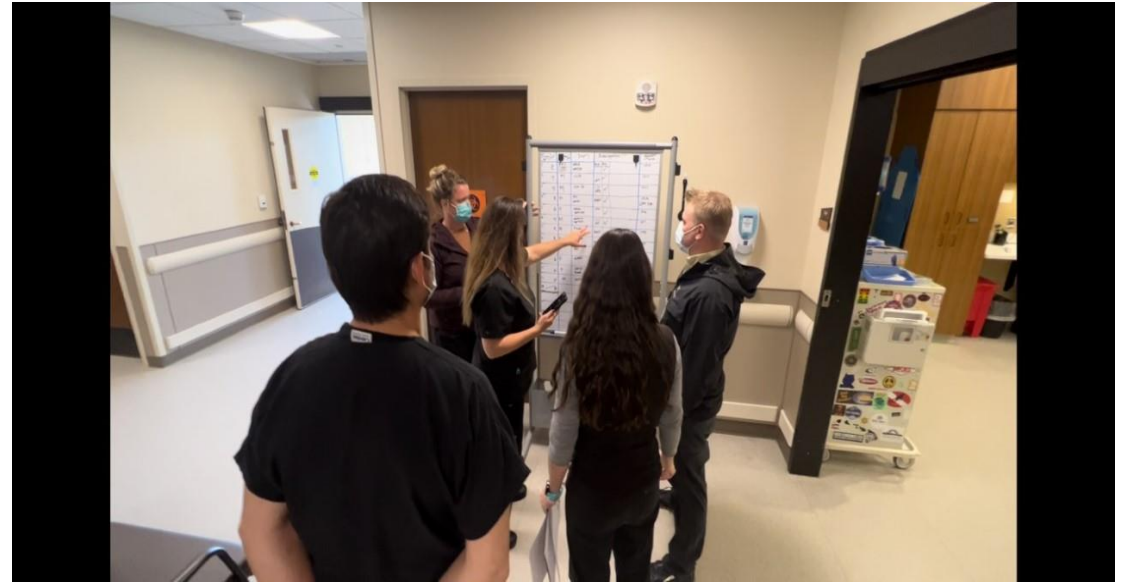
Percentage BSMC Trauma Patients with ISS > 15



MCI Drills

- Multi-agency drill- 03/23/2022
 - MCI 08/30/2022- influx of 12 trauma patients
 - Rescue Task Force 03/24/2023
-

MCI Drills



Rescue Task Force



A dark blue silhouette of a mountain range with several peaks of varying heights, set against a teal background.

Injury Prevention at Big Sky Medical Center

Bozeman Health

EPIC TBI

16 EPIC-TBI courses

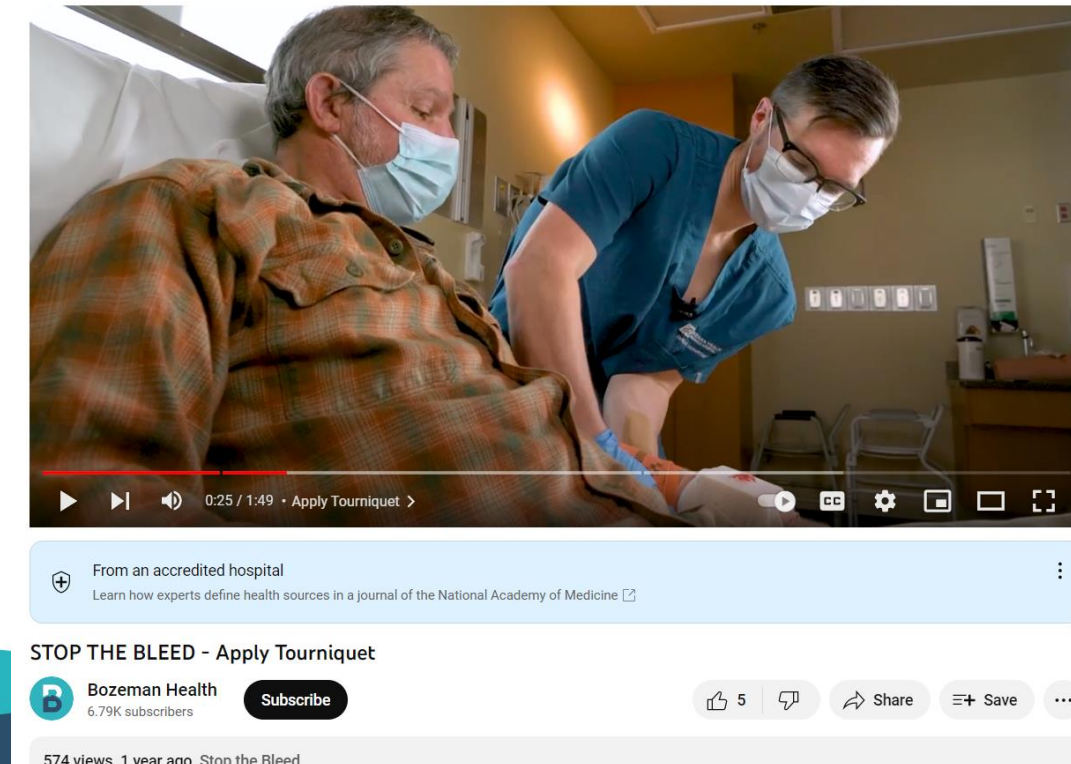
- Big Sky Medical Center- certified agency 12/01/2021
- Big Sky Ski Patrol
- Big Sky Fire Department
- Hebgen Basin Rural Fire District
- Big Sky Search and Rescue

Stop The Bleed

- Distributed to Big Sky and West Yellowstone public schools
- Kits/education provided to security staff at Montage Resort
- 3 Hemorrhage control boxes mounted/stocked at BSMC
- Hemorrhage control education is built into all annual all employee Net Learning module
 - Education went live in Jan 2023

Stop The Bleed

- Bozeman Health Stop The Bleed Video available for training
 - [STOP THE BLEED - Introduction to Your Kit – YouTube](#)



Helmets and Head Injury

- Ski/bike helmets stored at BSMC for patients who should replace their helmet after a crash
 - Part of Injury Prevention Mini Grant awarded to Bozeman Health Trauma Program to promote helmet wearing in the community.
- Helmet Fit Event at Big Sky Farmers Market June 21, July 19, and August 16
 - Education on how to fit a helmet and when to replace a helmet
 - Will had 10-12 helmets available to distribute-Local builder provided the vouchers



A dark blue silhouette of a mountain range with several peaks of varying heights, set against a teal background.

Questions?

Bozeman Health