



Clinical Safety & Effectiveness Cohort # 13

Preventing Missed Fractures in Intubated Trauma Patients at UHS



CENTER FOR PATIENT SAFETY & HEALTH POLICY

UT HEALTH SCIENCE CENTERTM

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Educating for Quality Improvement & Patient Safety

The Team

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- * Florence Wall – BS, MS,PA-C; Dept. of Orthopaedics, UTHSCSA
- * Karla Hudson – CT technologist; University Hospital System
- * Virginia Calley – Research Associate; Dept. of Orthopaedics UTHSCSA
- * Hope Nora – CS&E Team Facilitator

* Sponsor Department

- * John Toohey, MD – Associate Professor; Dept. of Orthopaedics, UTHSCSA

The Team!



What Are We Trying to Accomplish?

OUR AIM STATEMENT

To improve initial assessment of intubated trauma patients with orthopedic consultation so that 100% of orthopedic diagnoses at 48 hours are the same as final diagnoses at discharge by January 7, 2014

Project Milestones

- * Team Created 9/2013
- * AIM statement created 9/2013
- * Twice a Month Team Meetings 9/9 – present
- * Background Data, Brainstorm Sessions,
Workflow and Fishbone Analyses 9/9 – 10/7/13
- * Interventions Implemented 10/23 – present
- * Data Analysis 9/2013 – 1/2014
- * CS&E Presentation 1/17/14

Why Do We Want to Do This?



38yo M s/p bicycle versus car

- * GCS 5 on scene, intubated
- * SDH, SAH, facial fractures
- * L radius fracture, R scapula fracture
- * Tracheostomy on HD 9
- * ORIF on HD 14

Why Do We Want to Do This?



- * Discharge to rehab anticipated for HD 21
- * XRs of both wrists HD 20
- * R radius fx missed
- * ORIF on HD 21
- * Subsequently discharged to rehab on HD 28

Plan: How Did We Approach Problem?

- * Compile multidisciplinary team of experts
- * Perform literature analysis
- * Flowchart trauma assessment process
- * Create cause effect diagram
- * Chart review to assess current missed fracture rate
- * Utilize IT resources
- * Analyze and maximize current clinical technology, particularly CT scanner

What Does the Literature Say?

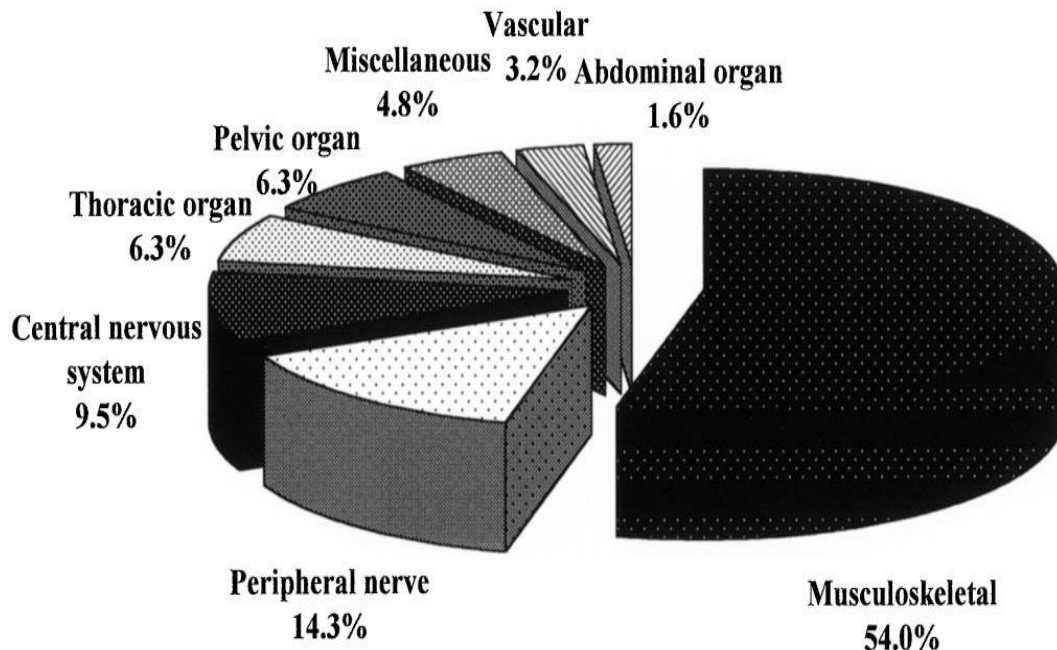
- * Overlooked/missed injuries and delayed diagnoses are common problems in polytrauma patients
- * Undiagnosed musculoskeletal injuries can lead to unsatisfactory fracture healing or malalignment (Buduhan G. et. al.).
- * Head injuries & GCS of 8 or lower more likely to have missed injuries/delayed diagnoses (Pfeifer R, et. al.)

What Does the Literature Say?

- * Diagnosing injuries improves with better patient communication (Houshian S., et. al.)
- * Reported incidence of 6%-38% for all injuries, depending on definition and type of missed injury
- * True incidence difficult to determine due to use of retrospective studies (Houshian S, et. al.)
- * Prospective studies show higher incidence compared with retrospective (Enderson et. al.)

What Does the Literature Say?

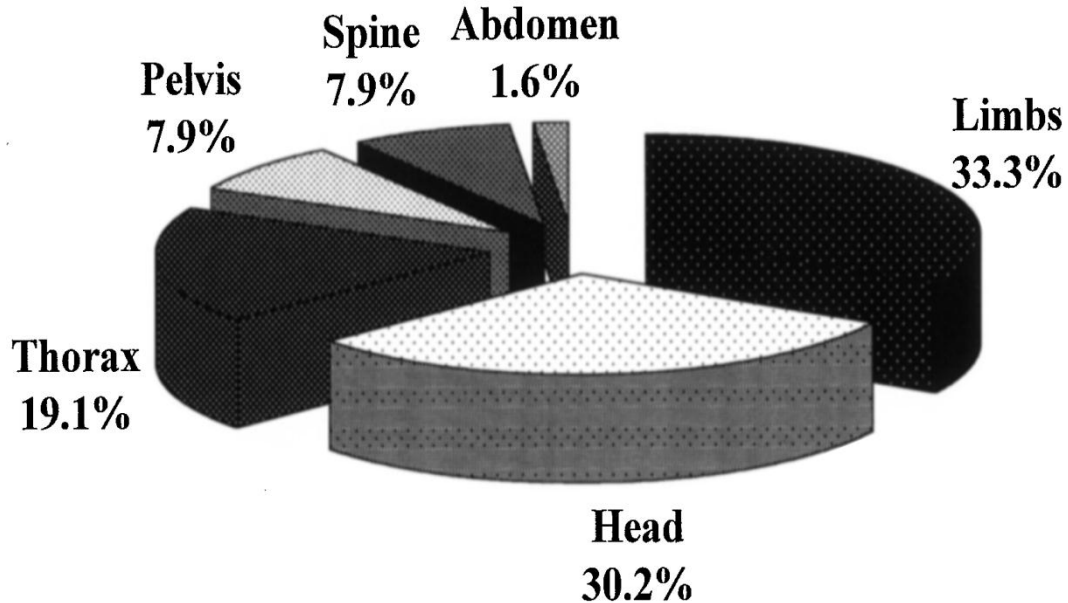
Types of missed injuries



- * Buduhan et al showed an 8.1% missed injury rate
- * 54% of those were musculoskeletal
- * 49% were fractures
- * Limbs/extremities most common fracture sites

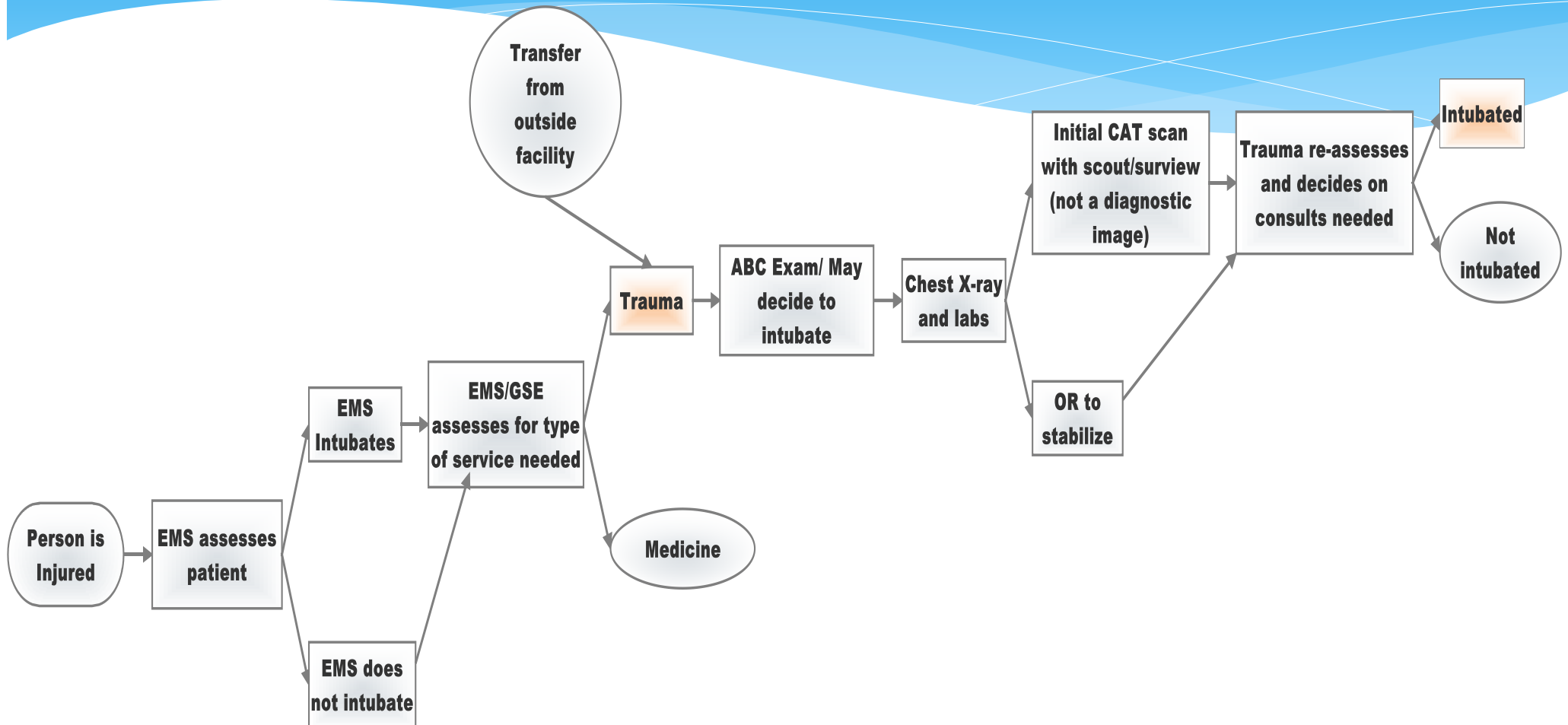
What Does the Literature Say?

Anatomic sites of missed injuries

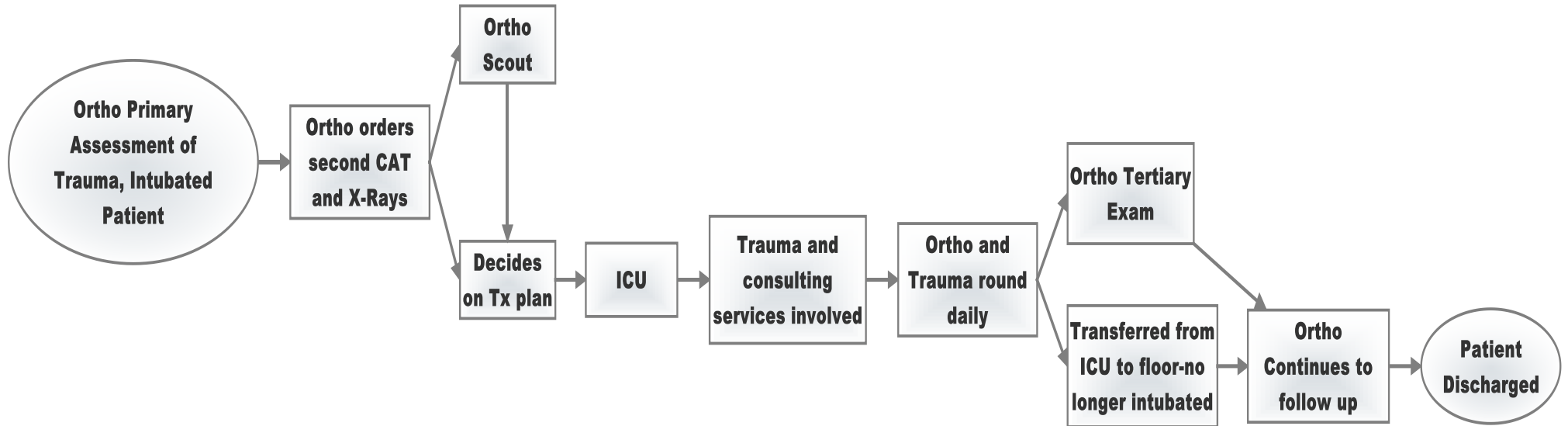


- * 33% missed injuries involve limbs
- * 25% of those are fractures
- * Buduhan G, et.al.

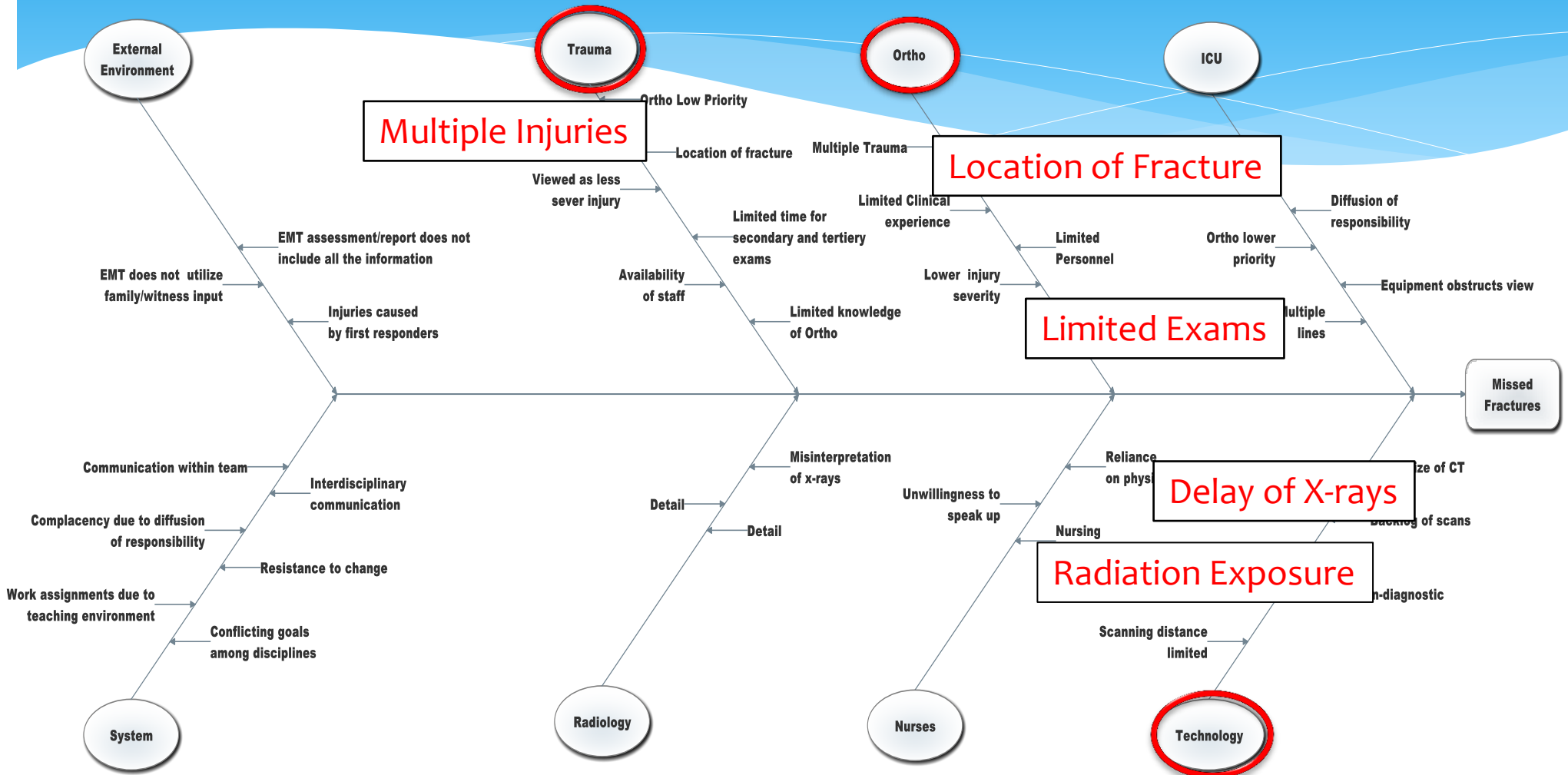
Where should we intervene?



Where should we intervene?



Cause-Effect Diagram

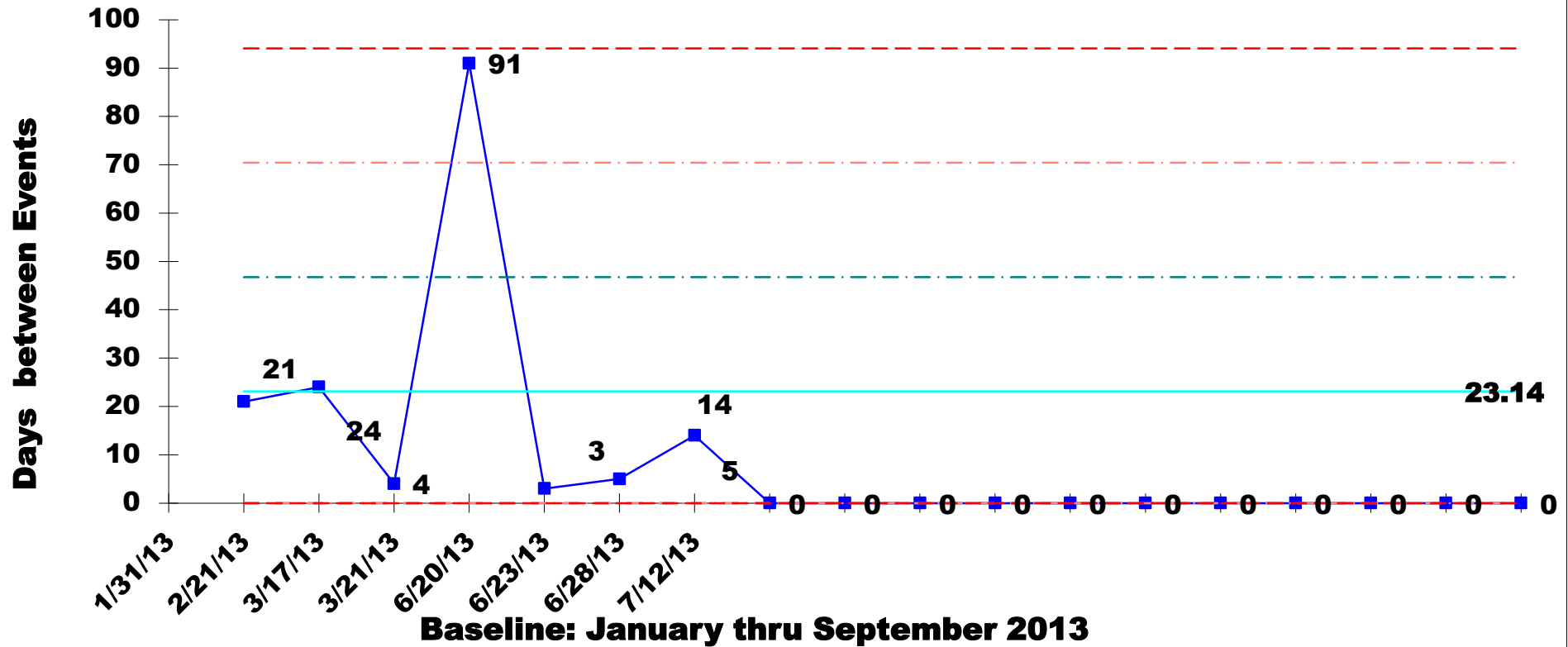


What Does Our Pre-Intervention Data Show?

- * 9 month period prior to planned intervention
- * Incidence:
 - * 210 intubated patients evaluated by ortho from 1/1/13 to 9/30/13
 - * 8 missed injuries identified in 210 patients
 - * Incidence is 3.8% during this time period
 - * Shortest time between misses: 3 days; longest: 91 days
- * Incidence in our population likely higher than literature due to exclusive look at intubated trauma patients versus all trauma patients

What Does Our Pre-Intervention Data Show?

**Pre-Intervention Data: Ortho Missed Fractures
Days between Events**



What Are We Going To Do?

- * Factors listed as causes of missed injuries from literature:
 - * clinical error in patient assessment
 - * misinterpretation of the radiologic findings
 - * lack of appropriate radiographic studies (Pfeifer et. al)
- * We chose to focus on improving initial radiographic survey to decrease missed orthopedic injuries
- * A scout image is a preliminary scan taken of a body region before a definitive imaging study and serves to establish a baseline
- * We hope to use the scout to improve initial radiographic assessment of intubated trauma patients

Back to **CT** for Patient



Do: How Do We Make This Happen?

- * Modify current protocol for CT scanning intubated trauma patients
 - * Reposition arms across abdomen during CT scout acquisition
 - * Every patient is unique; different techniques employed to assure as much of the body is within the scan field of view
- * Contact those who would be affected by this change in protocol
 - * Body radiologists, CT technologists & supervisor, trauma surgery team, orthopedic trauma team
- * Signage added to CT scanner room to remind technologists of protocol and reason of importance

Do: How Do We Make This Happen?

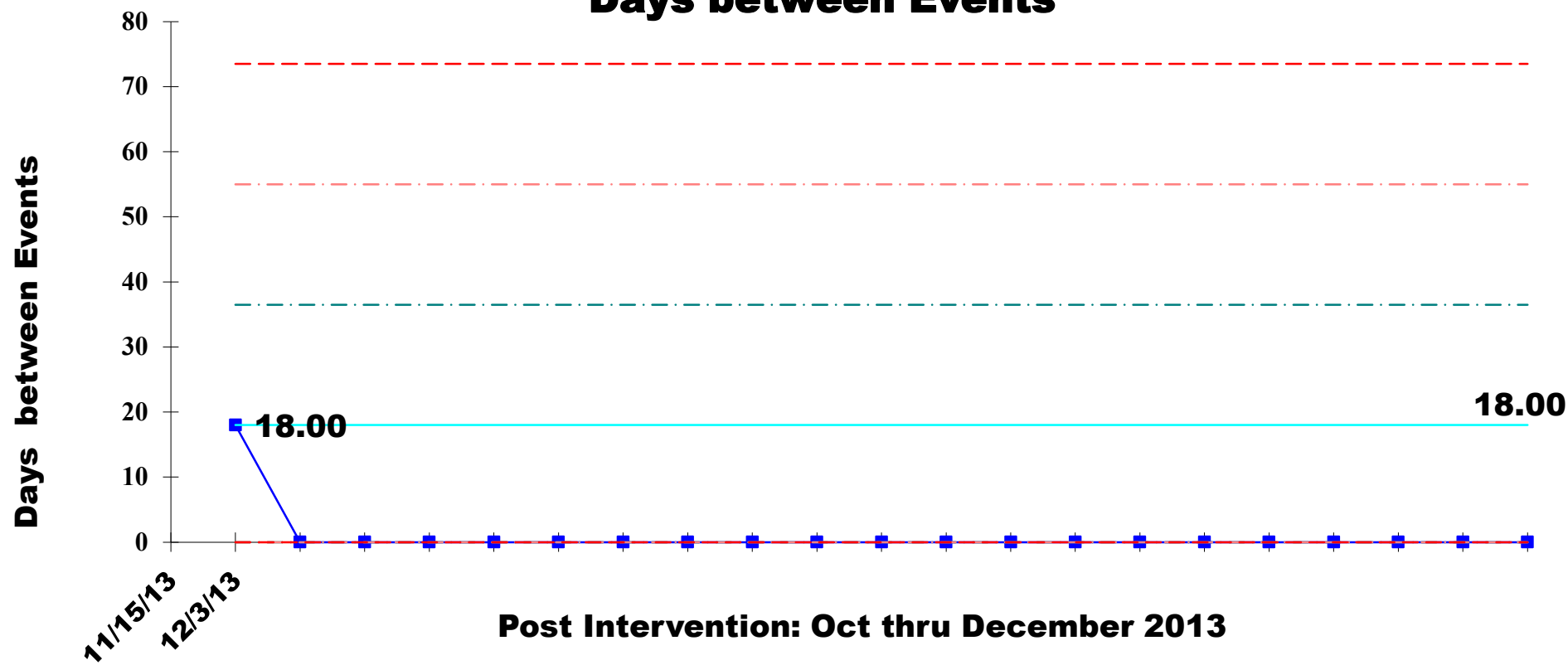
- * Project presented to Radiology Department Clinical Management Team
- * Analyze rate of intervention implementation
- * Collect anecdotal information about barriers to implementation
- * Repeat data analysis of post-intervention period

Study: How Will We Know That a Change is an Improvement?

- * Measuring the effect of the intervention was difficult because of the low event incidence
 - * Proving the negative
 - * Who would benefit from our intervention?
 - * # of patients where intervention could be applied/total of patients in population
- * Compile data from Sunrise for based on ortho consult with ventilator use
- * Identified dates of orthopedic diagnoses to compare diagnoses at 48 hours and discharge
- * Calculate rate of implementation in eligible patients

Post-Intervention Data

Post Intervention Data: Ortho Missed Fractures Days between Events



Post-Intervention Data

Implementation Rate:

	Attempted	Successful
October	5/17	2/17
November	5/16	3/16
December	4/7	0/7
TOTAL	14/40	5/40

2 patients in pre-intervention and 0 in intervention period had upper extremity injuries that could be identified with position change

Return on Investment

- * Difficult to establish ROI for this project
- * Value related to improved quality of care and decreased malfeasance by delayed care
- * Extrapolation of Trigger case
 - * Extra surgery & hospitalization: 4/10-17/13
 - * \$29,350**
- * Minimal investment involved with project
- * Not a 'Cure All' but effective addition to the initial assessment process

Act: Expansion of Our Implementation

- * Address the limitations to implementation
 - * Improve 'buy-in' with trauma, orthopedic, radiology and CT teams
 - * Re-think methods of positioning to optimize image versus body habitus limitations
- * Closer monitoring of intervention implementation going forward
- * Continue data collection to assess impact with analysis of missed injury type/location
- * Increase length of scout run to maximize lower extremity surveillance
- * Positioning part of training of CT technicians

Special Thanks!

- * Travis Haynes – Director of Coding & Reimbursement, UHS
- * Rachel Lyons – Coding Associate, UHS
- * For their crucial assistance in both brain power and grunt work to give us the data that we needed when we needed it!

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Thank you!



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