



THE IMPACT OF WEATHER, PREHOSPITAL CONDITIONS, AND PREHOSPITAL TIME ON TRAUMA PATIENT MORTALITY IN MAINE

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Presenter:

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DISCLOSURE

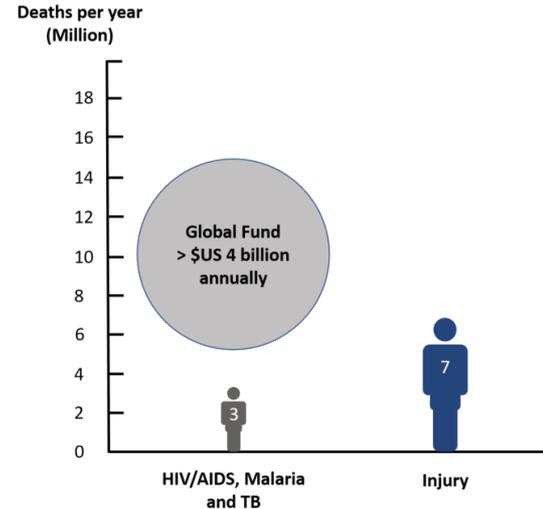


Authors have nothing to disclose

BACKGROUND

1

- ? Trauma is a leading cause of morbidity and mortality worldwide
- ? More people die from trauma annually, than malaria, HIV and TB combined
- ? Prehospital factors influence trauma patient outcomes.
- ? This study was designed to identify the factors that predict morbidity and mortality



AIMS

1

- ?
- This study aims to:
1. Define the clinical, epidemiology and geographic pattern(s) of trauma in Maine
 2. Discern the predictors of morbidity and mortality among trauma patients in Maine

HYPOTHESES

1



We hypothesized that:

1. Prehospital clinical conditions would predict mortality
2. Prehospital times would predict patient survival
3. Adverse weather negatively impacts patient survival

METHOD

2

- ❓ **Type:** Retrospective cohort study of all trauma patients (Jan 2015 - Jan 2018)
- ❓ **Setting:** Maine Medical Center (MMC), a level 1 trauma center
- ❓ **Data sources:**
 - **Trauma registry:** Demographic, prehospital, geospatial and clinical data
 - **National Oceanographic and Atmospheric Administration (NOAA) database:** Weather data
- ❓ **Inclusion criteria:** Trauma patients at MMC with $GCS \leq 9$ and/or $SBP \leq 90\text{mmHg}$

METHOD

2



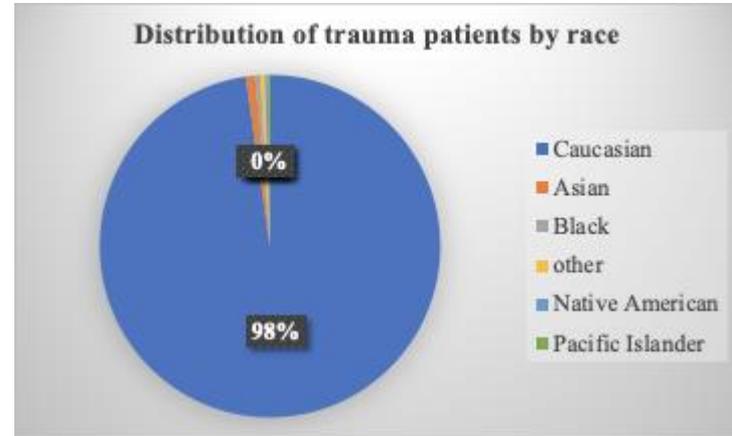
Analyses

- Student T-test, Chi-Square, ANOVA, Bonferroni tests, Kruskal-Wallis, and Dunn tests (Stata v12)
- Bivariate and multivariate logistic regression models to predict ICU admission, surgery and mortality (Stata v12)
- Geospatial mapping to identify trauma hotspots in Maine (Google fusion tables 2020)

RESULTS

Demography

- ? We captured 442 patients in the 3-year period
- ? **Age:** Median age = 52 years, [IQR = 33, 67] years
- ? **Sex:** Males (71%)
- ? **Race:** Most (98*) were caucasian, others <1%



RESULTS

Injury characteristics

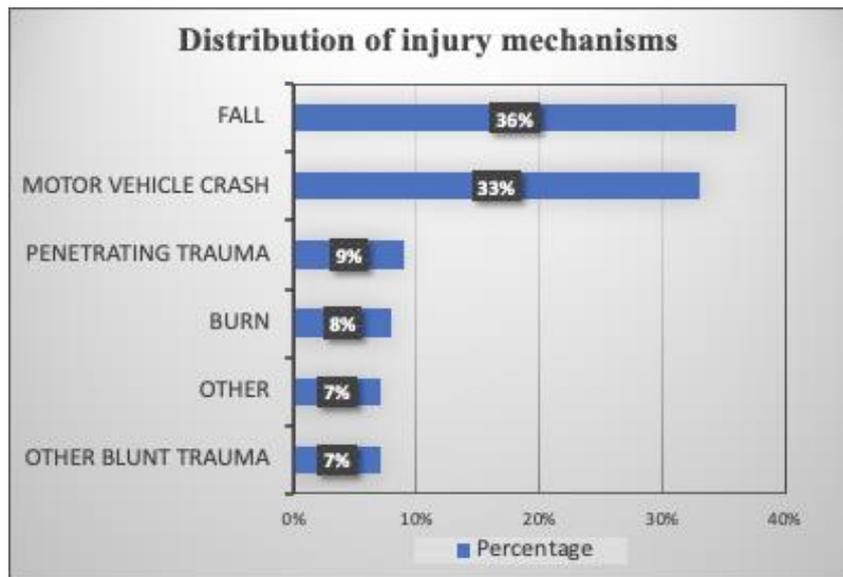


Fig. 1 Injury types (n=442)

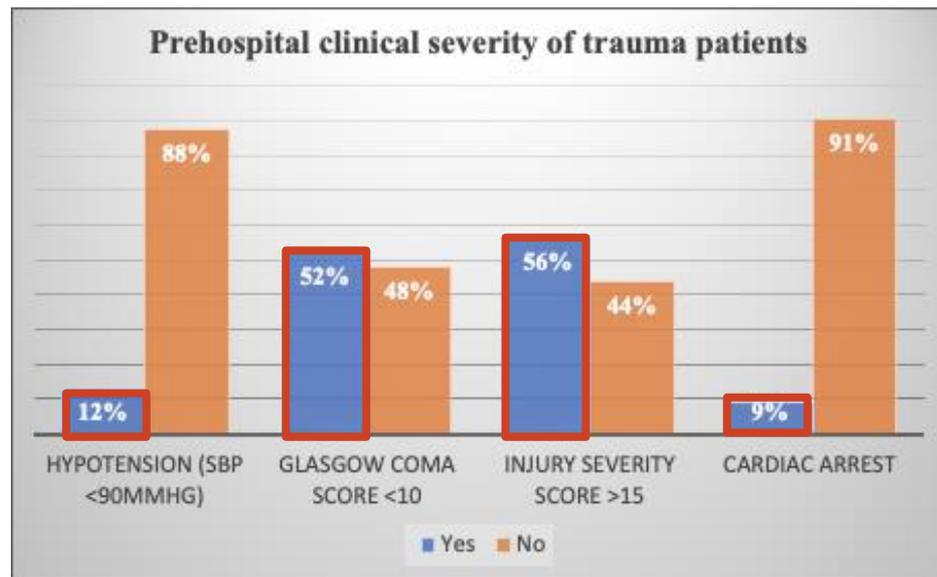


Fig. 2 Injury severity assessment (n=442)

RESULTS

2

Geospatial Mapping of injury hotspots in Maine among MMC patients

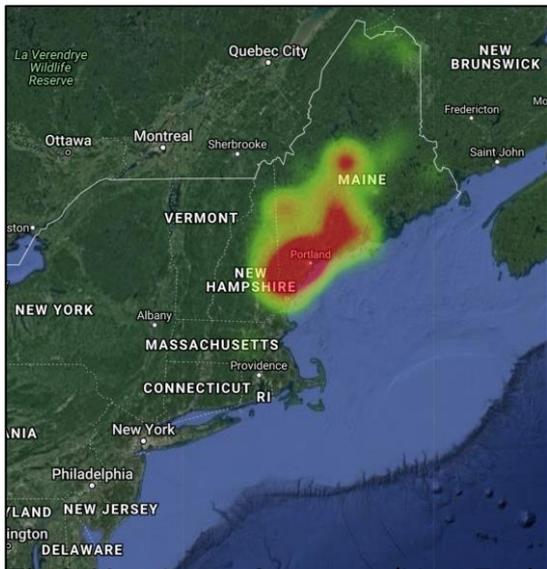


Fig 3: Heat map of trauma. (New England)

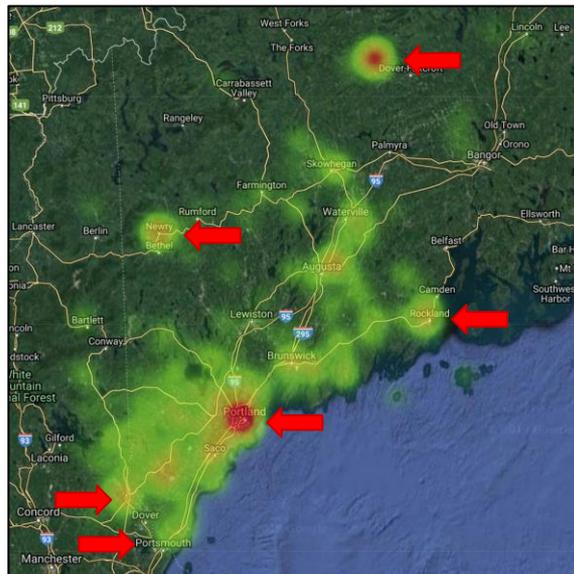


Fig 4: Heat map of trauma in Maine (State view)

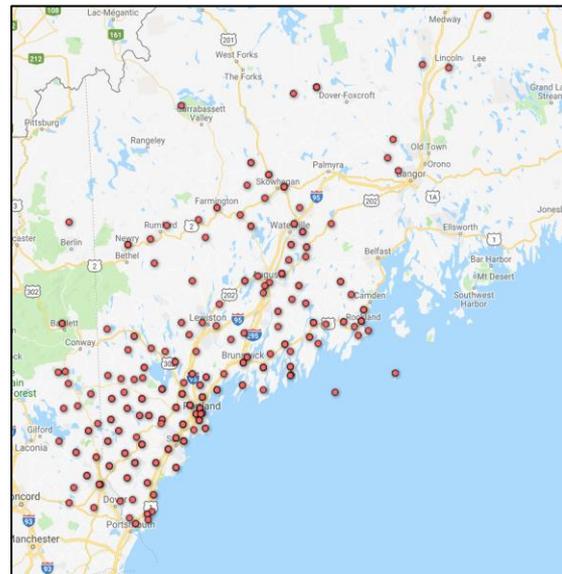


Fig 5: Trauma hotspots in Maine

RESULTS

Prehospital care trends

- ❓ The median time on the scene (field time) was 15-minutes [IQR =10, 20.5].
- ❓ Most patients were transferred from an outside hospital (54%).
- ❓ The median time to definitive care was 129 minutes [IQR= 61, 247].
- ❓ Ground ambulance (85%) and helicopter transport (7%) were the most frequently utilized.

RESULTS

2

What factors predict needing surgery or ICU admission?

Findings	Odds Ratio	P-value
Patients with field GCS ≤ 9 had higher odds of ICU admission	OR = 2	p=0.029
Patients with ISS > 15 were more likely to be taken to the OR	OR = 2.9	p=0.0001

RESULTS

2

What factors predicted mortality among patients with hypotension, GCS \leq 9 or both

Findings	Odds Ratio	P-value
Longer on-scene time was associated with lower lower odds of <u>ED mortality</u>	OR = 0.96	p=0.011
Hypotension in the field was the single greatest predictor of <u>ED mortality</u>	OR = 11	p=0.004
ISS >15 was associated with higher odds of <u>in-hospital mortality</u>	OR = 3	p=0.006
Hypoxia in the field was associated with higher odds of <u>in-hospital mortality</u>	OR = 3	p=0.004
Warmer weather was associated with lower odds of <u>in-hospital mortality</u>	OR = 0.94	p=0.019

CONCLUSION

2

- ❓ In our rural catchment area, among severely injured patients,
 - Time spent on the scene is associated with lower mortality.
 - Field hypotension, hypoxia, low GCS and higher ISS predict mortality.
- ❓ Geolocation did not significantly impact prehospital mortality
- ❓ Among trauma transfers, being injured under colder weather was associated with higher mortality

TEAM

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THANK YOU