58 Geospatial Analysis of Pediatric EMS Run Density and Endotracheal Intubation

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Background: Pediatric out-of-hospital airway management is a challenge for providers. The associations between geographic factors including transport distance and pediatric EMS run clustering on endotracheal intubation are unclear.

Objectives: The objective of this study was to determine if endotracheal intubation procedures are more likely to occur at greater distances from the hospital and near clusters of pediatric calls.

Methods: This was a retrospective observational study including all Emergency Medical Services (EMS) runs for patients less than 18 years of age from 2008 to 2014 in a geographically diverse Oregon county. We first computed descriptive statistics for all patients in the cohort in comparison to those who were intubated to describe the population and identify associations between intubation and transport distance. We geocoded scene addresses using the automated address locator created in ArcGIS supplemented with manual address geocoding for remaining cases. We successfully matched over 95% of addresses. We then use the Getis-Ord Gi spatial statistic feature in ArcGIS to map statistically significant spatial clusters (hot spots) of pediatric EMS runs. We then superimposed all intubation on the map of these hot spots.

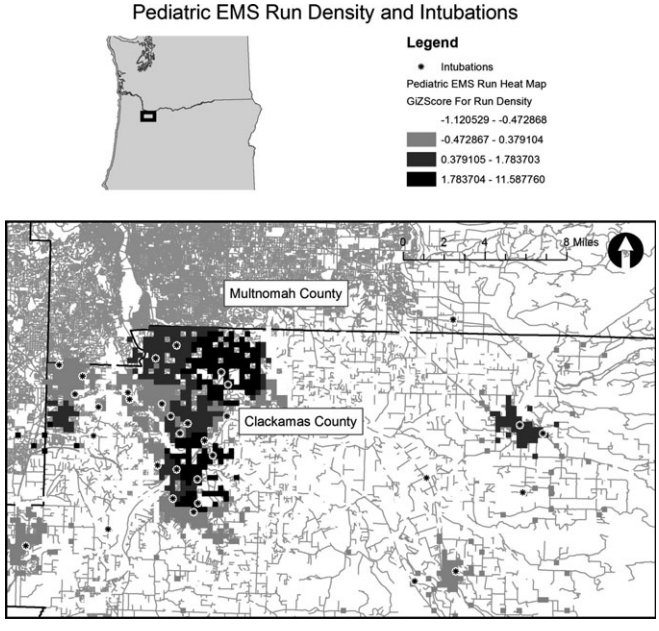

Figure 58 – Hansen

Table 1
Welch

	Non-intubated Patients n=7759	Intubated Patients n=38	P-value
Mean Age (SD)	10.6 (6.1)	13.0 (5.4)	0.014
Sex (% female)	43.6%	47%	0.89
Mean Ground Distance Traveled (SD)	15.9 (13.8)	10.4 (11.3)	0.014
Lights & Sirens	8.9%	94.7%	<0.001
Scene is a home	34.0%	42.4%	0.32
Children's Hospital Destination	41.1%	52.6%	0.15

Results: We identified a total of 7797 pediatric EMS runs during the study period and 38 endotracheal intubations. Patients who were intubated were similar to those who were not in sex and whether or not they were transported to a children's hospital. Intubated patients were transported with lights and sirens more commonly and tended to be transported shorter distances (Table 1). Patients who were intubated were older than non-intubated patients. The location of intubations was superimposed on hot spots of all pediatric EMS runs. A map focused on the portion of the county where hot spots were located is displayed in Figure 1. Most of the intubations occurred outside the areas where pediatric calls were highly clustered (dark black portions of the map)

Conclusion: In this geographically diverse county, it appears that the location of intubation procedures is not similar to the clustering of pediatric calls and that intubated patients were transported shorter distances on average compared to non-intubated patients.

59 A Prospective Study of Patients Receiving Prehospital Ketamine for Profound Agitation

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Background: Profound agitation (PA) in the prehospital environment is commonly encountered and represents a safety issue for both patients and their caregivers. Ketamine (K) is an emerging drug for PA, however data is limited mostly to retrospective case series.

Objectives: We sought to establish the time to adequate sedation for patients receiving K for PA in the prehospital environment, and to characterize these patients prospectively.

Methods: This was a prospective Waiver of Consent study (45 CFR 46.116) of all adult patients in our EMS system needing chemical restraint for PA that were transported to our ED from October 2014 to November 2015. All patients received 5 mg/kg of intramuscular K. All paramedics in our EMS system were trained in the Altered Mental Status Scale (AMSS), a validated ordinal scale of agitation. Patients were enrolled if their AMSS score was +4. Paramedics carried stopwatches and measured time to adequate sedation (AMSS ≤ +1) after injection. Secondary outcomes included need for additional sedatives, ethanol concentration, urine drug screen results, serum lactate and pH, intubation frequency, complications, and length of ED and/or hospital stay.

Results: 51 subjects were enrolled. Median age was 29 years (range 18 - 66), 77% were male, 48% were Caucasian, 37% were Black American, and 9% were Native American. A documented history of mental illness was present in 57% (29/51). Median time to adequate sedation was 4.2 min (range 1-25 min). 92% (45/51) had adequate sedation prehospital. 16% (8/51) required an additional drug prehospital. Median ethanol concentration was 90 mg/dL (0 - 363). Urine drug screens (n = 17/30 positive) were positive for opioids (n = 7), cocaine (n = 6), amphetamines (n = 4), benzodiazepines (n = 2), THC (n = 2), & LSD (n = 1). Median serum lactate was 3.2 mmol/L (1.2 - >14.8). Median pH was 7.34 (6.91-7.49). Intubation occurred in 53% (27/51) of patients. Complications included hypersalivation (n = 9), vomiting (n = 3), and emergence reaction (n = 2). No laryngospasm or deaths occurred. Median ED stay was 88 min (25 - 995). Median hospital stay (n = 30) was 1.7 days (0.25 - 29).

Conclusion: In patients with profound agitation (AMSS = +4) in the prehospital environment, ketamine typically provides effective sedation.

60 Incidence of Outcomes Based on Field Triage in Older Adults with Blunt Head Trauma Transported by EMS

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Background: The 2011 Guidelines for Field Triage of Injured Patients recommend patients that do not meet physiological (step 1), anatomical (step 2), or mechanism of injury (step 3) criteria but are anticoagulated with head trauma (step 4, "special considerations") should be transported to a trauma center or hospital capable of timely management.

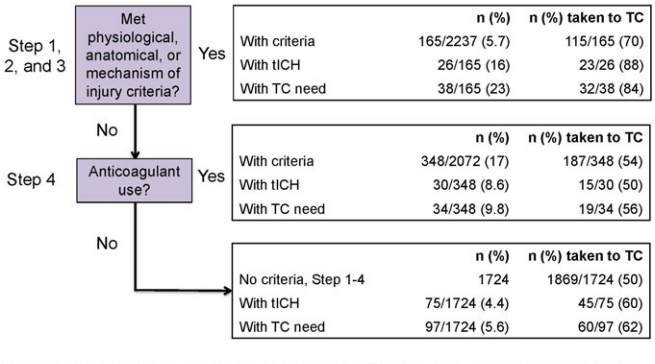
Objectives: We evaluated the incidence of acute traumatic intracranial hemorrhage (tICH) and trauma center need based on the presence or absence of field triage criteria.

Methods: We conducted a countywide, retrospective study at 5 EMS agencies and 11 hospitals (4 trauma centers) of older adults (≥55 years) who were transported to a hospital by EMS after head trauma during 2012. Data were abstracted from EMS medical records and matched to ED and hospital records. The primary outcomes of 1) acute tICH on CT imaging and, 2) trauma center need (composite outcome of acute tICH, death, neurosurgical intervention, emergency surgery, or injury severity score 16 or greater) were analyzed in 1 of 3 field triage groups: 1) step 1, 2 or 3 of field guidelines criteria present; 2) step 1-3 criteria not present but anticoagulated; or 3) no criteria present. We also reported the proportions of patients taken to a trauma center within each field triage group.

Results: 2237 patients were included for analysis; median age was 74 years old (IQR 62-85 years) and 899 (40%) were male. The most common mechanism of injury was fall from standing height or less (69%) and most patients had an initial EMS Glasgow Coma Scale score of 14 or 15 (96%). Of the 348 (17%) patients who did not have step 1-3 criteria present but were anticoagulated, 187 (54%) were taken to a trauma center, 30 (8.6%) had a tICH and 34 (9.8%) had a trauma center need (Figure).

Conclusion: Older adults with head trauma who do not meet step 1-3 triage criteria but are anticoagulated have a relatively high incidence of acute tICH and the need for a trauma center. Nearly half of these patients are not taken to a trauma center.

Figure. Incidence of outcomes by field triage criteria, n=2237



Abbreviations: TC; Level 1 or 2 trauma center; tICH, acute traumatic intracranial hemorrhage; TC need is a composite outcome that includes acute tICH, death, neurosurgical intervention, non-orthopedic surgery in first 24 hours of hospitalization, or injury severity score 16 or greater

Figure 60 – Nishijima

61 Diagnosis of Elder Abuse in U.S. Emergency Departments

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Background: Elder abuse is associated with significant morbidity and mortality, and has an estimated prevalence in the United States of 5-10%. EDs are an important site for identification of other forms of abuse including child abuse and intimate partner violence, but the epidemiology of elder abuse identification in U.S. EDs has not been described.

Objectives: We sought to estimate the proportion of older adults in US EDs receiving a diagnosis of elder abuse and characterize these patients.

Methods: Using the 2012 Nationwide Emergency Department Sample (NEDS), ED visits by patients aged 65 years and older with a diagnosis of elder abuse were identified using ICD-9 diagnosis codes and E-codes. The proportion of patients receiving a diagnosis of elder abuse was estimated using survey weights. Odds ratios were calculated

Evans Table. Odds ratios for elder abuse diagnosis in US EDs in calendar year 2012. (n= 23,097,740 ED visits)

	Odds Ratio (95% CI)	P Value
Female	1.90(1.60-2.25)	<0.001
Age, (years)		
65-69	Reference	
70-74	1.16(0.91-1.47)	0.22
75-79	1.06(0.81-1.38)	0.66
80-84	0.87(0.65-1.15)	0.32
85-89	1.15(0.88-1.51)	0.30
>90	1.00(0.71-1.40)	0.99
Charlson Comorbidity Index, Categories		
<1	Reference	
1-2	1.33(1.09-1.63)	0.006
2-3	1.11(0.85-1.45)	0.43
>3	1.18(0.92-1.52)	0.20
Common ED Diagnoses*‡		
Chest Pain	0.95(0.65-1.39)	0.81
Contusion/Superficial Injury	2.83(2.25-3.57)	<0.001
Chronic Obstructive Pulmonary Disease	1.01(0.81-1.27)	0.91
Urinary Tract Infection	2.25(1.86-2.71)	<0.001
Cardiac Dysrhythmias	0.99(0.80-1.22)	0.93
Abdominal Pain	0.36(0.20-0.65)	0.001
Spondylosis, Other Back Problems	0.95(0.72-1.26)	0.73
Pneumonia	0.79(0.55-1.12)	0.18
Septicemia	1.88(1.38-2.54)	<0.001
Congestive Heart Failure, Nonhypertensive	0.99(0.78-1.26)	0.95
Hospital Region		
Northeast	Reference	
Midwest	1.19(0.84-1.69)	0.32
South	1.23(0.93-1.63)	0.15
West	1.55(1.13-2.13)	0.007
Hospital Teaching Status		
Metropolitan Non-Teaching	Reference	
Metropolitan Teaching	1.77(1.42-2.21)	<0.001
Non-Metropolitan	1.15(0.89-1.48)	0.29

*10 most common ED diagnosis groups, ordered most to least common, identified using Clinical Classification Software (CCS) developed by the Agency for Health Research and Quality HCUPnet data tool.
‡ Referent group for common ED diagnosis odds ratios set as those patients without the CCS diagnosis group of interest

Table 61: Evans.