TEXAS EMS & TRAUMA REGISTRIES

Comparing the CR-3 Injury Severity Categories (KABCO) to Hospital-Assigned Injury Severity Score (ISS) – Linked Data Report

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INCLUSION CRITERIA

Texas Department of Transportation (TxDOT) Crash Record Information System (CRIS)

Per Texas Transportation Code Section 550.062, crash reports must be submitted to TxDOT if a motor vehicle crash results in injury or death or property damage of $1000 or more.

Texas EMS & Trauma Registries

The following report was generated with hospital patient records submitted to the Texas EMS & Trauma Registries as of 7/31/2015. The hospital inclusion criteria are as follows per Texas Administrative Code, Title 25, Chapter 103:

Traumatic Brain Injuries

An acquired injury to the brain, including brain injuries caused by anoxia due to submersion incidents. The following International Classification of Diseases 9th Revision Clinical Modification (ICD-9-CM) diagnostic codes are to be used to identify cases of traumatic brain injury: 800.0-801.9, 803.0-804.9, and 850.0-854.1. The ICD-9-CM diagnostic code to be used to identify traumatic brain injury caused by anoxia due to submersion incidents is 348.1 or 994.1 (Rule § 103.2).

Spinal Cord Injuries

An acute, traumatic lesion of the neural elements in the spinal canal, resulting in any degree of sensory deficit, motor deficits, or bladder/bowel dysfunction. The ICD-9-CM diagnostic codes are to be used to identify cases of traumatic spinal cord injury: 806.0-806.9 and 952.0-952.9 (Rule § 103.2).

Other Traumatic Injuries

An injury listed in the ICD-9-CM diagnostic codes between 800.0 and 959.9, excluding 905-909, 910-924, and 930-939, and admitted to a hospital inpatient setting (for more than 48 hours), or died after receiving any evaluation or treatment or was dead on arrival, or transferred into or out of the hospital (Rule § 103.2).

Note: The ICD-9-CM codes used above are diagnosis codes, not E-codes.

SUMMARY

This summary report only includes data on hospital records that were reported to the registry through a passive surveillance system. Additionally, these data are based on hospitalizations, not patients, such that if a patient was hospitalized more than once or transferred between facilities, both hospital records were included.

Utilizing 2013 Texas Department of Transportation (TxDOT) Crash Record Information System (CRIS) records linked to 2013 trauma hospitalization records, the objective of this report was to compare distributions between *crash-assigned* CR-3 injury severity categories (KABCO) to the *hospital-assigned* Abbreviated Injury Score - Injury Severity Score (ISS) among primary persons sustaining fatal/non-fatal injuries captured in the Texas EMS & Trauma Registries. Fatal/non-fatal outcomes were defined by registry disposition data where 'Emergency Department Disposition', 'Hospital disposition' or 'condition-on-discharge' included death or expired. Primary drivers are defined as the main driver of the vehicle and can refer to the driver designation of two or more drivers of the same vehicle on the same policy.

A total of 12,078 linked records were used in this preliminary analysis. Of these, 711 (5.9%) had a fatal outcome as determined by trauma hospitalization data (Table 1). Older individuals (≥65 years of age) were more likely to have fatal injuries as well as males. The majority (89.9%) of individuals with a fatal hospital-assigned outcome received 'severe' crash-assigned injury categories ('K' and 'A') (Table 2). However, disagreement between the two injury severity scales were observed. For example, individuals with a fatal *hospital-assigned* outcome and an ISS >15 were given an injury severity category of a 'C' or an 'O' at the site of the crash (Figure 1). The KABCO scale to ISS correlation was 0.28 for fatal and non-fatal outcomes.

Based on this preliminary analysis, crash-assigned injury severity categories (KABCO) were weakly correlated to ISS. Additional research involving linked data should investigate the utility of crash-assigned injury severity categories (KABCO) with regards to other injury severity metrics as well as other dimensions of injury severity including length of stay, disability, hospital charges, etc. Crash-assigned injury severity has several limitations including subjective injury determination by non-medical personnel and the potential for misclassification of 'severe' internal injuries.

2013 Linked (CRIS) Crash Records with 2013 Trauma Hospitalization Data (N = 12,078)

Table 1. Demographic Characteristics Among Primary Persons Suffering from Fatal/Non-Fatal Injuries, Texas, 2013

	Hospital-assigned	
	Fatal (N=711)*	**Non-Fatal (N=11,367)***
Age		
<18	4.4	5.7
18-64	77.1	82.0
65+	18.6	12.2
Male Sex	75.7	68.7
Race/Ethnicity^		
Hispanic	23.2	28.1
Non-Hispanic Black	10.1	11.7
Non-Hispanic White	61.2	54.0
Other	4.2	4.4
TBI only	48.4	23.8
SCI only	1.6	1.1
TBI and SCI	3.7	0.4
Cause of Injury		
MVT with other vehicle	48.9	42.9
MVT with pedestrian	17.8	8.4
MVT on highway	6.4	7.9
MVT and loss of control	20.1	23.4
MV Non-traffic accidents	4.8	5.2
Road vehicle accidents (non-MV)	0.4	0.7
Other	1.6	11.5

ABBREVIATIONS. TBI = Traumatic Brain Injury; SCI = Spinal Cord Injury; MVT = Motor Vehicle Traffic; MV = Motor Vehicle

* Fatal/Non-Fatal defined by registry disposition data where 'Emergency Department Disposition', 'Hospital disposition' or 'condition-on-discharge' = death or expired

^ Race Categories as defined by the 1997 Office of Management and Budget (OMB) standards. Other includes 'American Indian', 'Asian', 'Native Hawaiian Pacific Islander', and ≥2 race categories

NOTE: Values represent the number of hospitalizations in each category. Percentages (in parentheses) are based on the number of hospitalizations divided by the total number of hospitalizations. Percentages may not sum to 100% due to rounding.

Table 2. CR-3 Injury Severity Categories (KABCO) Among Primary Persons Suffering from Fatal/Non-Fatal Injuries, Texas, 2013

		Hospital-assigned	
		Fatal (N = 711)*	Non-Fatal (N = 11,367)*
Crash-assigned	K – Killed	586 (82.4)	73 (0.6)
	A – Incapacitating	53 (7.5)	4,343 (38.2)
	B – Non-incapacitating	26 (3.7)	3,723 (32.8)
	C – Possible	19 (2.7)	2,249 (19.8)
	O – Property Damage	21 (3.0)	903 (7.9)
	unknown/missing	6 (0.8)	76 (0.7)

* Fatal/Non-Fatal outcomes defined by registry disposition data where 'Emergency Department Disposition', 'Hospital disposition' or 'condition-on-discharge' = death or expired

NOTE: Values represent the number of hospitalizations in each category. Percentages (in parentheses) are based on the number of hospitalizations divided by the total number of hospitalizations. Percentages may not sum to 100% due to rounding.

Figure 1. Box Plots of KABCO by ISS Among Primary Persons Suffering Fatal Injuries, Texas, 2013

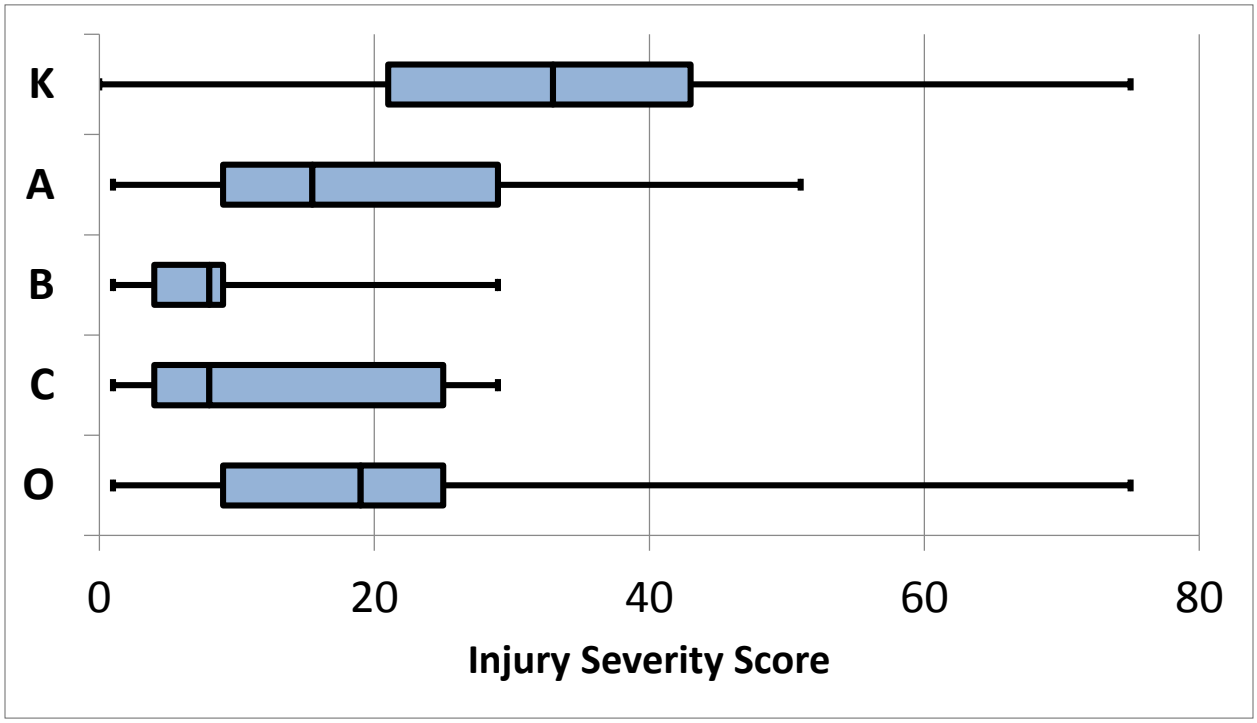

Figure 2. Box Plots of KABCO by ISS Among Primary Persons Suffering Non-Fatal Injuries, Texas, 2013