



**Association between Substance Use Disorder Diagnoses  
and Legal Intervention Suspect and Law Enforcement  
Official Injury Emergency Department Visits**

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# Declarations

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- Nothing to declare

# Background

- Law enforcement official (LEO) use of force during restraint and apprehension of suspects a serious issue of concern
- Multiple studies have determined incidence of suspect injuries due to use of force during arrests and stops
- Substance use epidemic has had a devastating effect on the U.S. population
- Use of force during arrests and stops not only result in suspect injuries, but can also result in injuries to the LEO
- Health care administrative billing data have been used to identify legal intervention injuries among suspects and bystanders using the ICD-9-CM coding system

# Objectives

- Characterize both LEO and suspect injuries during legal intervention using ICD-10-CM coded emergency department (ED) visit data
- Assess associations between legal intervention injury ED visits, specific diagnosed injuries, and substance abuse and/or dependence diagnoses

# Methods: Study Data

- Data obtained from Kentucky outpatient administrative billing records with discharge dates between January 1, 2016 –December 31, 2018
- Records received de-identified per state data use policies

# Methods: Inclusion/Exclusion Criteria

- Records not limited by patient residence
- Inclusion criteria for selection of legal intervention ED visits included any mention of Y35 ICD-10-CM external cause codes denoting legal intervention injuries sustained by the LEO or by the suspect
  - Injuries to LEOs denoted by external cause code with sixth character of '1'
  - Suspect injuries with sixth character of '3'
- LEO injury related ED visits limited to encounters for persons aged 18 years and older (range 18-70 years)
- Suspect injury related ED visits were not limited by age

# Methods: Analysis

- Descriptive analyses, frequencies and proportions calculated
- Pearson's chi-square test (or Fisher's exact test when appropriate) assessed differences between person type and year of ED visit
- Kentucky resident LEO legal intervention injury rates calculated
  - Denominator data obtained from National Institute for Occupational Safety and Health (NIOSH) Employed Labor Force (ELF) query system
- Two multiple logistic regression models produced to examine outcomes of interest
  - (Model 1) injury to wrist, hand, and/or fingers
  - (Model 2) injury to the head

# Results

## LEGAL INTERVENTION INJURY EMERGENCY DEPARTMENT (ED) VISITS BY INTERVENTION TYPE

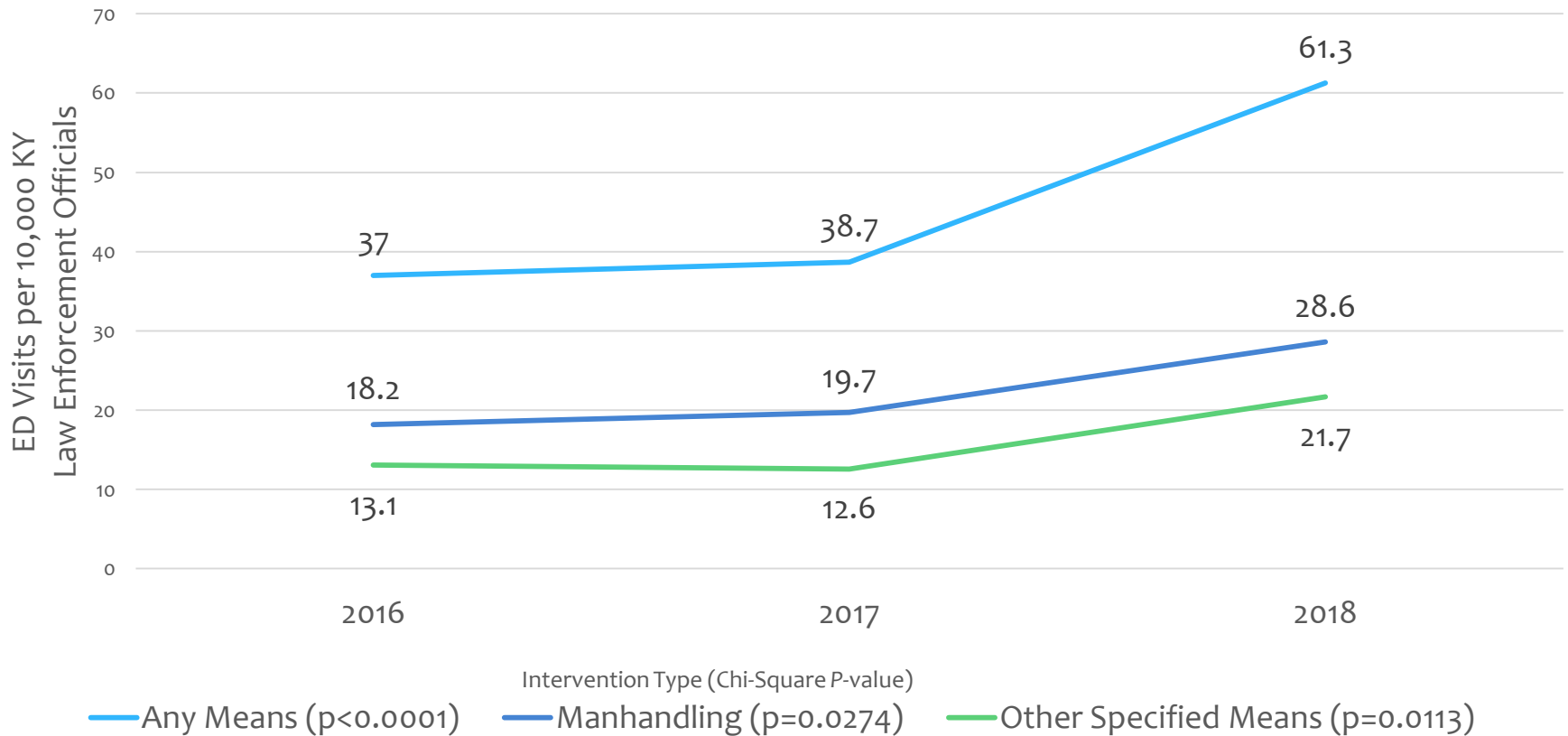
Legal Intervention	LAW ENFORCEMENT OFFICIAL <sup>1</sup> (n=407)	SUSPECT <sup>2</sup> (n=817)	CHI-SQUARE p-VALUE
Legal Intervention Involving Firearm Discharge (Y35.0xx)	8 (2%)	21 (3%)	0.0035
Legal Intervention Involving Explosives, Gas, Sharp Objects (Y35.1xx, Y35.2xx, Y35.4xx)	11 (3%)	11 (1%)	
Legal Intervention Involving Blunt Objects (Y35.3xx)	12 (3%)	26 (3%)	
Legal Intervention Involving Manhandling (Y35.81x)	196 (48%)	310 (38%)	
Legal Intervention Involving Other Specified Means (Y35.89x)	142 (35%)	333 (41%)	
Legal Intervention, Means Unspecified (Y35.9x)	38 (9%)	116 (14%)	



# LEGAL INTERVENTION EMERGENCY DEPARTMENT (ED) VISITS BY YEAR AND INTERVENTION TYPE

ICD-10-CM CODE	2016	2017	2018	CHI-SQUARE p-VALUE
<b>Law Enforcement Official Injury Numbers</b>	(n=122)	(n=127)	(n=158)	
<b>Legal Intervention Involving Manhandling (Y35.811)</b>	59 (48%)	63 (50%)	74 (47%)	0.8961
<b>Legal Intervention Involving Other Specified Means (Y35.891)</b>	44 (36%)	42 (33%)	56 (35%)	0.8691
<b>Legal Intervention, Means Unspecified (Y35.91)</b>	9 (7%)	11 (9%)	18 (11%)	0.4939
<b>Suspect Injury Numbers</b>	(n=240)	(n=238)	(n=339)	
<b>Legal Intervention Involving Manhandling (Y35.813)</b>	93 (39%)	105 (44%)	112 (33%)	0.0249
<b>Legal Intervention Involving Other Specified Means (Y35.893)</b>	96 (40%)	81 (34%)	156 (46%)	0.0150
<b>Legal Intervention, Means Unspecified (Y35.93)</b>	37 (15%)	30 (13%)	49 (14%)	0.6681

# Kentucky Resident Law Enforcement Official Legal Intervention Injury ED Visit Rates, 2016-2018



# Legal Intervention Injury Emergency Department Visits in Kentucky by Demographic Characteristics, 2016-2018

DEMOGRAPHIC CHARACTERISTICS	LAW ENFORCEMENT OFFICIALS (n=407)	SUSPECTS (n=817)	P-VALUE
<b>Age Group</b>			Chi-square
Under 18 years of age	0 (0%)	51 (6%)	< 0.0001
18-24 years of age	44 (11%)	122 (15%)	
25-34 years of age	162 (40%)	245 (30%)	
35-44 years of age	120 (29%)	212 (26%)	
45-54 years of age	51 (13%)	129 (16%)	
55 years of age or older	30 (7%)	58 (7%)	
<b>Gender</b>			Chi-square
Male	353 (87%)	697 (85%)	0.5027
Female	54 (13%)	120 (15%)	
<b>Race</b>			Chi-square
White	374 (92%)	658 (81%)	< 0.0001
Black, Other	33 (8%)	159 (19%)	
<b>Ethnicity</b>			Chi-square
Non-Hispanic	399 (98%)	793 (97%)	0.3154
Hispanic	8 (2%)	24 (3%)	
<b>Urban/Rural County of Residence<sup>1</sup></b>			Fisher's Exact
Urban	214 (53%)	453 (55%)	0.1239
Rural	193 (47%)	358 (44%)	
Other (County unknown, non-U.S.)	0 (0%)	6 (1%)	
<b>Appalachian/Non-Appalachian County of Residence<sup>2</sup></b>			
Appalachian	124 (30%)	204 (25%)	Fisher's Exact
Non-Appalachian	283 (70%)	607 (74%)	0.0293
Other (County unknown, non-U.S.)	0 (0%)	6 (1%)	

# Legal Intervention Injury ED Visits by Injury Diagnosis and Discharge Characteristics

DIAGNOSIS AND DISCHARGE CHARACTERISTICS	LAW ENFORCEMENT OFFICIALS (n=407)	SUSPECTS (n=817)	p-VALUE
<b>Body Part Injury Diagnosis<sup>1</sup></b>			Chi-square
Injuries to Head	98 (24%)	354 (43%)	< 0.0001
Injuries to Elbow and Forearm	55 (14%)	70 (9%)	0.0071
Injuries to Wrist, Hand, and Fingers	111 (27%)	131 (16%)	< 0.0001
<b>Expected Payer</b>			Chi-square
Worker's Compensation	206 (51%)	14 (2%)	< 0.0001
Commercial	42 (10%)	129 (16%)	
Medicaid	88 (22%)	413 (51%)	
Medicare	12 (3%)	65 (8%)	
Self-Pay or Charity	49 (12%)	173 (21%)	
Other	10 (2%)	23 (3%)	
<b>Total Charges (Thousands)</b>			T-test
Mean Total Charges (\$)	2294.29	3228.86	0.0046
Median Total Charges (\$)	1174.38	1649.28	
<b>Discharge Status<sup>2</sup></b>	(n=407)	(n=816)	Fisher's Exact
Discharged to home or self-care	340 (84%)	506 (62%)	<0.0001
Expired	0 (0%)	6 (1%)	
Discharged to law enforcement	58 (14%)	256 (31%)	
Discharged to other health care institution	0 (0%)	10 (1%)	
Discharged/transferred other	9 (2%)	38 (5%)	
<b>Substance Abuse or Dependence Diagnosis</b>			Chi-square
Alcohol related disorders	20 (5%)	62 (8%)	0.0778
Other Stimulant, Cocaine, Sedative, hypnotic, anxiolytic, Hallucinogen or Opioid related disorders; non-psychoactive substances; Inhalant abuse	14 (3%)	52 (6%)	0.0328
Cannabis related disorders	7 (2%)	47 (6%)	0.0012
No Drug Diagnosis	369 (91%)	674 (82%)	0.0001

# Regression Model 1: Adjusted Odds Ratios for Legal Intervention ED Visits with Diagnosis of Injury to the Wrist, Hand, and Fingers

Characteristic	Adjusted Odds Ratio	95% Confidence Interval
<b>Injured Person Type</b>		
Suspect	Ref.	
Law Enforcement Official	2.00*	1.50–2.68
<b>Age (years)</b>	0.99	0.98–1.01
<b>Appalachian Residence Status</b>		
Not Appalachian	Ref.	
Appalachian	0.92	0.66–1.29
Unknown/Non-US	2.67	0.48–14.82
<b>Race</b>		
White	Ref.	
Black and Other	0.96	0.63–1.45

# Regression Model 2: Adjusted Odds Ratios for Legal Intervention ED Visits with Diagnosis of Injury to the Head

Characteristic	Adjusted Odds Ratio	95% Confidence Interval
<b>Injured Person Type</b>		
Law Enforcement Official	Ref.	
Suspect	2.42*	1.84–3.18
<b>Age (years)</b>	1.00	0.99–1.01
<b>Appalachian Residence Status</b>		
Not Appalachian	Ref.	
Appalachian	1.38**	1.05–1.81
Unknown/Non-US	0.82	0.15–4.55
<b>Race</b>		
White	Ref.	
Black and Other	1.20	0.85–1.68
<b>All Diagnosis of Drug Abuse or Dependency (Including Alcohol)</b>		
No Diagnosis	Ref.	
Diagnosis Present	1.99*	1.44–2.76
<b>Legal Intervention Diagnosis Type</b>		
Non-Manhandling Intervention	Ref.	
Manhandling Intervention	1.46***	1.14–1.87

# Conclusions

- Legal intervention ED visits with any drug or alcohol abuse/dependence diagnosis were associated with higher odds of head injury diagnoses compared to those without drug abuse or dependence diagnoses
- LEO ED-treated injury visit rates significantly increased over the study period
- When LEO de-escalation training techniques have failed, LEOs should consider other techniques to reduce officer and suspect injuries during legal intervention such as control techniques, striking zones on suspects, and utilizing other tools and body parts that are not as fragile as the hands or the heads