

**Title:** Pre-hospital Refusal of Transport and Characteristics for New Jersey Naloxone Administration Incidents

**Authors:** Morgan K. Anderson, MPH<sup>1</sup>, Douglas G. Butler Jr., EMT-P<sup>1</sup>, Tim Seplaki, BS, NRP, CPM<sup>2</sup>, Malathi Aarkoti, MPH<sup>2</sup>, Rita Masiello.

- 1) ImageTrend, Inc., Lakeville, Minnesota, USA
- 2) New Jersey Department of Health, New Jersey, USA

**Introduction:** The administration of naloxone by Emergency Medical Services (EMS) within communities is becoming a common occurrence as the opioid epidemic continues. The state of New Jersey Office of EMS has been on the forefront of combating the opioid epidemic.

**Objective:** The purpose of this study is to examine the characteristics and factors associated with patients that are administered naloxone by EMS, specifically those that refuse EMS transport after being treated.

**Method:** This retrospective study evaluated all patients administered naloxone in NJ by EMS during 2018. Gender, age, race, month, time of day (from the NJ EMS Data Repository), and median county household income (from Census) were aggregated and analyzed through descriptive statistics.<sup>1-2</sup> Independent confounders were calculated using unadjusted and adjusted odds ratios in multi-variate logistic regressions (95% confidence interval). Significant unadjusted confounders (p-value < 0.05) were entered into the adjusted multivariate model.

**Results:** In 2018, there were 10,377 EMS naloxone administrations, with 328 (3%) pre-hospital mortality (patients dead at scene – pronounced or treated – pronounced) and 1,158 (11%) of patients refused further EMS treatment/or transport after EMS administered naloxone. However, this refusal percentage does not include patients that were treated by Law Enforcement with naloxone prior to EMS arrival but refused further EMS treatment and/or transport. 10% of the patients that received naloxone were repeat patients (being seen by EMS for a suspected overdose on more than one occasion) but repeatedly refused transport to the hospital. Most of the patients were male (71%), 26 to 45 years old (47%), and were white (51%). The top three counties for naloxone administrations were Camden County (22%), Essex County (13%), and Hudson County (8%). When looking specifically at naloxone administrations per 10,000 capita, the top three counties were Camden County (44.50 administrations/10,000 people), Cumberland County (30.98 administrations/10,000 people), and Atlantic (21.07 administrations/10,000 people).

There was increased odds of patients refusing EMS care and/or transport for incidents occurring in large fringe metros and small metros compared to large central metros (large fringe metro (OR: 1.53, 95%CI 1.17-1.98); small metro (OR: 3.79, 95%CI 2.95-4.86) and patients between the ages of 26-45 ((26-35 OR: 1.59, 95%CI 1.25-2.00) and (36-45 OR: 1.44, 95%CI 1.13-1.84)) compared to <= 25 years old. There was decreased odds of refusing EMS care and/or transport for incidents where patients were between the ages of 56-65 years (OR: 0.63, 95%CI

0.46-0.86) compared to < 25-year old patients located in counties with median household incomes between \$77,000-\$111,000 thousand dollar (\$77,000 – \$90,000 OR: 0.64, 95%CI 0.50-0.82) and (\$91,000 - \$111,000 OR: 0.43, 95%CI 0.30-0.61)) compared to \$50,000-\$64,000 thousand dollar median household income counties.

**Conclusion:** While the percentage of patients that refuse further EMS treatment and or transportation after naloxone (11% in this population) is relatively low; overall patients that refused EMS treatment and or transport (despite the use of naloxone) with an EMS provider impression(diagnosis)<sup>4</sup> indicating an opioid overdose or intoxication was 34% (n=3,526). Due to the refusal of further treatment or transport by EMS, these patients consequently did not receive any immediate access to recovery resources. The odds of refusing care and/or transport increased for smaller metro counties and middle-aged individuals. It also decreased as county median income increased, indicative of socioeconomic differences. Currently, New Jersey has no law that requires patients to be transported to a definitive care facility (Hospital) after the administration of Naloxone if the patient is alert and oriented to person, place and time. With 9.8% (n=345) of the patients being treated by EMS for a suspected overdose on more than one occasion but repeatedly refusing transport to the hospital, efforts should be made to reach this population and make resources available. EMS providers are not trained or equipped to offer substance abuse resources to patients, and most are not made aware of what resources are available.

In 2018, New Jersey suffered 3118 suspected opioid deaths<sup>3</sup>, averaging 8.5 fatalities per day or a 40.4% increase from 2016. With EMS being the one entity that interacts with virtually the entire emergency overdose population, greater emphasis needs to be placed on including the EMS population in recovery efforts. EMS should continue efforts to partner with local & state health departments, law enforcement, as well as state mental health and addiction services to create a multi-disciplinary approach to combat the epidemic. This effort should include improved data reporting and coordination, education, and EMS provider coordination in the recovery efforts that focuses on this at-risk population and help break the cycle of overdose and addiction while combating compassion fatigue and ensures mental health and wellness of the responders that are on the front lines of this epidemic.

**Table 1. Odds of Refusal of EMS Treatment and/or Transport by EMS for New Jersey Naloxone-related Incidents**

Variable	Variable Level	Total Naloxone Incidents (N) <sup>3</sup>	Refusal of Treat or Transport (N)	Refusal of Transport		
				Unadjusted Odds Ratio (95% CI)	Multi-variate N	Multi-variate Odds Ratio (95% CI)
Gender	Male	7058	847(12%)	1.00	6979	
	Female	2966	310(11%)	0.86(0.75-0.98)*	2937	
Age (years)	≤25	1034	100(10%)	1.00	1033	1.00
	26-35	2676	415(16%)	1.71(1.36-2.16)*	2675	<b>1.58(1.25-2.00)*</b>
	36-45	2016	286(14%)	1.54(1.21-1.97)*	2015	<b>1.44(1.12-1.83)*</b>
	46-55	2141	228(11%)	1.11(0.87-1.43)	2138	1.07(0.83-1.38)
	+56	2057	112(5%)	0.54(0.41-0.71)*	2055	<b>0.55(0.42-0.73)*</b>
Race	White	5096	641(13%)	1.00	5058	1.00
	Black/African American	2612	276(11%)	0.82(0.71-0.95)*	2574	0.97(0.82-1.15)
	Hispanic/Latino	795	81(10%)	0.79(0.62-1.01)	787	0.79(0.61-1.02)
	Asian	75	4(5%)	0.39(0.14-1.08)	73	0.57(0.21-1.59)
	Multiple	600	60(10%)	0.77(0.58-1.02)	595	<b>0.69(0.52-0.92)*</b>
	Other*	43	2(5%)	0.34(0.08-1.41)	43	0.37(0.09-1.56)
	Unknown	812	94(13%)	0.91(0.72-1.15)	786	1.06(0.83-1.34)
Incident Time of Day	12:00am-5:59am	1182	122(10%)	0.78(0.63-0.97)*	1169	
	6:00am-11:59am	1947	203(10%)	0.79(0.66-0.95)*	1926	
	12:00pm-5:59pm	3605	410(11%)	0.87(0.76-1.01)	3560	
	6:00pm-11:59pm	3299	423(13%)	1.00	3261	
Median County Household Income <sup>2</sup>	\$50-64K	3850	486(13%)	1.00	3807	1.00
	\$65-76K	3208	445(14%)	1.12(0.97-1.28)	3157	1.01(0.80-1.26)
	\$77-90K	2007	171(9%)	0.65(0.54-0.77)*	1993	<b>0.64(0.50-0.82)</b>
	\$≥91K	968	56(6%)	0.43(0.32-0.57)*	959	<b>0.42(0.30-0.59)</b>
CDC Metro Size <sup>1</sup>	Large Central Metro	2067	176(9%)	1.00	2034	1.00
	Large Fringe Metro	6353	716(11%)	1.37(1.15-1.62)*	6273	<b>1.50(1.16-1.96)*</b>
	Medium Metro	1042	104(10%)	1.19(0.92-1.54)	1039	<b>1.26(0.96-1.67)</b>
	Small Metro	571	162(28%)	4.26(3.35-5.40)*	570	<b>3.75(2.92-4.82)*</b>
Incident Month	Jan-Mar	2144	188(9%)	0.73(0.60-0.89)*	2123	<b>0.66(0.54-0.81)*</b>
	Apr-June	2705	330(12%)	1.05(0.89-1.25)	2674	0.99(0.83-1.17)
	July-Sept	2826	365(13%)	1.12(0.95-1.33)	2793	1.05(0.88-1.25)
	Oct-Dec	2358	275(12%)	1.00	2326	1.00

\*Significant at < 0.05

<sup>3</sup>Incidents were excluded if disposition was DOA, Dead, etc

\*Quartiles

Population Rank	County	Population	Naloxone Incidents	Per capita <sup>2</sup> (100,000)	Median Household Income <sup>2</sup>	CDC Urban-Rural Classification
1	Bergen County	937,920	319	3.40	91,572	Large Fringe
2	Middlesex County	837,288	588	7.02	83,133	Large Fringe
3	Essex County	800,401	1306	16.32	57,365	Large Central
4	Hudson County	679,756	810	11.92	62,681	Large Central
5	Monmouth County	627,551	388	6.18	91,807	Large Fringe
6	Ocean County	589,699	388	6.58	65,771	Large Fringe
7	Union County	557,320	546	9.80	73,376	Large Central
8	Camden County	510,996	2274	44.50	65,037	Large Fringe
9	Passaic County	510,563	552	10.81	63,339	Large Fringe
10	Morris County	498,847	178	3.57	107,034	Large Fringe
11	Burlington County	449,192	581	12.93	82,839	Large Fringe
12	Mercer County	373,362	418	11.20	77,027	Medium
13	Somerset County	333,316	105	3.15	106,046	Large Fringe
14	Gloucester County	291,372	451	15.48	82,839	Large Fringe
15	Atlantic County	272,926	575	21.07	57,514	Medium
16	Cumberland County	154,952	480	30.98	50,000	Small
17	Sussex County	143,570	53	3.69	89,238	Large Fringe
18	Hunterdon County	125,717	36	2.86	110,969	Large Fringe
19	Warren County	107,088	93	8.68	75,500	Medium
20	Cape May County	94,549	116	12.27	62,332	Small
21	Salem County	63,776	120	18.82	63,934	Large Fringe

1. CDC Rural-Urban Definition

- Large Central metro(akin to inner cities): 1 million or more population and at least 250,000 residents in any principal city.
- Large Fringe metro(akin to suburbs): 1 million or more population that did not qualify as Large Central metro.
- Medium metro: 250,000 – 999,999 population
- Small metro: Less than 250,000 population

1. [https://www.cdc.gov/nchs/data/series/sr\\_02/sr02\\_166.pdf](https://www.cdc.gov/nchs/data/series/sr_02/sr02_166.pdf)
2. [https://factfinder.census.gov/faces/nav/jsf/pages/community\\_facts.xhtml](https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml)
3. <https://www.njcares.gov/>
4. [https://nemsis.org/media/nemsis\\_v3/release-3.4.0/DataDictionary/PDFHTML/DEMEMS/NEMSIDataDictionary.pdf](https://nemsis.org/media/nemsis_v3/release-3.4.0/DataDictionary/PDFHTML/DEMEMS/NEMSIDataDictionary.pdf)