



Factors Associated with EMS Transport Refusal After Naloxone Reversal: A Multi-City Analysis from the RENDOR Cohort



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Background

- Naloxone is widely used by bystanders, non-medical first responders, and EMS to reverse opioid overdoses.
- Despite effectiveness, some patients refuse transport or elope after naloxone reversal.
- Understanding how demographics, naloxone administration, and clinical response affect transport outcomes is crucial for overdose prevention and response efforts.
- Aim – Examine factors associated with EMS transport refusal following naloxone administration.**

Methods

- The Real-World Examination of Naloxone for Drug Overdose Reversal (RENDOR) study examines pre-hospital naloxone use patterns and patient outcomes by bystanders (family/friends/strangers), non-medical first responders (firefighters & police officers), and EMS.



RENDOR Sites
 Denver, CO
 Detroit, MI
 Pittsburgh, PA
 Portland, OR
 San Francisco, CA

Figure 1. Map of RENDOR Sites

- 1,609 overdose cases were analyzed for differences in age, sex, race/ethnicity, naloxone route & dose, and prevalence of precipitated withdrawal in the context of transport outcome (transported vs. eloped/refused).
- Multivariable logistic regression identified sociodemographic and naloxone-related predictors of outcomes among patients who received IN-only naloxone (n = 951).

Results

Table 1. Sociodemographic and Overdose-Related Characteristics of RENDOR Patients, Stratified by Patient Disposition (N = 1609)

	Total N = 1609 N (%)	Transported N = 1342 N (%)	Eloped/Refused N = 267 N (%)	p-value
Age (continuous) ¹	47.7 (15.4)	48.2 (15.6)	45.2 (14.2)	0.002
Sex				
Male	1107 (68.8)	920 (68.6)	187 (70.0)	
Female	497 (30.9)	418 (31.1)	79 (29.6)	
Unknown	5 (0.3)	4 (0.3)	1 (0.4)	0.729
Race & Ethnicity				
Non-Hispanic White	639 (39.7)	516 (38.5)	123 (46.1)	
Black	818 (50.8)	704 (52.5)	114 (42.7)	
Hispanic	83 (5.2)	66 (4.9)	17 (6.4)	
Other	13 (0.8)	10 (0.7)	3 (1.1)	
Unknown	56 (3.5)	46 (3.4)	10 (3.7)	0.047
Naloxone Routes of Administration				
IN-only	984 (61.2)	793 (59.1)	191 (71.5)	
IV/IM/IO only	366 (22.7)	326 (24.3)	40 (15.0)	
Mixed	194 (12.1)	167 (12.4)	27 (10.1)	
Other	13 (0.8)	13 (1.0)	-	
Unknown	52 (3.2)	43 (3.2)	9 (3.4)	0.001
Dose (mg, continuous)				
IN-only (N = 1017)	5.0 (3.8)	5.0 (3.8)	5.0 (3.9)	0.832
IV/IM/IO-only (N = 410)	1.6 (1.0)	1.6 (1.0)	1.9 (0.9)	0.099
Precipitated withdrawal ²				
Yes	185 (11.5)	152 (11.3)	33 (12.4)	
No	1424 (88.5)	1190 (88.7)	234 (87.6)	0.705

¹ Mean (standard deviation) provided.

² A patient was classified as experiencing precipitated withdrawal if pre-EMS naloxone administrators noted the patient experienced agitation, combativeness, anxiousness, restlessness, vomiting, or diarrhea, if EMS noted iatrogenic withdrawal, or if EMS administered buprenorphine.

Table 2. Correlates of EMS Disposition Among Patients Experiencing Overdose Who Receive Only Intranasal Naloxone (N = 951)

	Eloped/Refused Transport	
	OR (95% CI)	AOR (95% CI)
Age (continuous)	0.99 (0.98, 1.00)	0.99 (0.98, 1.00)
Sex		
Male	1.12 (0.79, 1.62)	1.01 (0.70, 1.49)
Female	-	-
Race & Ethnicity		
Non-Hispanic White	-	-
Black	0.70 (0.49, 0.95)	0.70 (0.48, 1.03)
Hispanic	0.85 (0.40, 1.67)	0.65 (0.29, 1.38)
Other	1.66 (0.34, 6.45)	1.31 (0.27, 5.22)
Site		
Denver	-	-
Detroit	0.79 (0.41, 1.62)	1.28 (0.57, 3.17)
Pittsburgh	0.66 (0.33, 1.40)	1.00 (0.44, 2.50)
San Francisco	1.37 (0.67, 2.96)	2.10 (0.92, 5.30)
IN Naloxone Dose (mg)	1.00 (0.96, 1.05)	0.98 (0.93, 1.03)

¹ Reference group is people who were transported to the emergency department for additional care.

Discussion

Age

- Patients who were transported were older than those who eloped/refused (48.2 vs 45.2 years; $p = 0.002$).

Race

- Among those transported, most were Black (52.5%), followed by non-Hispanic White (38.5%).
- Among patients who eloped/refused, 46.1% were non-Hispanic White, and 42.7% were Black.

Administration Characteristics

- Approximately 71.5% of cases that eloped/refused received IN-only naloxone, while 15.0% received IV/IM/IO-only, and 10.1% received a combination of IN/IV/IM/IO.
- IN-only recipients received higher average naloxone doses (5.0 mg) than those who received IV/IM/IO-only (1.6 mg).
- Dose alone was not significantly associated with transport status ($p = 0.832$ for IN-only, $p = 0.099$ for IV/IM/IO-only)

Conclusions

- Racial and ethnic variations in refusal rates were observed with most eloped/refused cases being non-Hispanic White.
- Intranasal naloxone use may reflect timely bystander intervention in areas with strong naloxone distribution.
- Findings highlight need for targeted post-reversal strategies to reduce elopement and improve engagement.

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