COMPARISON OF TRANSPORTED VS NON-TRANSPORTED HYPOGLYCEMIC PATIENTS IN THE PREHOSPITAL SETTING

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INTRODUCTION

- Prehospital patients presenting with hypoglycemia need immediate treatment.
- Recommendations influencing Emergency Medical Services (EMS) treatment and use of treat-and-release protocols for hypoglycemic patients have changed in recent years.[1]
- Limited research exists on current national prehospital treatment and transport practices for hypoglycemic patients.

OBJECTIVES

Compare characteristics of transported and non-transported hypoglycemic patients and identify factors associated with transport of hypoglycemia patients.

METHODS

Restrospective analysis of 2022 ImageTrend Collaborate dataset

Inclusion Criteria: 9-1-1 EMS Incidents, Advanced Life Support (ALS) level of care; patients ≥ 24 hours old

Hypoglycemia Defined Using NEMSQA Definitions:[2]
a.) Primary or Secondary Impression of 'Hypoglycemia' & GCS < 15 or AVPU < Alert
b.) Primary or Secondary impression of 'Altered Mental Status' & blood glucose < 60

Descriptive Statistics reported for patient, encounter and treatment characteristics.

Multivariable Logistic Regression Model with complete case analysis. Odds ratios and 95% confidence intervals (OR,95%CI) reported.
- **Outcome:** Disposition of hypoglycemic patient
- **Variables:** age, gender, race, urbanicity[3], final level of consciousness (LOC), diabetes history, incident locations, time of day, treatment received

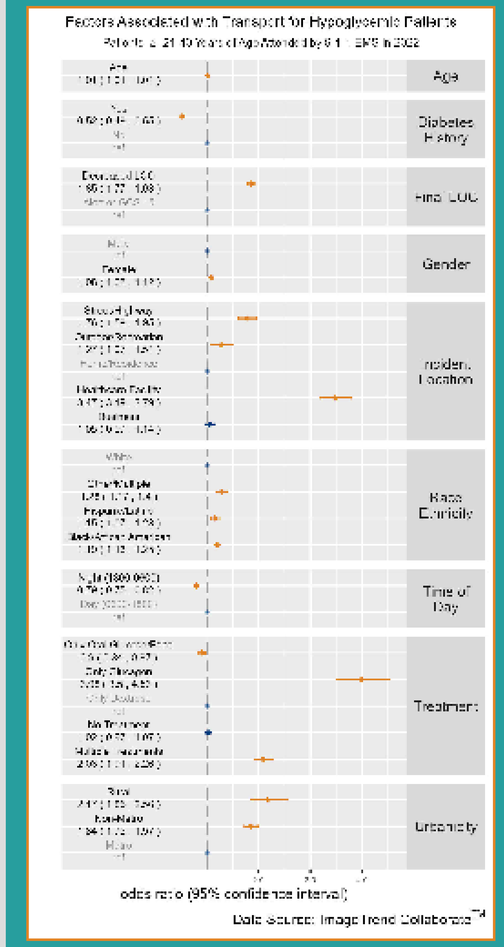

Table 1. Hypoglycemia Treatment Characteristics for ALS EMS Encounters in 2022 Stratified by Disposition

	Refusal (N=22,081)	Transport (N=25,272)	Total (N=47,353)
Dextrose	12,143 (55.0%)	12,886 (51.0%)	25,029 (52.9%)
Dextrose 10%	8,025(66.1%)	7,917 (61.4%)	15,942 (63.7%)
Dextrose 25%	134 (1.1%)	163 (1.3%)	297 (1.2%)
Dextrose 50%	**4,004 (33.0%)**	**4,898 (38.0%)**	**8,902 (35.6%)**
Note: 112 patients received more than 1 concentration of dextrose			
Treatment Combinations			
No Treatment	6,557 (29.7%)	7,663 (30.3%)	14,220 (30.0%)
Only Food	11 (0.0%)	7 (0.0%)	18 (0.0%)
Only Oral Glucose	2,707 (12.3%)	2,458 (9.7%)	5,165 (10.9%)
Only Glucagon	421 (1.9%)	1,734 (6.9%)	2,155 (4.6%)
Only D10	7,227 (32.7%)	6,497 (25.7%)	13,724 (29.0%)
Only D25	116 (0.5%)	130 (0.5%)	246 (0.5%)
Only D50	3,695 (16.7%)	4,270 (16.9%)	7,965 (16.8%)
Glucagon & Dextrose	254 (1.2%)	704 (2.8%)	958 (2.0%)
Glucose & Dextrose	824 (3.7%)	1,221 (4.8%)	2,045 (4.3%)
Glucose & Glucagon	242 (1.1%)	524 (2.1%)	766 (1.6%)
All 3 Medications	27 (0.1%)	64 (0.3%)	91 (0.2%)

Over 35% of patients receiving dextrose were administered 50% dextrose.

Table 2. Hypoglycemia Encounter Characteristics for ALS EMS Incidents in 2022 Stratified by Disposition

	Refusal (N=22,081)	Transport (N=25,272)	Total (N=47,353)
Incident Location			
Home/Residence	17,930 (81.2%)	17,741 (70.2%)	35,671 (75.3%)
Healthcare Facility	**864 (3.9%)**	**3,579 (14.2%)**	**4,443 (9.4%)**
Non-Healthcare Business	1,659 (7.5%)	1,683 (6.7%)	3,342 (7.1%)
Street or Highway	759 (3.4%)	1,300 (5.1%)	2,059 (4.3%)
Outdoor or Recreation	344 (1.6%)	384 (1.5%)	728 (1.5%)
Missing	525 (2.4%)	585 (2.3%)	1,110 (2.3%)
Time of Day			
Day (0600-1800)	11,683 (52.9%)	15,480 (61.3%)	27,163 (57.4%)
Night (1800-0600)	10,398 (47.1%)	9,792 (38.7%)	20,190 (42.6%)
Top 5 Dispatch Complaints			
Diabetic Problem	13,692 (62.0%)	8,869 (35.1%)	22,561 (47.6%)
Unconscious/Fainting	1,917 (8.7%)	3,679 (14.6%)	5,596 (11.8%)
Sick Person	1,647 (7.5%)	3,295 (13.0%)	4,942 (10.4%)
Seizure/Convulsions	911 (4.1%)	1,063 (4.2%)	1,974 (4.2%)
Falls	567 (2.6%)	1,252 (5.0%)	1,819 (3.8%)

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RESULTS

Table 3. Hypoglycemia Patient Characteristics for ALS EMS Incidents in 2022 Stratified by Disposition

	Refusal (N=22,081)	Transport (N=25,272)	Total (N=47,353)
Age (years) Median [IQR]	63.0 [25.0]	67.0 [23.0]	65.0 [24.0]
Gender - Male	12,359 (56.0%)	12,945 (51.2%)	25,304 (53.4%)
Race			
White	10,910 (49.4%)	12,085 (47.8%)	22,995 (48.6%)
Black/African American	3,715 (16.8%)	5,169 (20.5%)	8,884 (18.8%)
Hispanic/Latino	1,974 (8.9%)	2,053 (8.1%)	4,027 (8.5%)
Other/Multiple	1,065 (4.8%)	1,311 (5.2%)	2,376 (5.0%)
Missing	4,417 (20.0%)	4,654 (18.4%)	9,071 (19.2%)
Urbanicity[a]			
Metro	19,661 (89.0%)	20,841 (82.5%)	40,502 (85.5%)
Non-Metro	1,881 (8.5%)	3,529 (14.0%)	5,410 (11.4%)
Rural	237 (1.1%)	553 (2.2%)	790 (1.7%)
Missing	302 (1.4%)	349 (1.4%)	651 (1.4%)
History of Diabetes -Yes	18,328 (83.0%)	17,110 (67.7%)	35,438 (74.8%)
Initial Blood Glucose			
Median [IQR]	38.0 [21.0]	40.0 [25.0]	39.0 [23.0]
Missing	517 (2.3%)	905 (3.6%)	1422 (3.0%)
Final Blood Glucose			
Median [IQR]	143 [105]	121 [98.0]	131 [102]
Missing	3,840 (17.4%)	6,662 (26.4%)	10,502 (22.2%)
Initial LOC Decreased[b]			
Alert or GCS 15	3,410 (15.4%)	2,770 (11.0%)	6,180 (13.1%)
Decreased LOC	18,671 (84.6%)	22,502 (89.0%)	41,173 (86.9%)
Final LOC Decreased[b]			
Alert or GCS 15	11,424 (51.7%)	8,766 (34.7%)	20,190 (42.6%)
Decreased LOC	10,657 (48.3%)	16,506 (65.3%)	27,163 (57.4%)

[a]United States Department of Agriculture. 2020. Rural-Urban Continuum Codes. [Accessed 6/10/2023]. https://www.ers.usda.gov/data-products/rural-urban-continuum-codes.aspx
[b]Decreased LOC defined as level of consciousness (LOC) of (1) AVPU less than Alert (A) or (2) Glasgow Coma Score (GCS) less than 15

LIMITATIONS

- Our results are limited by not analyzing the patient care narrative, particularly with documentation of food as a treatment
- Data is from a convenience sample.

CONCLUSION

- Nearly half of hypoglycemic patients were not transported, ultimately reducing the strain on emergency departments.
- Despite recommendations4 to use dextrose 10%, 35.6% of patients are still receiving dextrose 50%.
- Further investigation is needed to understand the relationships between glucagon, time of day and transport.

[1]Rostykus P, Kennel J, Adair K, Fillinger M, Palmberg R, Quinn A, Ripley J, Daya M. Variability in the Treatment of Prehospital Hypoglycemia: A Structured Review of EMS Protocols in the United States. Prehosp Emerg Care. 2016 Jul-Aug;20(4):524-30.
[2]From the Hypoglycemia-01 Measure Package (pg 4), by National EMS Quality Alliance, 2021, https://www.nemsqa.org/measures. Copyright 2021 by National EMS Quality Alliance
[3]United States Department of Agriculture. 2020. Rural-Urban Continuum Codes. [Accessed 6/10/2023]. https://www.ers.usda.gov/data-products/rural-urban-continuum-codes.aspx
[4]Hern, H. G., Kiefer, M., Louie, D., Barger, J., & Alter, H. J. (2017). D10 in the Treatment of Prehospital hypoglycemia: A 24 month Observational Cohort Study. Prehospital Emergency Care, 21(1), 63-67

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