

Online-Only Supplemental Material

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Figure S1. Study Flow Diagram.

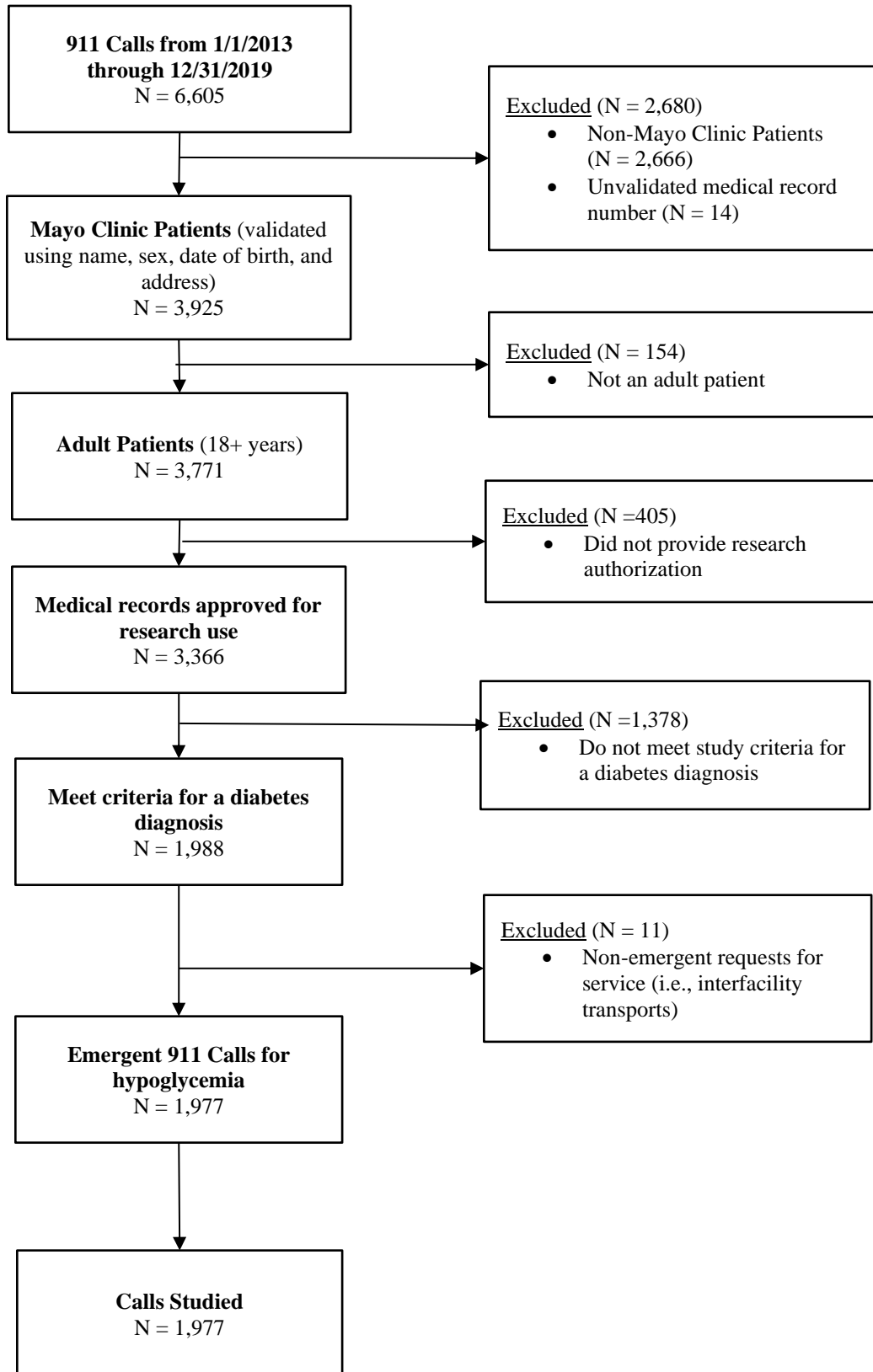


Table S1. Code sets for severe hypoglycemia and hyperglycemia.

| Comorbidity | ICD-9 Codes | ICD-10 codes | Included code types |
|-----------------------------|---|---|---|
| Hypoglycemia | 251.0, 251.1, 251.2, 962.3, 250.8x (for 250.8x: if no concurrent 259.8, 272.7, 681.xx, 682.xx, 686.9, 707.1x-707.2x, 707.8, 707.9, 709.3, 730.0x-730.2x, 731.8) | E10.641, E10.649, E11.641, E11.649, E13.641, E13.649, E16.0, E16.1, E16.2, T38.3X1A, T38.3X1D, T38.3X1S, T38.3X2A, T38.3X2D, T38.3X2S, T38.3X3A, T38.3X3D, T38.3X3S, T38.3X4A, T38.3X4D, T38.3X4S, T38.3X5A, T38.3X5D, T38.3X5S | Hospital and ED claims Codes in 1 st position |
| Hyperglycemic crises | 250.10, 250.11, 250.12, 250.13, 250.20, 250.21, 250.22, 250.23 | E10.10, E10.11, E11.10, E11.11, E13.10, E13.11, E11.00, E11.01, E13.00, E13.01 | Hospital and ED claims Codes in 1 st position |

Table S2. Code sets for identifying diabetes education and pharmacy visits in the electronic health record.

| Visit specialty | CPT Codes | HCPCS codes |
|---|---|--|
| Certified diabetes care and education specialist | 98960, 98961, 98962, 97802, 97803, 97804, 99078 | G0108, G0109, S9140, S9141, S9145, S9455, S9460, S9465, G0270, G0271, S9470, S9452, 0403T, 0488T, G9873, G9874, G9875, G9876, G9877, G9878, G9879, G9882, G9883, G9884, G9885, G9890 |
| Medication therapy management pharmacist | 99605, 99606, 99607, 99211 | |

Table S3. Study population: patients with type 1 diabetes. *Baseline patient characteristics at the time of their first encounter with emergency medical services (EMS) for the treatment of hypoglycemia. For patients who experienced multiple encounters during the study period, characteristics from the first encounter are included. †Patient characteristics at the time of the EMS encounter as a function of whether patients were or were not transported to the emergency department (ED). In this analysis, patients may be included more than once if they experienced multiple EMS encounters for hypoglycemia. CDCES, Certified Diabetes Care and Education Specialist.

| | Study Population* | EMS Encounter Outcome† | | p-value |
|--|-------------------|------------------------|-----------------|---------|
| | | Transported | Not Transported | |
| No. patients | 263 | 265 (32.1%) | 587 (68.9%) | |
| Age, mean (SD) | 49.7 (17.4) | 51.0 (16.5) | 53.6 (15.4) | 0.02 |
| Age, category, N (%) | | | | 0.20 |
| 18-44 | 106 (40.3) | 101 (38.1) | 180 (30.7) | |
| 45-64 | 100 (38.0) | 110 (41.5) | 276 (47.0) | |
| 65-74 | 35 (13.3) | 30 (11.3) | 73 (12.4) | |
| ≥75 | 22 (8.4) | 24 (9.1) | 58 (9.9) | |
| Sex, N (%) | | | | 0.91 |
| Male | 150 (57.0) | 137 (51.7) | 301 (51.3) | |
| Female | 113 (43.0) | 128 (48.3) | 286 (48.7) | |
| Race/ethnicity, N (%) | | | | 0.36 |
| White | 242 (92.0) | 252 (95.1) | 566 (96.4) | |
| Non-White/Unknown | 21 (8.0) | 13 (4.9) | 21 (3.6) | |
| Rurality of primary residence, N (%) | | | | 0.001 |
| Urban | 164 (62.4) | 162 (61.1) | 288 (49.1) | |
| Rural | 99 (37.6) | 103 (38.9) | 299 (50.9) | |
| Marital status, N (%) | | | | 0.30 |
| Married or living with partner | 115 (43.7) | 90 (34.0) | 221 (37.7) | |
| Not Married/Unknown | 148 (56.3) | 175 (66.0) | 366 (62.3) | |
| Any comorbid conditions (excluding diabetes), N (%) | | | | <0.001 |
| Yes | 235 (89.4) | 252 (95.1) | 508 (86.5) | |
| No | 28 (10.6) | 13 (4.9) | 79 (13.5) | |
| Diabetes complications and other comorbidities, N (%) | | | | |
| Retinopathy | 105 (39.9) | 137 (51.7) | 258 (43.9) | 0.04 |
| Nephropathy | 106 (40.3) | 150 (56.6) | 252 (42.9) | <0.001 |
| Neuropathy | 115 (43.7) | 173 (65.3) | 250 (42.6) | <0.001 |
| Cerebrovascular disease | 15 (5.7) | 23 (8.7) | 32 (5.4) | 0.08 |
| Cardiovascular disease | 90 (34.2) | 135 (50.9) | 248 (42.2) | 0.02 |
| Heart failure | 30 (11.4) | 73 (27.5) | 129 (22.0) | 0.08 |
| Peripheral vascular disease | 55 (20.9) | 86 (32.4) | 165 (28.1) | 0.20 |
| Hypertension | 157 (59.7) | 190 (71.7) | 411 (70.0) | 0.62 |
| Chronic pulmonary disease | 46 (17.5) | 78 (29.4) | 136 (23.2) | 0.05 |
| Cancer | 13 (4.9) | 19 (7.2) | 37 (6.3) | 0.64 |
| Alcohol abuse | 23 (8.7) | 40 (15.1) | 65 (11.1) | 0.10 |
| Drug abuse | 34 (12.9) | 44 (16.6) | 51 (8.7) | <0.001 |
| Depression | 80 (30.4) | 107 (40.4) | 165 (28.1) | <0.001 |
| Dementia | 16 (6.1) | 36 (13.6) | 73 (12.4) | 0.64 |

| | | | | |
|---|------------|------------|------------|--------|
| History of severe dysglycemia, N (%) | | | | |
| Severe hypoglycemia | 18 (6.8) | 56 (21.1) | 81 (13.8) | 0.007 |
| Hyperglycemic crises | 29 (11.0) | 48 (18.1) | 52 (8.9) | <0.001 |
| Active glucagon prescription, N (%) | 111 (42.2) | 128 (48.3) | 222 (37.8) | 0.004 |
| Hemoglobin A_{1c}, mean (SD) | 8.2 (1.9) | 8.4 (1.8) | 8.2 (1.7) | 0.047 |
| Hemoglobin A_{1c}, category, N (%) | | | | |
| <6% | 14 (5.3) | 9 (3.4) | 25 (4.3) | |
| 6.0 - 6.4% | 17 (6.5) | 19 (7.2) | 50 (8.5) | |
| 6.5 - 6.9% | 22 (8.4) | 18 (6.8) | 68 (11.6) | |
| 7.0 - 7.9% | 72 (27.4) | 64 (24.1) | 122 (20.8) | |
| 8.0 - 8.9% | 63 (23.9) | 65 (24.5) | 122 (20.8) | |
| 9.0-9.9% | 32 (12.2) | 41 (15.5) | 87 (14.8) | |
| ≥10% | 32 (12.2) | 40 (15.1) | 68 (11.6) | |
| No results available | 11 (4.2) | 9 (3.4) | 45 (7.7) | |
| Healthcare system utilization during the prior 6 months, N (%) | | | | |
| Primary care | 75 (28.5) | 110 (41.5) | 195 (33.2) | 0.02 |
| Endocrinology | 82 (31.2) | 80 (30.2) | 150 (25.5) | 0.16 |
| CDCES or dietician | 62 (23.6) | 70 (26.4) | 124 (21.1) | 0.09 |
| Pharmacist | 55 (20.9) | 78 (29.4) | 133 (22.7) | 0.03 |
| ED visit (any cause) | 92 (35.0) | 149 (56.2) | 234 (39.9) | <0.001 |
| Hospitalization (any cause) | 74 (28.1) | 122 (46.0) | 162 (27.6) | <0.001 |

Table S4. Study population: patients with type 2 diabetes. *Baseline patient characteristics at the time of their first encounter with emergency medical services (EMS) for the treatment of hypoglycemia. For patients who experienced multiple encounters during the study period, characteristics from the first encounter are included. †Patient characteristics at the time of the EMS encounter as a function of whether patients were or were not transported to the emergency department (ED). In this analysis, patients may be included more than once if they experienced multiple EMS encounters for hypoglycemia. CDCES, Certified Diabetes Care and Education Specialist.

| | Study Population* | EMS Encounter Outcome† | | p-value |
|--|-------------------|------------------------|-----------------|---------|
| | | Transported | Not Transported | |
| No. patients | 765 | 652 (58.0%) | 473 (42.0%) | |
| Age, mean (SD) | 68.2 (15.2) | 68.4 (14.7) | 64.9 (15.1) | <0.001 |
| Age, category, N (%) | | | | <0.001 |
| 18-44 | 55 (7.2) | 41 (6.3) | 50 (10.6) | |
| 45-64 | 240 (31.4) | 199 (30.5) | 184 (38.9) | |
| 65-74 | 179 (23.4) | 181 (27.8) | 96 (20.3) | |
| ≥75 | 291 (38.0) | 231 (35.4) | 143 (30.2) | |
| Sex, N (%) | | | | 0.77 |
| Male | 417 (54.5) | 349 (53.5) | 249 (52.6) | |
| Female | 348 (45.5) | 303 (46.5) | 224 (47.4) | |
| Race/ethnicity, N (%) | | | | 0.73 |
| White | 656 (85.7) | 538 (82.5) | 394 (83.3) | |
| Non-White/Unknown | 109 (14.3) | 114 (17.5) | 79 (16.7) | |
| Rurality of primary residence, N (%) | | | | 0.85 |
| Urban | 428 (55.9) | 358 (54.9) | 257 (54.3) | |
| Rural | 337 (44.1) | 294 (45.1) | 216 (45.7) | |
| Marital status, N (%) | | | | 0.01 |
| Married or living with partner | 333 (43.5) | 256 (39.3) | 222 (46.9) | |
| Not Married/Unknown | 432 (56.5) | 396 (60.7) | 251 (53.1) | |
| Any comorbid conditions (excluding diabetes), N (%) | | | | 0.002 |
| Yes | 703 (91.9) | 610 (93.6) | 417 (88.2) | |
| No | 62 (8.1) | 42 (6.4) | 56 (11.8) | |
| Diabetes complications and other comorbidities, N (%) | | | | |
| Retinopathy | 154 (20.1) | 144 (22.1) | 121 (25.6) | 0.17 |
| Nephropathy | 333 (43.5) | 295 (45.2) | 193 (40.8) | 0.14 |
| Neuropathy | 296 (38.7) | 259 (39.7) | 172 (36.4) | 0.25 |
| Cerebrovascular disease | 78 (10.2) | 67 (10.3) | 32 (6.8) | 0.04 |
| Cardiovascular disease | 420 (54.9) | 387 (59.4) | 201 (42.5) | <0.001 |
| Heart failure | 237 (31.0) | 219 (33.6) | 94 (19.9) | <0.001 |
| Peripheral vascular disease | 173 (22.6) | 162 (24.8) | 94 (19.9) | 0.049 |
| Hypertension | 585 (76.5) | 514 (78.8) | 347 (73.4) | 0.03 |
| Chronic pulmonary disease | 189 (24.7) | 189 (29.0) | 82 (17.3) | <0.001 |
| Cancer | 106 (13.9) | 90 (13.8) | 55 (11.6) | 0.28 |
| Alcohol abuse | 61 (8.0) | 66 (10.1) | 25 (5.3) | 0.003 |
| Drug abuse | 37 (4.8) | 47 (7.2) | 15 (3.2) | 0.003 |
| Depression | 229 (29.9) | 218 (33.4) | 121 (25.6) | 0.005 |
| Dementia | 88 (11.5) | 101 (15.5) | 33 (7.0) | <0.001 |

| | | | | |
|---|------------|------------|------------|--------|
| History of severe dysglycemia, N (%) | | | | |
| Severe hypoglycemia | 28 (3.7) | 72 (11.0) | 33 (7.0) | 0.02 |
| Hyperglycemic crises | 17 (2.2) | 25 (3.8) | 27 (5.7) | 0.14 |
| Active glucagon prescription, N (%) | 85 (11.1) | 97 (14.9) | 83 (17.5) | 0.23 |
| Diabetes treatment regimen, N (%) | | | | <0.001 |
| Bolus insulin (\pm basal insulin and other medications) | 460 (60.1) | 404 (62.0) | 337 (71.2) | |
| Basal insulin (\pm non-insulin medications) | 142 (18.6) | 107 (16.4) | 89 (18.8) | |
| Sulfonylurea (\pm other non-insulin medications) | 82 (10.7) | 64 (9.8) | 32 (6.8) | |
| Other glucose-lowering medications (not sulfonylurea or insulin) | 19 (2.5) | 20 (3.1) | 3 (0.6) | |
| No glucose-lowering medication | 62 (8.1) | 57 (8.7) | 12 (2.5) | |
| Hemoglobin A_{1c}, mean (SD) | 7.6 (1.7) | 7.6 (1.8) | 7.9 (2.1) | 0.009 |
| Hemoglobin A_{1c}, category, N (%) | | | | 0.18 |
| <6% | 89 (11.6) | 82 (12.6) | 42 (8.9) | |
| 6.0 - 6.4% | 80 (10.5) | 67 (10.3) | 34 (7.2) | |
| 6.5 - 6.9% | 100 (13.1) | 84 (12.9) | 60 (12.7) | |
| 7.0 - 7.9% | 178 (23.3) | 144 (22.1) | 110 (23.3) | |
| 8.0 - 8.9% | 103 (13.5) | 89 (13.6) | 63 (13.3) | |
| 9.0-9.9% | 61 (8.0) | 59 (9.1) | 57 (12.1) | |
| $\geq 10\%$ | 58 (7.6) | 55 (8.4) | 46 (9.7) | |
| No results available | 96 (12.5) | 72 (11.0) | 61 (12.9) | |
| Healthcare system utilization during the prior 6 months, N (%) | | | | |
| Primary care | 214 (28.0) | 200 (30.7) | 146 (30.9) | 0.95 |
| Endocrinology | 68 (8.9) | 54 (8.3) | 51 (10.8) | 0.15 |
| CDCES or dietician | 79 (10.3) | 79 (12.1) | 55 (11.6) | 0.80 |
| Pharmacist | 163 (21.3) | 140 (21.5) | 97 (20.5) | 0.70 |
| ED visit (any cause) | 284 (37.1) | 295 (45.2) | 166 (35.1) | <0.001 |
| Hospitalization (any cause) | 277 (36.2) | 275 (42.2) | 141 (29.8) | <0.001 |

Table S5. Patient status and clinical management at the time the hypoglycemia-related emergency medical services (EMS) encounter: patients with type 1 diabetes.

| | All Encounters | Encounter Outcome | | p-value |
|---|----------------|-------------------|-----------------|---------|
| | | Transported | Not Transported | |
| No. EMS encounters, N (%) | 852 | 265 (31.1) | 587 (68.9) | |
| Initial blood glucose level, N (%) | | | | <0.001 |
| <54 mg/dL and “low” | 708 (83.1) | 202 (76.2) | 506 (86.2) | |
| 54-69 mg/dL | 55 (6.5) | 20 (7.5) | 35 (6.0) | |
| 70-100 mg/dL | 23 (2.7) | 15 (5.7) | 8 (1.4) | |
| >100 mg/dL and “high” | 28 (3.3) | 11 (4.1) | 17 (2.9) | |
| Unknown | 38 (4.5) | 17 (6.4) | 21 (3.6) | |
| Intervention, N (%) | | | | |
| Oral glucose | 250 (29.3) | 83 (31.3) | 167 (28.4) | 0.39 |
| D10 | -- | -- | -- | -- |
| D25 | 5 (0.6) | 0 (0) | 5 (0.8) | 0.33 |
| D50 | 670 (78.6) | 203 (76.6) | 467 (79.6) | 0.33 |
| Glucagon | 80 (9.4) | 42 (15.8) | 38 (6.5) | <0.001 |
| Intubation/advanced life support | -- | -- | -- | -- |
| Time of encounter, N (%) | | | | 0.08 |
| Nighttime (7 pm to 7 am) | 340 (39.9) | 94 (35.5) | 246 (41.9) | |
| Daytime (7 am to 7 pm) | 612 (60.1) | 171 (64.5) | 341 (58.1) | |

Table S6. Patient status and clinical management at the time the hypoglycemia-related emergency medical services (EMS) encounter: patients with Type 2 Diabetes.

| | All Encounters | Encounter Outcome | | p-value |
|---|----------------|-------------------|-----------------|---------|
| | | Transported | Not Transported | |
| No. EMS encounters, N (%) | 1,125 | 652 (58.0) | 473 (42.0) | |
| Initial blood glucose level, N (%) | | | | <0.001 |
| <54 mg/dL and “low” | 790 (70.2) | 411 (63.0) | 379 (80.1) | |
| 54-69 mg/dL | 187 (16.6) | 136 (20.9) | 51 (10.8) | |
| 70-100 mg/dL | 47 (4.2) | 38 (5.8) | 9 (1.9) | |
| >100 mg/dL and “high” | 36 (3.2) | 22 (3.4) | 14 (3.0) | |
| Unknown | 65 (5.8) | 45 (6.9) | 20 (4.2) | |
| Intervention, N (%) | | | | |
| Oral glucose | 387 (34.4) | 225 (34.5) | 162 (34.3) | 0.93 |
| D10 | 2 (0.2) | 2 (0.3) | 0 (0) | 0.51 |
| D25 | 1 (0.1) | 0 (0) | 1 (0.2) | 0.42 |
| D50 | 821 (73.0) | 467 (71.6) | 354 (74.8) | 0.23 |
| Glucagon | 67 (6.0) | 44 (6.7) | 23 (4.9) | 0.19 |
| Intubation/advanced life support | 6 (0.5) | 5 (0.8) | 1 (0.2) | 0.21 |
| Time of encounter, N (%) | | | | <0.001 |
| Nighttime (7 pm to 7 am) | 485 (43.1) | 253 (38.8) | 232 (49.1) | |
| Daytime (7 am to 7 pm) | 640 (56.9) | 399 (61.2) | 241 (50.9) | |

Table S7. Factors associated with transport to the emergency department among patients with type 1 diabetes. Odds ratios and 95% confidence intervals were calculated using hierarchical multivariable logistic regression, clustered at the patient level, adjusting for all variables included in the table.

| | OR (95% CI) | p-value |
|--|--------------------|----------------|
| Age, category | | 0.49 |
| 18-44 | Reference | |
| 45-64 | 0.69 (0.42, 1.15) | |
| 65-74 | 0.83 (0.41, 1.69) | |
| ≥75 | 0.65 (0.31, 1.35) | |
| Sex | | 0.47 |
| Male | Reference | |
| Female | 1.19 (0.75, 1.89) | |
| Race/ethnicity | | 0.75 |
| White | Reference | |
| Non-White/Unknown | 1.18 (0.42, 3.35) | |
| Rurality of primary residence | | 0.43 |
| Urban | Reference | |
| Rural | 0.83 (0.51, 1.33) | |
| Marital status | | 0.84 |
| Married or living with partner | Reference | |
| Not Married/Unknown | 1.06 (0.61, 1.84) | |
| Any comorbid conditions (excluding diabetes) | | 0.03 |
| Yes | 2.91 (1.04, 8.14) | |
| No | Reference | |
| History of severe dysglycemia | | |
| Severe hypoglycemia | 1.03 (0.59, 1.80) | 0.91 |
| Hyperglycemic crises | 1.46 (0.92, 2.31) | 0.13 |
| Active glucagon prescription | 1.00 (0.65, 1.53) | 0.98 |
| Hemoglobin A1c, category | | 0.89 |
| <6% | 1.22 (0.38, 3.97) | |
| 6.0 - 6.4% | 1.35 (0.61, 3.01) | |
| 6.5 - 6.9% | Reference | |
| 7.0 - 7.9% | 1.43 (0.65, 3.17) | |
| 8.0 - 8.9% | 1.18 (0.53, 2.59) | |
| 9.0-9.9% | 0.88 (0.38, 2.07) | |
| ≥10% | 1.17 (0.47, 2.91) | |
| No results available | 1.01 (0.31, 3.27) | |
| Healthcare system utilization during the prior 6 months | | |
| Primary care | 1.27 (0.87, 1.86) | 0.22 |
| Endocrinology | 0.83 (0.53, 1.29) | 0.40 |
| Certified diabetes care and education specialist or dietician | 1.24 (0.80, 1.94) | 0.35 |
| Pharmacist | 1.55 (1.03, 2.36) | 0.05 |
| ED visit (any cause) | 1.50 (0.97, 2.34) | 0.08 |
| Hospitalization (any cause) | 1.43 (0.91, 2.24) | 0.14 |
| Initial blood glucose level | | 0.007 |
| <54 mg/dL and “low” | Reference | |

| | OR (95% CI) | p-value |
|--------------------------|--------------------|----------------|
| 54-69 mg/dL | 1.60 (0.73, 3.51) | |
| 70-100 mg/dL | 7.65 (2.08, 28.17) | |
| >100 mg/dL and “high” | 1.95 (0.87, 4.36) | |
| Unknown | 2.68 (1.10, 6.50) | |
| Intervention | | |
| Oral glucose | 1.68 (1.04, 2.72) | 0.05 |
| D50 | 2.61 (1.42, 4.81) | 0.004 |
| Glucagon | 3.77 (1.89, 7.54) | <0.001 |
| Time of encounter | | 1.00 |
| Nighttime (7 pm to 7 am) | Reference | |
| Daytime (7 am to 7 pm) | 1.00 (0.69, 1.44) | |

Table S8. Factors associated with transport to the emergency department among patients with type 2 diabetes. Odds ratios and 95% confidence intervals were calculated using hierarchical multivariable logistic regression, clustered at the patient level, adjusting for all variables included in the table.

| | OR (95% CI) | p-value |
|--|--------------------|----------------|
| Age, category | | 0.002 |
| 18-44 | Reference | |
| 45-64 | 1.69 (0.91, 3.12) | |
| 65-74 | 3.46 (1.72, 6.95) | |
| ≥75 | 2.84 (1.46, 5.54) | |
| Sex | | 0.89 |
| Male | Reference | |
| Female | 0.98 (0.69, 1.39) | |
| Race/ethnicity | | 0.25 |
| White | Reference | |
| Non-White/Unknown | 1.33 (0.82, 2.17) | |
| Rurality of primary residence | | 0.86 |
| Urban | Reference | |
| Rural | 0.97 (0.67, 1.40) | |
| Marital status | | 0.01 |
| Married or living with partner | Reference | |
| Not Married/Unknown | 1.63 (1.10, 2.43) | |
| Any comorbid conditions (excluding diabetes) | | 0.51 |
| Yes | 0.82 (0.45, 1.48) | |
| No | Reference | |
| History of severe dysglycemia | | |
| Severe hypoglycemia | 1.22 (0.68, 2.18) | 0.53 |
| Hyperglycemic crises | 0.96 (0.45, 2.05) | 0.91 |
| Active glucagon prescription | 1.10 (0.66, 1.82) | 0.73 |
| Diabetes treatment regimen | | 0.007 |
| Bolus insulin (± basal insulin and other medications) | Reference | |
| Basal insulin (± non-insulin medications) | 1.21 (0.79, 1.86) | |
| Sulfonylurea (± other non-insulin medications) | 1.67 (0.89, 3.14) | |
| Other glucose-lowering medications (not sulfonylurea or insulin) | 3.92 (0.90, 16.98) | |
| No glucose-lowering medication | 4.05 (1.52, 10.75) | |
| Hemoglobin A1c, category | | 0.64 |
| <6% | 0.83 (0.46, 1.52) | |
| 6.0 - 6.4% | 0.80 (0.42, 1.54) | |
| 6.5 - 6.9% | Reference | |
| 7.0 - 7.9% | 0.99 (0.58, 1.67) | |
| 8.0 - 8.9% | 1.11 (0.62, 1.99) | |
| 9.0-9.9% | 0.70 (0.36, 1.36) | |
| ≥10% | 0.97 (0.49, 1.93) | |
| No results available | 0.53 (0.25, 1.11) | |
| Healthcare system utilization during the prior 6 months | | |
| Primary care | 0.96 (0.68, 1.37) | 0.84 |
| Endocrinology | 0.61 (0.37, 1.02) | 0.07 |

| | OR (95% CI) | p-value |
|---|--------------------|----------------|
| Certified diabetes care and education specialist or dietician | 1.05 (0.60, 1.83) | 0.86 |
| Pharmacist | 0.96 (0.63, 1.45) | 0.85 |
| ED visit (any cause) | 1.19 (0.82, 1.73) | 0.38 |
| Hospitalization (any cause) | 1.23 (0.84, 1.79) | 0.31 |
| Initial blood glucose level | | 0.001 |
| <54 mg/dL and “low” | Reference | |
| 54-69 mg/dL | 2.45 (1.51, 3.98) | |
| 70-100 mg/dL | 2.72 (1.09, 6.82) | |
| >100 mg/dL and “high” | 0.85 (0.38, 1.89) | |
| Unknown | 2.06 (0.98, 4.31) | |
| Intervention | | |
| Oral glucose | 0.87 (0.56, 1.36) | 0.55 |
| D50 | 1.08 (0.64, 1.81) | 0.78 |
| Glucagon | 1.63 (0.81, 3.26) | 0.16 |
| Time of encounter | | 0.01 |
| Nighttime (7 pm to 7 am) | Reference | |
| Daytime (7 am to 7 pm) | 1.51 (1.11, 2.04) | |

Table S9. Rates of recurrent severe hypoglycemia among transported and not transported patients with type 1 diabetes.

| | Transported (N = 265) | Non-transported (N = 587) | P-value |
|---|----------------------------------|--------------------------------------|----------------|
| Composite Outcome (EMS, ED, or hospitalization for hypoglycemia) | | | |
| 72 hours | 11 (4.1) | 40 (6.8) | 0.13 |
| 7 days | 23 (8.7) | 71 (12.1) | 0.14 |
| 30 days | 50 (18.9) | 171 (29.1) | 0.002 |
| EMS call for hypoglycemia | | | |
| 72 hours | 7 (2.6) | 33 (5.6) | 0.06 |
| 7 days | 20 (7.5) | 62 (10.6) | 0.17 |
| 30 days | 46 (17.4) | 163 (27.8) | 0.001 |
| ED visit for hypoglycemia | | | |
| 72 hours | 3 (1.1) | 7 (1.2) | 0.94 |
| 7 days | 6 (2.3) | 9 (1.5) | 0.45 |
| 30 days | 14 (5.3) | 21 (3.6) | 0.25 |
| Hospitalization for hypoglycemia | | | |
| 72 hours | 3 (1.1) | 5 (0.8) | 0.69 |
| 7 days | 6 (2.3) | 7 (1.2) | 0.24 |
| 30 days | 9 (3.4) | 9 (1.5) | 0.08 |

Table S10. Rates of recurrent severe hypoglycemia among transported and not transported patients with type 2 diabetes.

| | Transported (N = 652) | Non-transported (N = 473) | P-value |
|---|----------------------------------|--------------------------------------|----------------|
| Composite Outcome (EMS, ED, or hospitalization for hypoglycemia) | | | |
| 72 hours | 15 (2.3) | 38 (8.0) | <0.001 |
| 7 days | 25 (3.8) | 48 (10.1) | <0.001 |
| 30 days | 47 (7.2) | 71 (15.0) | <0.001 |
| EMS call for hypoglycemia | | | |
| 72 hours | 10 (1.5) | 24 (5.1) | <0.001 |
| 7 days | 16 (2.4) | 33 (7.0) | <0.001 |
| 30 days | 32 (4.9) | 57 (12.1) | <0.001 |
| ED visit for hypoglycemia | | | |
| 72 hours | 5 (0.8) | 14 (3.0) | 0.005 |
| 7 days | 6 (0.9) | 18 (3.8) | <0.001 |
| 30 days | 14 (2.1) | 19 (4.0) | 0.07 |
| Hospitalization for hypoglycemia | | | |
| 72 hours | 6 (0.9) | 6 (1.3) | 0.57 |
| 7 days | 12 (1.8) | 6 (1.3) | 0.45 |
| 30 days | 18 (2.8) | 6 (1.3) | 0.09 |

Table S11. Factors associated with recurrent hypoglycemic events in the overall population. This analysis examines the composite of hypoglycemic events requiring emergency medical services, emergency department, or hospital care within 30 days of the initial hypoglycemia-related EMS call. Odds ratios and 95% confidence intervals were calculated using hierarchical multivariable logistic regression, clustered at the patient level, adjusting for all variables included in the table. CDCES, certified diabetes care and education specialist

| | OR (95% CI) | p-value |
|--|--------------------|----------------|
| Transported to the ED (no vs. yes) | 0.58 (0.42, 0.80) | 0.002 |
| Age, category | | 0.36 |
| 18-44 | Reference | |
| 45-64 | 1.44 (0.81, 2.55) | |
| 65-74 | 1.25 (0.64, 2.42) | |
| ≥75 | 1.60 (0.87, 2.96) | |
| Sex | | 0.20 |
| Male | Reference | |
| Female | 1.30 (0.88, 1.90) | |
| Race/ethnicity | | 0.04 |
| White | Reference | |
| Non-White/Unknown | 1.90 (1.15, 3.15) | |
| Rurality of primary residence | | 0.003 |
| Urban | Reference | |
| Rural | 1.94 (1.32, 2.86) | |
| Marital status | | 0.15 |
| Married or living with partner | Reference | |
| Not Married/Unknown | 1.34 (0.89, 2.02) | |
| Any comorbid conditions (excluding diabetes) | | 0.92 |
| Yes | 1.03 (0.53, 2.03) | |
| No | Reference | |
| History of severe dysglycemia | | |
| Severe hypoglycemia | 1.04 (0.61, 1.80) | 0.87 |
| Hyperglycemic crises | 2.00 (1.19, 3.36) | 0.03 |
| Active glucagon prescription | 0.84 (0.57, 1.23) | 0.36 |
| Diabetes Type | | <0.001 |
| Type 1 | 3.35 (2.17, 5.19) | |
| Type 2 | Reference | |
| Diabetes treatment regimen | | 0.18 |
| Bolus insulin (± basal insulin and other medications) | Reference | |
| Basal insulin (± non-insulin medications) | 0.74 (0.40, 1.36) | |
| Sulfonylurea (± other non-insulin medications) | 1.17 (0.58, 2.36) | |
| Other glucose-lowering medications (not sulfonylurea or insulin) | 0.59 (0.08, 4.44) | |
| No glucose-lowering medication | 0.38 (0.12, 1.22) | |
| Hemoglobin A_{1c}, category | | 0.16 |
| <6% | 1.01 (0.53, 1.89) | |
| 6.0 - 6.4% | 0.94 (0.57, 1.54) | |
| 6.5 - 6.9% | Reference | |
| 7.0 - 7.9% | 0.78 (0.46, 1.33) | |
| 8.0 - 8.9% | 0.70 (0.42, 1.18) | |
| 9.0-9.9% | 1.26 (0.68, 2.33) | |
| ≥10% | 0.89 (0.47, 1.69) | |
| No results available | 1.56 (0.93, 2.64) | |
| Healthcare system utilization during the prior 6 months | | |

| | | |
|-----------------------------|-------------------|-------|
| Primary care | 1.76 (1.23, 2.51) | 0.007 |
| Endocrinology | 0.60 (0.40, 0.91) | 0.02 |
| CDCES or dietician | 0.76 (0.49, 1.17) | 0.20 |
| Pharmacist | 1.10 (0.71, 1.70) | 0.69 |
| ED visit (any cause) | 1.06 (0.77, 1.46) | 0.73 |
| Hospitalization (any cause) | 1.31 (0.94, 1.82) | 0.13 |

Table S12. Factors associated with recurrent hypoglycemic events among patients with type 1 diabetes. This analysis examines the composite of hypoglycemic events requiring emergency medical services, emergency department, or hospital care within 30 days of the initial hypoglycemia-related EMS call. Odds ratios and 95% confidence intervals were calculated using hierarchical multivariable logistic regression, clustered at the patient level, adjusting for all variables included in the table. CDCES, certified diabetes care and education specialist.

| | OR (95% CI) | p-value |
|--|--------------------|----------------|
| Transported to the ED (yes vs. no) | 0.64 (0.43, 0.96) | 0.06 |
| Age, category | | 0.46 |
| 18-44 | Reference | |
| 45-64 | 1.44 (0.80, 2.58) | |
| 65-74 | 0.88 (0.34, 2.28) | |
| ≥75 | 1.20 (0.55, 2.64) | |
| Sex | | 0.40 |
| Male | Reference | |
| Female | 1.28 (0.74, 2.23) | |
| Race/ethnicity | | 0.86 |
| White | Reference | |
| Non-White/Unknown | 0.90 (0.27, 2.97) | |
| Rurality of primary residence | | 0.03 |
| Urban | Reference | |
| Rural | 1.79 (1.15, 2.79) | |
| Marital status | | 0.30 |
| Married or living with partner | Reference | |
| Not Married/Unknown | 1.32 (0.78, 2.24) | |
| Any comorbid conditions (excluding diabetes) | | 0.60 |
| Yes | 0.81 (0.39, 1.69) | |
| No | Reference | |
| History of severe dysglycemia | | |
| Severe hypoglycemia | 1.08 (0.56, 2.08) | 0.81 |
| Hyperglycemic crises | 1.72 (0.87, 3.39) | 0.18 |
| Active glucagon prescription | 0.64 (0.42, 0.97) | 0.05 |
| Hemoglobin A_{1c}, category | | 0.13 |
| <6% | 0.81 (0.32, 2.02) | |
| 6.0 - 6.4% | 0.85 (0.51, 1.43) | |
| 6.5 - 6.9% | Reference | |
| 7.0 - 7.9% | 0.52 (0.26, 1.02) | |
| 8.0 - 8.9% | 0.54 (0.30, 0.97) | |
| 9.0-9.9% | 0.85 (0.39, 1.84) | |
| ≥10% | 0.45 (0.21, 0.97) | |
| No results available | 1.06 (0.56, 1.99) | |
| Healthcare system utilization during the prior 6 months | | |
| Primary care | 1.49 (0.91, 2.43) | 0.16 |
| Endocrinology | 0.60 (0.39, 0.91) | 0.03 |
| CDCES or dietician | 0.84 (0.49, 1.43) | 0.51 |
| Pharmacist | 1.30 (0.77, 2.19) | 0.39 |
| ED visit (any cause) | 1.00 (0.70, 1.43) | 1.00 |
| Hospitalization (any cause) | 1.72 (1.17, 2.53) | 0.02 |

Table S13. Factors associated with recurrent hypoglycemia among patients with type 2 diabetes. This analysis examines the composite of hypoglycemic events requiring emergency medical services, emergency department, or hospital care within 30 days of the initial hypoglycemia-related EMS call. Odds ratios and 95% confidence intervals were calculated using hierarchical multivariable logistic regression, clustered at the patient level, adjusting for all variables included in the table. CDCES, certified diabetes care and education specialist.

| | OR (95% CI) | p-value |
|--|--------------------|----------------|
| Transported to the ED (yes vs. no) | 0.42 (0.24, 0.75) | 0.002 |
| Age, category | | 0.15 |
| 18-44 | Reference | |
| 45-64 | 1.57 (0.65, 3.81) | |
| 65-74 | 2.44 (0.89, 6.66) | |
| ≥75 | 2.66 (0.97, 7.30) | |
| Sex | | 0.40 |
| Male | Reference | |
| Female | 1.25 (0.77, 2.01) | |
| Race/ethnicity | | 0.02 |
| White | Reference | |
| Non-White/Unknown | 2.71 (1.47, 5.00) | |
| Rurality of primary residence | | 0.003 |
| Urban | Reference | |
| Rural | 2.07 (1.27, 3.35) | |
| Marital status | | 0.19 |
| Married or living with partner | Reference | |
| Not Married/Unknown | 1.40 (0.84, 2.33) | |
| Any comorbid conditions (excluding diabetes) | | 0.47 |
| Yes | 1.40 (0.49, 4.00) | |
| No | Reference | |
| History of severe dysglycemia | | |
| Severe hypoglycemia | 0.82 (0.30, 2.20) | 0.66 |
| Hyperglycemic crises | 3.14 (1.41, 7.02) | 0.04 |
| Active glucagon prescription | 1.38 (0.78, 2.43) | 0.32 |
| Diabetes treatment regimen | | 0.52 |
| Bolus insulin (± basal insulin and other medications) | Reference | |
| Basal insulin (± non-insulin medications) | 0.72 (0.36, 1.47) | |
| Sulfonylurea (± other non-insulin medications) | 1.38 (0.64, 2.95) | |
| Other glucose-lowering medications (not sulfonylurea or insulin) | 1.07 (0.14, 8.15) | |
| No glucose-lowering medication | 0.56 (0.16, 1.93) | |
| Hemoglobin A_{1c}, category | | 0.41 |
| <6% | 1.40 (0.58, 3.36) | |
| 6.0 - 6.4% | 1.07 (0.34, 3.34) | |
| 6.5 - 6.9% | Reference | |
| 7.0 - 7.9% | 1.21 (0.56, 2.61) | |
| 8.0 - 8.9% | 0.81 (0.34, 1.94) | |
| 9.0-9.9% | 1.51 (0.60, 3.83) | |
| ≥10% | 2.05 (0.77, 5.47) | |
| No results available | 2.23 (0.92, 5.39) | |
| Healthcare system utilization during the prior 6 months | | |
| Primary care | 2.82 (1.68, 4.73) | <0.001 |
| Endocrinology | 0.61 (0.20, 1.87) | 0.32 |
| CDCES or dietician | 0.56 (0.25, 1.25) | 0.10 |

| | | |
|-----------------------------|-------------------|------|
| Pharmacist | 0.94 (0.54, 1.63) | 0.84 |
| ED visit (any cause) | 1.34 (0.78, 2.31) | 0.26 |
| Hospitalization (any cause) | 0.99 (0.59, 1.67) | 0.98 |

Table S14. Rates of recurrent severe hypoglycemia among transported and not transported patients in subgroups of patient age. This analysis examines the composite of hypoglycemic events requiring emergency medical services, emergency department, or hospital care within 30 days.

| | Transport to the ED | | P-value |
|----------------------------------|-------------------------|--------------------------|---------|
| | No | Yes | |
| Age 18-44 years (N = 372) | No (N = 230) | Yes (N = 142) | |
| 72 hours | 13 (5.6%) | 4 (2.8%) | 0.20 |
| 7 days | 22 (9.6%) | 6 (4.2%) | 0.06 |
| 30 days | 55 (23.9%) | 19 (13.4%) | 0.01 |
| Age 45-64 years (N = 769) | No (N = 460) | Yes (N = 309) | |
| 72 hours | 34 (7.4%) | 12 (3.9%) | 0.04 |
| 7 days | 51 (11.1%) | 22 (7.1%) | 0.07 |
| 30 days | 111 (24.1%) | 43 (13.9%) | <0.001 |
| Age 65-74 years (N = 380) | No (N = 169) | Yes (n = 211) | |
| 72 hours | 11 (6.5%) | 1 (0.5%) | <0.001 |
| 7 days | 18 (10.6%) | 4 (1.9%) | <0.001 |
| 30 days | 32 (18.9%) | 9 (4.3%) | <0.001 |
| Age ≥75 years (N = 456) | No (N = 201) | Yes (N = 255) | |
| 72 hours | 20 (9.9%) | 9 (3.5%) | 0.005 |
| 7 days | 28 (13.9%) | 16 (6.3%) | 0.006 |
| 30 days | 44 (21.9%) | 26 (10.2%) | <0.001 |

Table S15. Rates of recurrent severe hypoglycemia among transported and not transported patients as a function of patients' baseline history of severe hypoglycemia. This analysis examines the composite of hypoglycemic events requiring emergency medical services, emergency department, or hospital care.

| | Transport to the ED | | P-value |
|---|-------------------------|--------------------------|---------|
| | No | Yes | |
| Prior history of hypoglycemia (N = 242) | No (N = 114) | Yes (N = 128) | |
| 72 hours | 13 (11.4%) | 8 (6.2%) | 0.16 |
| 7 days | 18 (15.8%) | 15 (11.7%) | 0.36 |
| 30 days | 33 (28.9%) | 35 (27.3%) | 0.78 |
| No Prior History of hypoglycemia (N = 1,735) | No (N = 946) | Yes (N = 789) | |
| 72 hours | 65 (6.9%) | 18 (2.3%) | <0.001 |
| 7 days | 101 (10.7%) | 33 (4.2%) | <0.001 |
| 30 days | 209 (22.1%) | 62 (7.9%) | <0.001 |

Table S16. Rates of recurrent severe hypoglycemia among patients who were not transported, transported to the ED and discharged, or admitted to the hospital. This analysis examines the composite of hypoglycemic events requiring emergency medical services, emergency department, or hospital care.

| | Transport Status | | | P-value |
|--------------------------------------|-----------------------------|------------------------------|------------------------------|---------|
| | No Transport (N = 1,060) | Transport to ED (N = 457) | Hospitalization (N = 412) | |
| Recurrent severe hypoglycemia | | | | |
| 72 hours | 78 (7.4%) | 20 (4.4%) | 5 (1.2%) | <0.001 |
| 7 days | 119 (11.2%) | 35 (7.7%) | 10 (2.4%) | <0.001 |
| 30 days | 242 (22.8%) | 71 (15.5%) | 22 (5.3%) | <0.001 |

Table S17. Mortality among transported and not transported patients.

| | Transported (N = 917) | Non-transported (N = 1,060) | P-value |
|--|----------------------------------|--|----------------|
| Death after EMS call for hypoglycemia | | | |
| 72 hours | 16 (1.7%) | 2 (0.2%) | <0.001 |
| 7 days | 25 (2.7%) | 3 (0.3%) | <0.001 |
| 30 days | 58 (6.3%) | 6 (0.6%) | <0.001 |

Table S18. Rates of recurrent severe hypoglycemia among transported and not transported patients excluding those who had died after the index hypoglycemia-related EMS call.

| | Transported | Non-transported | P-value |
|--|----------------------------------|--|----------------|
| Outcomes within 72 hours | Transported (N = 890) | Non-transported (N = 1,058) | |
| Composite Outcome (EMS, ED, or hospitalization for hypoglycemia) | 26 (2.9) | 78 (7.4) | <0.001 |
| EMS call for hypoglycemia | 17 (1.9) | 57 (5.4) | <0.001 |
| ED visit for hypoglycemia | 8 (0.9) | 21 (2.0) | 0.05 |
| Hospitalizations for hypoglycemia | 9 (1.0) | 11 (1.0) | 0.95 |
| Outcomes within 7 days | Transported (N = 882) | Non-transported (N = 1,057) | |
| Composite Outcome (EMS, ED, or hospitalization for hypoglycemia) | 48 (5.4) | 119 (11.3) | <0.001 |
| EMS call for hypoglycemia | 36 (4.1) | 95 (9.0) | <0.001 |
| ED visit for hypoglycemia | 12 (1.4) | 27 (2.5) | 0.06 |
| Hospitalizations for hypoglycemia | 18 (2.0) | 13 (1.2) | 0.16 |
| Outcomes within 30 days | Transported (N = 854) | Non-transported (N = 1,054) | |
| Composite Outcome (EMS, ED, or hospitalization for hypoglycemia) | 91 (10.7) | 241 (22.9) | <0.001 |
| EMS call for hypoglycemia | 74 (8.7) | 220 (20.9) | <0.001 |
| ED visit for hypoglycemia | 27 (3.2) | 39 (3.7) | 0.52 |
| Hospitalizations for hypoglycemia | 22 (2.6) | 14 (1.3) | 0.046 |