**eTable 1**: International Classification of Diseases 9th Edition (ICD-9) codes for EGS Conditions

|  |  |  |
| --- | --- | --- |
|  | **Uncomplicated** | **Complex\*** |
| **Appendicitis** | 540.9  541 | 540  540.1 |
| **Cholecystitis** | 574  574.01;  574.3  574.31  574.6  574.61  574.8  574.81  575  575.12  575.2  575.3 | 567.21  567.22  567.29  567.81  614.5  575.4  575.5  576.1  576.3  576.4 |
| **Diverticulitis** | 562.11  562.13 | 569.83  567.22  569.5  567.31  567.38  614.5  567.21  567.29 |
| **Abdominal Hernia** | 550.90  550.91  550.92  550.93  553.00  553.01  553.02  553.03  553.1  553.20  553.21  553.29  553.3  553.8  553.9  550.10  550.11  550.12  550.13  552.00  552.01  552.02  552.03  552.1  552.20  552.21  552.29  552.3  552.8  552.9 | 569.83  567.21  567.29  614.5  550.00  550.01  550.02  550.03  551.00  551.01  551.02  551.03  551.1  551.20  551.21  551.29  551.3  551.8  551.9 |
| **Acute Pancreatitis** | 577.0  577.2 | 567.31  567.38  567.39  557  557.9  558.9  567.21  567.22  567.29  567.89  567.9  569.83  614.5 |
| **Intestinal Obstruction** | 560  560.2  560.3  560.31  560.39  560.81  560.89  560.9 | 557  557.9  569.83  567.29  567.22  567.21  569.5  614.5 |
| **Peptic Ulcer Disease** | 531.x  532.x  533.x  534.x  535.01  535.11  535.21  535.31  535.41  535.51  535.61  535.71 | 567.29  567.22  567.31  567.38  567.39  567.21  614.5 |
| **Mesenteric Ischemia** | 557.0  557.9 | 567.22  569.83  567.21  567.29  569.5  614.5 |

\* For all diseases, if 785.52 OR 995.92 present, diagnosis is coded as “complex”.

Classification scheme adopted from Scott JW, Staudenmayer K, Sangji N, Fan Z, Hemmila M, Utter G. Evaluating the association between American Association for the Surgery of Trauma emergency general surgery anatomic severity grades and clinical outcomes using national claims data. *J Trauma Acute Care Surg*. 2021;90(2):296-304. doi:10.1097/TA.0000000000003030

**eTable 2:** International Classification of Diseases 9th Edition (ICD-9) codes for major morbidity

|  |  |
| --- | --- |
| **Complications** | **ICD-9 Diagnoses (DX)/ Procedure (SX) Codes** |
| Pulmonary failure | 518.81 ; 518.82 ; 518.84 |
| Pneumonia | 481.xx ; 482.xx ; 483.xx; 484.xx; 485.xx; 507.0x |
| Myocardial infarction | 410.xx |
| Deep venous thrombosis and pulmonary embolism | 415.1x; 451.11; 451.19; 451.2x; 451.81; 453.8x |
| Acute renal failure | 584.xx |
| Surgical site infection | 958.3x; 998.3x; 998.5x |
| Cerebrovascular Accident / Stroke | 433.01, 433.11, 433.21, 433.31, 433.81, 433.91, 434.01, 434.11, 434.91 |
| Urinary Tract Infection / Acute Cystitis | 590.10, 590.11, 599.0, 595.0 |

**eTable 3**. Univariable Regression of In-Hospital Mortality

|  | **Univariate  OR (95% CI)** | **p-value** |
| --- | --- | --- |
| **SPAR** | 0.96 (0.95, 0.97) | <0.001 |
| **Age** | 1.04 (1.04, 1.04) | <0.001 |
| **Sex** |  |  |
| Female | - Reference - |  |
| Male | 1.20 (1.17, 1.23) | <0.001 |
| **Race/Ethnicity** |  |  |
| White | - Reference - |  |
| Asian or Pacific Islander | 0.99 (0.94, 1.05) | 0.75 |
| Black | 0.85 (0.81, 0.89) | <0.001 |
| Hispanic | 0.61 (0.58, 0.63) | <0.001 |
| Native American | 0.84 (0.70, 1.00) | 0.055 |
| Not Reported | 1.56 (1.40, 1.73) | <0.001 |
| Other | 0.85 (0.79, 0.92) | <0.001 |
| **Expected Primary Payor** |  |  |
| Private | - Reference - |  |
| Medicaid | 1.09 (1.04, 1.14) | <0.001 |
| Medicare | 2.76 (2.67, 2.86) | <0.001 |
| No Charge | 0.53 (0.37, 0.75) | <0.001 |
| Other | 1.52 (1.38, 1.68) | <0.001 |
| Self pay | 0.81 (0.74, 0.89) | <0.001 |
| **Charlson Comorbidity Index** | 1.32 (1.32, 1.33) | <0.001 |
| **Poverty** | 0.70 (0.59, 0.82) | <0.001 |
| **Teaching Hospital** |  |  |
| No | - Reference - |  |
| Yes | 1.42 (1.30, 1.55) | <0.001 |
| **Advanced Resource Hospital** |  |  |
| No | - Reference - |  |
| Yes | 1.25 (1.19, 1.32) | <0.001 |
| **Diagnosis Category** |  |  |
| Uncomplicated | - Reference - |  |
| Complex | 11.09 (10.82, 11.37) | <0.001 |

SPAR: Spatial Access Ratio

**eTable 4**: Univariable Regression of Major Morbidity

| **Variable** | **Univariate  OR (95% CI)** | **p-value** |
| --- | --- | --- |
| **SPAR** | 1.00 (0.99, 1.00) | 0.15 |
| **Age** | 1.04 (1.04, 1.04) | <0.001 |
| **Sex** |  |  |
| Female | - Reference - |  |
| Male | 0.96 (0.95, 0.97) | <0.001 |
| **Race/Ethnicity** |  |  |
| White | - Reference - |  |
| Asian or Pacific Islander | 0.90 (0.88, 0.92) | <0.001 |
| Black | 1.01 (1.00, 1.03) | 0.11 |
| Hispanic | 0.66 (0.65, 0.66) | <0.001 |
| Native American | 0.81 (0.76, 0.86) | <0.001 |
| Not Reported | 0.92 (0.87, 0.96) | <0.001 |
| Other | 0.81 (0.79, 0.83) | <0.001 |
| **Expected Primary Payer** |  |  |
| Private | - Reference - |  |
| Medicaid | 1.24 (1.22, 1.26) | <0.001 |
| Medicare | 2.96 (2.92, 2.99) | <0.001 |
| No Charge | 0.93 (0.87, 1.01) | 0.077 |
| Other | 1.35 (1.31, 1.40) | <0.001 |
| Self pay | 0.85 (0.82, 0.87) | <0.001 |
| **Charlson Comorbidity Index** | 1.30 (1.29, 1.30) | <0.001 |
| **Poverty** | 0.96 (0.90, 1.02) | 0.15 |
| **Teaching Hospital** |  |  |
| No | - Reference - |  |
| Yes | 1.12 (1.05, 1.19) | <0.001 |
| **Advanced Resource Hospital** |  |  |
| No | - Reference - |  |
| Yes | 1.23 (1.19, 1.28) | <0.001 |
| **Diagnosis Category** |  |  |
| Simple | - Reference - |  |
| Complex | 3.16 (3.12, 3.20) | <0.001 |

SPAR: Spatial Access Ratio

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **a) Operative Intervention During Admission** | | | | | |
|  | **SPAR = 0**  **N=6,454** | **0 < SPAR < 0.5 N=21,433** | **0.5 ≤ SPAR < 1.0 N=46,405** | **1.0 ≤ SPAR N=140,860** | **Multivariable Model\***  **SPAR aOR (95%CI)** |
| **In-Hospital Mortality** | 321 (5%) | 685 (3%) | 784 (2%) | 36,08 (3%) | 0.96 (0.94, 0.99) |
| **Composite Major Morbidity** | 1,641 (25%) | 48,73 (23%) | 8,555 (18%) | 29,487 (21%) | 0.98 (0.97, 0.99) |
|  |  |  |  |  |  |
| **b) Interhospital Transfer** | | | | | |
|  | **SPAR = 0**  **N=1,842** | **0 < SPAR < 0.5 N=5,772** | **0.5 ≤ SPAR < 1.0 N=7,389** | **1.0 ≤ SPAR N=14,857** | **Multivariable Model\***  **SPAR aOR (95%CI)** |
| **In-Hospital Mortality** | 241 (13%) | 356 (6%) | 314 (4%) | 880 (6%) | 0.98 (0.94, 1.03) |
| **Composite Major Morbidity** | 872 (47%) | 2,207 (38%) | 2,513 (34%) | 5,431 (37%) | 0.98 (0.96, 1.01) |

**eTable 5**. Subgroup analysis of Operative and Interhospital Transfer Cohorts

\*Adjusted for age, sex, race/ethnicity, expected primary payer, Charlson Comorbidity Index, poverty, teaching hospital, advanced resource hospital