Table H-1. Characteristics of head-to-head studies

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| **Author, Year** | **Study Design** | **Eligibility Criteria** | **Population Characteristics** | **Setting and Dates Assessments**  **Performed** | **N** | **Outcomes (Proportion with Outcome)** |
| Acker, *et al.,* 2014 | Retrospective cohort | Children ≤18 years old who were admitted to the hospital with a diagnosis of TBI and had complete tGCS and mGCS data available. | Age (mean, years): 6.9 (SD 5.8)  Male: 65%  Race: NR  TBI: 100%  ISS (median): 17 (IQR: 10-26)  tGCS on presentation (median): 15 (IQR: 8-15)  mGCS on presentation (median): 6 (IQR: 4-6)  *Cause of injury*  -Fall: 21%  -MVC: 22%  -NAT: 18%  -Other: 39% | USA, Colorado  Urban  2 Level 1 pediatric trauma centers  2002 to 2011 | 2,231 | Need for craniotomy (10.4%)  Need for ICP monitoring (16.9%)  Admission to the ICU (56.5%)  Hospital stay of ≥5 days (30.4%)  Discharge to rehabilitation (13.2%)  Dependence on caretakers at followup (76.9%)  Mortality (8.4%) |
| Al-Salamah, *et* *al.,* 2004 | Retrospective analysis of prospective cohort | Patients who had an injury caused by any mechanism, ISS >12, transported by land ambulance, entered into the Ontario Trauma Registry Comprehensive Data set | Age (mean, years): 44 (SD 21)  Male: 70%  Race: NR  *Primary site of injury on arrival to ED*  -Head and neck: 32%  -Chest and abdomen: 11%  -Lower extremity: 3%  -Upper extremity: 3%  -Spine: 2%  -Multiple sites: 36%  -Unknown: 13%  Endotracheal intubation before arrival to ED: 0.3%  Required intubation in ED: 16% | Canada, Ontario  Trauma registry  72% urban, 28% suburban or rural  1994 to 2002 | 795 | Mortality (18%)  ICU admission (8%)  Composite outcome of ICU admission or requiring intubation in the ED (NR) |

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| **Author, Year** | **Glasgow Coma**  **Scale Used** | **Personnel**  **Performing Assessments and Where Assessed** | **Potential**  **Confounders** | **Results: Univariate** | **Method for Constructing**  **Multivariate Model** |
| Acker, *et al.,* 2014 | tGCS vs. mGCS (from tGCS) | On presentation, but otherwise not described | Mentions univariate analysis was adjusted using the Bonferroni method for multiple comparisons, but adjustments not described and only goodness of fit data reported | NR | NR |
| Al-Salamah, *et* *al.,* 2004 | tGCS vs. mGCS (from tGCS) | Trauma team, not otherwise described | Only diagnostic accuracy and discrimination reported; no adjustment performed | NR | NR |

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| **Author, Year** | **Results: Multivariate** | **Measures of Diagnostic Accuracy** |
| Acker, *et al.,* 2014 | NR | NR |
| Al-Salamah, *et* *al.,* 2004 | NR | **Test characteristics (95% CI)\* of mortality, tGCS (score ≤13) vs. mGCS (score ≤5)**  Sensitivity: 80.28% (72.78 to 86.48) vs. 80.28% (72.78 to 86.48)  Specificity: 67.99% (64.26 to 71.56) vs. 73.05% (69.47 to 76.42%)  PLR: 2.51 (2.18 to 2.88) vs. 2.98 (2.56 to 3.46)  NLR: 0.29 (0.21 to 0.41) vs. 0.27 (0.19 to 0.38)  PPV: 35.29% (30.08 to 40.78) vs. 39.31% (33.65 to 45.19)  NPV: 94.07% (91.54 to 96.02) vs. 94.46% (92.09 to 96.28) |

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| **Author, Year** | **Discrimination or Calibration** | **Risk of Bias** |
| Acker, *et al.,* 2014 | **AUROC (95% CI), p-value, tGCS vs. mGCS**  *All ages (0-18 years)*  Survived to hospital discharge: 0.949 (0.938 to 0.961) vs. 0.941 (0.926 to 0.957), p=0.06  Craniotomy: 0.642 (0.603 to 0.681) vs. 0.638 (0.601 to 0.675), p=0.64  ICU admission: 0.772 (0.754 to 0.790) vs. 0.721 (0.705 to 0.738), p<0.001  LOS >4 days: 0.683 (0.660 to 0.706) vs. 0.644 (0.622 to 0.666), p<0.001  Discharge to rehabilitation: 0.804 (0.782 to 0.826) vs. 0.766 (0.740 to 0.792), p<0.001  Dependent on caregiver: 0.757 (0.732 to 0.783) vs. 0.747 (0.722 to 0.772), p=0.06  ICP monitoring: 0.808 (0.784 to 0.832) vs. 0.774 (0.748 to 0.800), p<0.001  *Youngest age group (0-3 years)*  Survived to hospital discharge: 0.949 (0.934 to 0.964) vs. 0.936 (0.911 to 0.962), p=0.10  Craniotomy: 0.680 (0.617 to 0.743) vs. 0.659 (0.597 to 0.721), p=0.17  ICU admission: 0.786 (0.758 to 0.814) vs. 0.723 (0.696 to 0.750), p<0.001  LOS >4 days: 0.630 (0.594 to 0.666) vs. 0.589 (0.555 to 0.623), p<0.001  Discharge to rehabilitation: 0.772 (0.732 to 0.811) vs. 0.713 (0.667 to 0.760), p<0.001  Dependent on caregiver: 0.808 (0.774 to 0.842) vs. 0.787 (0.752 to 0.821), p=0.02  ICP monitoring: 0.728 (0.686 to 0.769) vs. 0.685 (0.643 to 0.726), p<0.001 | Moderate |
| Al-Salamah, *et* *al.,* 2004 | **Mortality, tGCS vs. mGCS**  AUROC: 0.82 vs. 0.81  Hosmer-Lemeshow Goodness of Fit p-value: <0.01 vs. <0.01  **ICU admission, tGCS vs. mGCS**  p-value: 0.02 vs. 0.03  **ICU admission or required intubation in the ED, tGCS vs. mGCS**  p-value: <0.001 vs. <0.001 | Moderate |

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| **Author, Year** | **Study Design** | **Eligibility Criteria** | **Population Characteristics** | **Setting and Dates Assessments**  **Performed** | **N** | **Outcomes (Proportion with Outcome)** |
| Beskind, *et al.,* 2014 | Retrospective cohort | Trauma patients presenting to the ED via EMS at a level 1 trauma center | Age (median, years): 32 (IQR: 20-51)  Male: 65.5%  Race: NR  Blunt trauma: 88.8%  Penetrating trauma: 10.7%  Burn trauma: 0.6%  AIS 2005 body region  -Head or neck: 28.8%  -External: 26.5%  -Extremities or pelvic girdle: 21.2%  -Chest: 10.8%  -Abdominal or pelvic contents: 6.3%  -Face: 5.4%  GCS ≤13: 10.8%  mGCS ≤5: 8.2%  ISS ≥16: 11.7%  Head AIS ≥3: 11.9%  BP: NR  Alcohol intoxication: NR  Medication/procedures in field: NR | USA, Southern Arizona  Urban, University Health Network  Level 1 trauma center  2008 to 2010 | 9,816 | Survival to hospital discharge (97.1%)  Out-of-hospital or ED intubation (4.1%)  Neurosurgical intervention (3.8%) |

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| **Author, Year** | **Glasgow Coma**  **Scale Used** | **Personnel**  **Performing Assessments and Where Assessed** | **Potential**  **Confounders** | **Results: Univariate** | **Method for Constructing**  **Multivariate Model** |
| Beskind, *et al.,* 2014 | tGCS vs. mGCS (from tGCS) | Out-of-hospital, otherwise not described | Only discrimination reported; no adjustment performed | NR | NR |

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| **Author, Year** | **Results: Multivariate** | **Measures of Diagnostic Accuracy** |
| Beskind, *et al.,* 2014 | NR | NR |

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| **Author, Year** | **Discrimination or Calibration** | **Risk of Bias** |
| Beskind, *et al.,* 2014 | **AUROC (95% CI). tGCS vs. mGCS**  Survival to discharge: 0.899 (0.874 to 0.923) vs. 0.888 (0.864 to 0.913), mean difference=0.010 (0.002 to 0.018)  Intubation in out-of-hospital setting or ED: 0.966 (0.955 to 0.976) vs. 0.948 (0.933 to 0.963), mean difference=0.018 (0.011 to 0.024)  Neurosurgical intervention: 0.690 (0.661 to 0.718) vs. 0.671 (0.643 to 0.699), mean difference=0.019 (0.008 to 0.029)  *Patients with ISS ≥16 (n=1,151)*  Survival to discharge: 0.844 (0.815 to 0.874) vs. 0.837 (0.808 to 0.866), mean difference=0.008 (-0.001 to 0.018)  Intubation in out-of-hospital setting or ED: 0.914 (0.895 to 0.932) vs. 0.905 (0.884 to 0.926), mean difference=0.009 (0.0001 to 0.017)  Neurosurgical intervention: 0.571 (0.533 to 0.609) vs. 0.570 (0.531 to 0.608), mean difference=0.002 (-0.013 to 0.016)  *Patients with head AIS ≥3 (n=1,165; TBI)*  Survival to discharge: 0.869 (0.838 to 0.899) vs. 0.855 (0.824 to 0.886), mean difference=0.014 (0.005 to 0.023)  Intubation in out-of-hospital setting or ED: 0.918 (0.899 to 0.937) vs. 0.907 (0.884 to 0.929), mean difference=0.012 (0.002 to 0.021)  Neurosurgical intervention: 0.596 (0.558 to 0.635) vs. 0.602 (0.565 to 0.640), mean difference=-0.006 (-0.021 to 0.009) | Low |

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| **Author, Year** | **Study Design** | **Eligibility Criteria** | **Population Characteristics** | **Setting and Dates Assessments**  **Performed** | **N** | **Outcomes (Proportion with Outcome)** |
| Brown, *et al.,* 2014 | Retrospective cohort | Patients age ≥3 years transported from the scene of injury during 2007 to 2008 identified in the NTDB  Exclusion: patients undergoing interfacility transfer. | Age (median): 39 (IQR: 23-57)  Male: 66.1%  Race: NR  ISS (median): 9 (IQR: 4-13)  Survival: 95.7%  Trauma center need: 38.7%  GCS score ≤13: 16.8%  mGCS score ≤5: 14.2%  SBP<90 mm Hg: 5.2%  Respiratory rate <10 or >29: 6.3%  Any step 1 criteria of the NTTP: 23%  Penetrating injury: 11.6%  Flail chest: 0.4%  Open skull fracture: <0.1%  ≥2 long bone fractures: 1.3%  Pelvic fracture: 6.3%  Crush injury: 0.5%  Amputation: 0.2%  Paralysis: 0.4%  Any step 2 criteria of the NTTP: 19.9%  Any step 1 or 2 criteria of the NTTP: 46.5% | USA  Trauma registry  2007 to 2008 | 811,143 | Trauma center need  (38.7%): ISS >15; ICU admission of ≥24 hours; need for urgent surgery (ED disposition to the OR); or death in the ED |

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| **Author, Year** | **Glasgow Coma**  **Scale Used** | **Personnel**  **Performing Assessments and Where Assessed** | **Potential**  **Confounders** | **Results: Univariate** | **Method for Constructing**  **Multivariate Model** |
| Brown, *et al.,* 2014 | tGCS vs. mGCS (from tGCS) | Out-of-hospital, otherwise not described | Adjusted for other triage criteria in the first 2 steps of the NTTP (SBP, respiratory rate, and anatomy of injury) | NR | Forward stepwise logistic regression |

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| **Author, Year** | **Results: Multivariate** | **Measures of Diagnostic Accuracy** |
| Brown, *et al.,* 2014 | **OR (95% CI) tGCS (score ≤13) vs. mGCS (score ≤5)**  All patients, with missing data imputed:  3.03 (2.94 to 3.13, p<0.01) vs. 3.37 (3.27 to 3.48, p<0.01)  Only completed cases (59% of subjects had tGCS vs. 58% had mGCS present): 4.84 (4.40 to 4.57) vs. 4.87 (4.70 to 4.97) | **Need for trauma center, tGCS (score ≤13) vs. mGCS (score ≤5)**  *GCS scores alone*  Sensitivity: 30.3% vs. 26.7%  Specificity: 93.1% vs. 95.1%  Accuracy: 66.3% vs. 66.1%  r2: 0.882 vs. 0.964  *GCS scores incorporated into the NTTP Step 1 and 2 criteria*  Sensitivity: 62.1% vs. 60.4%  Specificity: 65.7% vs. 67.1%  Accuracy: 64.2% vs. 64.2% |

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| **Author, Year** | **Discrimination or Calibration** | **Risk of Bias** |
| Brown, *et al.,* 2014 | **AUROC, tGCS vs. mGCS**  GCS scores alone: 0.617 vs. 0.609, p<0.01  GCS scores incorporated into NTTP Step 1 and 2 criteria: 0.639 vs. 0.637, p=0.10 | Moderate |

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| **Author, Year** | **Study Design** | **Eligibility Criteria** | **Population Characteristics** | **Setting and Dates Assessments**  **Performed** | **N** | **Outcomes (Proportion with Outcome)** |
| Caterino and Raubenolt, 2012 | Retrospective cohort | Patients ≥16 years transported from the scene to a hospital by EMS, entered into the Ohio Trauma Registry, with complete EMS GCS scores | Age (mean, years): 53  Male: 55.9%  White: 79.9%  Black: 13.5%  Hispanic: 1.5%  Other race: 1.7%  Race not documented: 3.4%  Injury type  -Blunt: 90.2%  -Penetrating: 8.2%  -Burn: 1.3%  -Asphyxial: 0.3%  Systolic pressure by EMS (mean): 158 mm Hg  ISS (median): 9  ISS >15: 26.6%  GCS ≤13: 16.0% | USA, Ohio  Urban, hospitals  Trauma and non-trauma centers  2002 to 2007 | 52,412 | Mortality (5.8%)  TBI (15.2%): skull fracture with underlying brain injury, intracranial hemorrhage, cerebral contusion, or nonspecific intracranial injury  Neurosurgical intervention (1.5%)  Any emergency intubation (7.6%)  ED intubation (6.4%) |

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| **Author, Year** | **Glasgow Coma**  **Scale Used** | **Personnel**  **Performing Assessments and Where Assessed** | **Potential**  **Confounders** | **Results: Univariate** | **Method for Constructing**  **Multivariate Model** |
| Caterino and Raubenolt, 2012 | tGCS vs. SMS (from tGCS) | Out-of-hospital, obtained by EMS providers | Only diagnostic accuracy and discrimination reported; no adjustment performed | NR | NR |

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| **Author, Year** | **Results: Multivariate** | **Measures of Diagnostic Accuracy** |
| Caterino and Raubenolt, 2012 | NR | **Test characteristics (95% CI)\* tGCS ≤13 vs. SMS ≤1 vs. SMS 0**  *Mortality*  Sensitivity: 75.03% (73.45 to 76.56) vs. 72.20% (70.57 to 73.79) vs. 66.91% (65.20 to 68.58)  Specificity: 87.63% (87.34 to 87.92) vs. 89.42% (89.14 to 89.69) vs. 93.80% (93.58 to 94.01)  PLR: 6.07 (5.88 to 6.26) vs. 6.82 (6.60 to 7.06) vs. 10.79 (10.34 to 11.26)  NLR: 0.28 (0.27 to 0.30) vs. 0.31 (0.29 to 0.33) vs. 0.35 (0.34 to 0.37)  PPV: 27.20% (26.25 to 28.17) vs. 29.59% (28.55 to 30.64) vs. 39.92% (38.57 to 41.28)  NPV: 98.28% (98.15 to 98.40) vs. 98.12% (97.99 to 98.25) vs. 97.87% (97.74 to 98.00)  *TBI*  Sensitivity: 45.40% (44.30 to 46.50) vs. 40.81% (39.72 to 41.89) vs. 30.12% (29.12 to 31.15)  Specificity: 89.30% (89.01 to 89.59) vs. 90.50% (90.22 to 90.77) vs. 94.10% (93.88 to 94.32)  PLR: 4.24 (4.09 to 4.40) vs. 4.30 (4.13 to 4.47) vs. 5.11 (4.86 to 5.37)  NLR: 0.61 (0.60 to 0.62) vs. 0.65 (0.64 to 0.67) vs. 0.74 (0.73 to 0.75)  PPV: 43.20% (42.13 to 44.27) vs. 43.50% (42.38 to 44.64) vs. 47.79% (46.60 to 49.18)  NPV: 90.12% (89.84 to 90.40) vs. 89.51% (89.22 to 89.79) vs. 88.25% (87.96 to 88.54) |

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| **Author, Year** | **Discrimination or Calibration** | **Risk of Bias** |
| Caterino and Raubenolt, 2012 | **AUROC (95% CI), tGCS vs. SMS**  *Non-parametric analysis*  Mortality: 0.85 (0.84 to 0.86) vs. 0.82 (0.81 to 0.83)  TBI: 0.72 (0.71 to 0.72) vs. 0.66 (0.65 to 0.66)  Neurosurgical intervention: 0.75 (0.73 to 0.77) vs. 0.70 (0.68 to 0.72)  Any emergency intubation: 0.86 (0.85 to 0.87) vs. 0.83 (0.82 to 0.83)  ED intubation: 0.86 (0.86 to 0.87) vs. 0.83 (0.82 to 0.84)  *Parametric analysis*  Mortality: 0.87 (0.86 to 0.88) vs. 0.86 (0.85 to 0.88)  TBI: 0.80 (0.80 to 0.81) vs. 0.78 (0.76 to 0.80)  Neurosurgical intervention: 0.82 (0.81 to 0.84) vs. 0.81 (0.78 to 0.84)  Any emergency intubation: 0.90 (0.90 to 0.91) vs. 0.91 (0.90 to 0.91)  ED intubation: 0.91 (0.90 to 0.91) vs. 0.91 (0.90 to 0.92) | Moderate |

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| **Author, Year** | **Results: Multivariate** | **Measures of Diagnostic Accuracy** |
| Caterino and Raubenolt, 2012  Continued |  | *Neurosurgical intervention*  Sensitivity: 60.05% (56.53 to 63.50) vs. 52.93% (49.37 to 56.46) vs. 42.24% (38.76 to 45.78)  Specificity: 84.70% (84.39 to 85.01) vs. 86.40% (86.10 to 86.69) vs. 90.70% (90.45 to 90.95)  PLR: 3.92 (3.69 to 4.17) vs. 3.89 (3.63 to 4.17) vs. 4.54 (4.17 to 4.95)  NLR: 0.47 (0.43 to 0.51) vs. 0.54 (0.51 to 0.59) vs. 0.64 (0.60 to 0.68)  PPV: 5.64% (5.15 to 6.15) vs. 5.59% (5.08 to 6.14) vs. 6.47% (5.81 to 7.18)  NPV: 99.29% (99.20 to 99.36) vs. 99.18% (99.09 to 99.26) vs. 99.04% (98.95 to 99.13)  *Any emergency intubation*  Sensitivity: 75.50% (74.13 to 76.83) vs. 72.71% (71.30 to 74.09) vs. 63.49% (61.98 to 64.99)  Specificity: 88.90% (88.62 to 89.18) vs. 90.60% (90.34 to 90.86) vs. 94.70% (94.50 to 94.90)  PLR: 6.80 (6.59 to 7.01) vs. 7.74 (7.48 to 8.00) vs. 11.98 (11.46 to 12.52)  NLR: 0.28 (0.26 to 0.29) vs. 0.30 (0.29 to 0.32) vs. 0.39 (0.37 to 0.40)  PPV: 35.87% (34.84 to 36.91) vs. 38.88% (37.77 to 40.00) vs. 49.63% (48.25 to 51.01)  NPV: 97.78% (97.64 to 97.92) vs. 97.58% (97.44 to 97.72) vs. 96.93% (96.77 to 97.08)  *ED intubation*  Sensitivity: 76.89% (75.43 to 78.31) vs. 74.09% (72.57 to 75.57) vs. 64.61% (62.96 to 66.23)  Specificity: 88.20% (87.91 to 88.48) vs. 89.83% (89.56 to 90.09) vs. 94.00% (93.79 to 94.21)  PLR: 6.52 (6.32 to 6.72) vs. 7.28 (7.05 to 7.53) vs. 10.77 (10.32 to 11.24)  NLR: 0.26 (0.25 to 0.28) vs. 0.29 (0.27 to 0.31) vs. 0.38 (0.36 to 0.39)  PPV: 30.82% (29.83 to 31.82) vs. 33.22% (32.15 to 34.30) vs. 42.41% (41.05 to 43.78)  NPV: 98.24% (98.11 to 98.36) vs. 98.07% (97.94 to 98.19) vs. 97.49% (97.35 to 97.63) |

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| **Author, Year** | **Study Design** | **Eligibility Criteria** | **Population Characteristics** | **Setting and Dates Assessments**  **Performed** | **N** | **Outcomes (Proportion with Outcome)** |
| Cicero and Cross, 2013 | Retrospective cohort | Patients in the NTDB data set from 2007- 2009, ages <19 years. Exclusion: interfacility transfers, ED LOS >7 days or greater than the total recorded hospital LOS. | Age (mean, years): 12.6 (SD 5.5)  Male: 67%  Nonwhite race: 38%  ED LOS (mean, minutes): 227 (SD  229)  Hospital LOS (mean, days): 3.8 (SD  6.8)  ISS (mean): 9.9 (SD 10.3) | USA  Trauma registry  2007 to 2009 | 104,035 | Mortality (3.8%)  Death on arrival (NR): having a recorded ED disposition of death regardless of duration of resuscitation efforts  Major injury (15%): having a recorded ISS >15  ED LOS (NA): duration from arrival until disposition or death  Hospital LOS (NA): duration of admission to any hospital inpatient service |
| Corrigan, *et al.,* 2014 | Retrospective cohort | Patients in the NTDB data set with a diagnosis of TBI, ages ≥18 years, were not transferred in from another hospital, did not die in the ED, with no missing data. | NR | USA  Trauma registry  2007 to 2010 | 77,470 | Days in the ICU (NA)  Discharged alive  (NR)  LOS days (NA)  Discharged home, if alive (NR) |

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| **Author, Year** | **Glasgow Coma**  **Scale Used** | **Personnel**  **Performing Assessments and Where Assessed** | **Potential**  **Confounders** | **Results: Univariate** | **Method for Constructing**  **Multivariate Model** |
| Cicero and Cross, 2013 | tGCS vs. mGCS (from tGCS) | Out-of-hospital, otherwise not described | Only discrimination reported; no adjustment performed | NR | NR |
| Corrigan, *et al.,* 2014 | tGCS vs. mGCS (from tGCS) | Out-of-hospital, otherwise not described | Only discrimination reported; no adjustment performed | NR | NR |

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| **Author, Year** | **Results: Multivariate** | **Measures of Diagnostic Accuracy** |
| Cicero and Cross, 2013 | NR | NR |
| Corrigan, *et al.,* 2014 | NR | NR |

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| **Author, Year** | **Discrimination or Calibration** | **Risk of Bias** |
| Cicero and Cross, 2013 | **tGCS vs. mGCS**  *AUROC (95% CI)*  Overall mortality: 0.946 (0.941 to 0.951) vs. 0.940 (0.935 to 0.945)  Death on arrival: 0.958 (0.953 to 0.963) vs. 0.953 (0.948 to 0.959)  Major injury: 0.720 (0.715 to 0.724) vs. 0.681 (0.677 to 0.686)  **Likelihood of surviving at arrival to ED (95% CI)**  tGCS=3: 0.71 (0.70 to 0.72)  tGCS=15: 1 (1.0 to 1.0)  **LOS tGCS=3 vs. tGCS=14 or 15**  ED LOS (hours): 2 vs. 4  Hospital LOS (days): 8 vs. approximately 4 | Moderate |
| Corrigan, *et al.,* 2014 | **tGCS vs. mGCS**  *ICU days*  AIC: 371699 vs. 373272  R2: 0.1318 vs. 0.1140  *Discharged alive*  AIC: 31456 vs. 32351  SC: 31520.430 vs. 32416.138 c-index: 0.886 vs. 0.878  *LOS days*  AIC: 461601 vs. 462758  R2: 0.0956 vs. 0.0820  *Discharged home (if alive)*  AIC: 71373 vs. 72631  SC: 71437.519 vs. 72695.471 c-index: 0.763 vs. 0.750 | Moderate |

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| **Author, Year** | **Study Design** | **Eligibility Criteria** | **Population Characteristics** | **Setting and Dates Assessments**  **Performed** | **N** | **Outcomes (Proportion with Outcome)** |
| Davis, *et al.,* 2006 | Retrospective registry cohort | Adult patients with moderate-to-severe TBI (head/neck AIS ≥3) and available GCS scores.  Exclusion: head/neck AIS was defined by a neck injury. | NR | USA, California (San Diego)  Urban, other data NR Date NR | 12,882 | Mortality (NR)  Neurosurgical intervention (NR): composite endpoint, which included mortality, craniotomy, invasive intracranial pressure monitoring, or ICU admission >48 hours |
| Eken, *et al.,* 2009 | Prospective cohort | Patients >17 years old with an altered level of consciousness, after any trauma to the head, neurological complaints of lateralizing motor, and/or sensory deficits, dysarthria, dysphasia, or facial asymmetry were eligible.  Exclusion: patients who were intubated or administered sedative or paralytic agents before presentation to ED. | Age (median, years): 59 (range: 18-97)  Male: 64%  Race: NR | Turkey  Tertiary care ED of hospital  Level IV trauma center  2006 | 185 | 3-month mortality  (25%)  Hospital mortality  (14%)  3-month morbidity using an MRS (39%) |

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| **Author, Year** | **Glasgow Coma**  **Scale Used** | **Personnel**  **Performing Assessments and Where Assessed** | **Potential**  **Confounders** | **Results: Univariate** | **Method for Constructing**  **Multivariate Model** |
| Davis, *et al.,* 2006 | tGCS vs. mGCS (from tGCS) | In-field and upon admission to ED, otherwise not described | NR | NR | Linear regression model adjusted for field GCS, otherwise not described. |
| Eken, *et al.,* 2009 | tGCS vs. mGCS (from tGCS) | On presentation to ED, otherwise not described | Only discrimination reported; no adjustment performed | NR | NR |

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| **Author, Year** | **Results: Multivariate** | **Measures of Diagnostic Accuracy** |
| Davis, *et al.,* 2006 | NR | NR |
| Eken, *et al.,* 2009 | NR | NR |

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| **Author, Year** | **Discrimination or Calibration** | **Risk of Bias** |
| Davis, *et al.,* 2006 | **Reported AUROC (optimized threshold value)**  *Mortality*  Preadmission tGCS (field or arrival): 0.84 (5.016)  Preadmission mGCS: 0.83 (3.010)  Field tGCS: 0.84 (5.016)  Arrival tGCS: 0.84 (6.024)  *Neurosurgical intervention*  Preadmission tGCS (field or arrival): 0.80 (11.016)  Preadmission mGCS 0.78 (5.010)  Field tGCS: 0.80 (12.024)  Arrival tGCS: 0.83 (12.024) | Moderate |
| Eken, *et al.,* 2009 | **Reported AUROC (95% CI) tGCS vs. mGCS**  3-month mortality: 0.726 (0.656 to 0.789) vs. 0.679 (0.606 to 0.745)  Hospital mortality: 0.735 (0.655 to 0.797) vs. 0.662 (0.589 to 0.730)  Modified Rankin Scale 3-6, all patients: 0.720 (0.650 to 0.784) vs. 0.651 (0.578 to 0.720)  MRS 3-6, patients with trauma: 0.776 (0.657 to 0.869) vs. 0.706 (0.582 to 0.811)  MRS 3-6, patients without trauma: 0.655 (0.562 to 0.740) vs. 0.597 (0.503 to 0.686) | Moderate |

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| **Author, Year** | **Study Design** | **Eligibility Criteria** | **Population Characteristics** | **Setting and Dates Assessments**  **Performed** | **N** | **Outcomes (Proportion with Outcome)** |
| Gill, *et al.,* 2005 | Retrospective cohort | Patients of all ages presenting to level 1 trauma center who met standard trauma alert criteria | Age (median, years): 24 (IQR: 15-38)  Male: 71.5%  Race: NR  Trauma mechanism  -MVC: 60.8%  -Homicide and injury purposely inflicted by other people: 20.7%  -Motor vehicle, nontraffic accidents:  3.8%  -Other accidents: 3.0%  -Suicide and self-inflicted injury: 1.9%  -Other road vehicle accidents: 1.4% | USA, California (Loma Linda)  Urban, University  Level 1 trauma center and children's hospital  1990 to 2002 | 8,432 | ED intubation (26.4%)  Neurosurgical intervention (9.3%)  Clinically significant brain injury (17.1%)  Mortality (11.4%) |
| Gill, *et al.,* 2006 | Retrospective cohort | Patients of all ages presenting to level 1 trauma center who met standard trauma alert criteria | Age (median, years): 24 (IQR: 16-38)  Male: 70%  Race: NR | USA, California (Loma Linda)  Urban, University  Level 1 trauma center and children's hospital  1990 to 2002 | 7,233 | ED intubation (26%)  Neurosurgical intervention (9%)  Clinically significant brain injury (17%)  Mortality (10%) |
| Haukoos, *et* *al.,* 2007 | Retrospective cohort | All adult and pediatric patients who presented to the ED and were included in the trauma registry | Age (median, years): 32 (IQR: 21-45)  Male: 71%  Race: NR  ISS score (median): 9 (IQR: 2-14)  Trauma mechanism  -MVC: 49%  -Homicide and injury purposely inflicted by other people: 21%  -Accidental falls: 17%  -Other accidents: 5%  -Suicide and self-inflicted injury: 2%  -Other road vehicle crashes: 2%  -Motor vehicle nontraffic crash: 1% | USA, Colorado  Urban, Denver Health Medical Center  Level 1 trauma center  1995 to 2004 | 21,170 | Intubation, out-of-hospital or ED (18%)  Brain injury (14%)  Neurosurgical intervention (7%)  Mortality (5%) |

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| **Author, Year** | **Glasgow Coma**  **Scale Used** | **Personnel**  **Performing Assessments and Where Assessed** | **Potential**  **Confounders** | **Results: Univariate** | **Method for Constructing**  **Multivariate Model** |
| Gill, *et al.,* 2005 | tGCS vs. mGCS (from tGCS) vs. SMS (from tGCS) | Administered in ED by ED physicians | Only discrimination reported; no adjustment performed | NR | NR |
| Gill, *et al.,* 2006 | tGCS vs. mGCS (from tGCS) and SMS (from tGCS) | Administered out-of-hospital, otherwise not described | Only discrimination reported; no adjustment performed | NR | NR |
| Haukoos, *et* *al.,* 2007 | tGCS vs. mGCS (from tGCS) vs. SMS (from tGCS) | Administered in ED by ED physicians | Only discrimination reported; no adjustment performed | NR | NR |

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| **Author, Year** | **Results: Multivariate** | **Measures of Diagnostic Accuracy** |
| Gill, *et al.,* 2005 | NR | NR |
| Gill, *et al.,* 2006 | NR | NR |
| Haukoos, *et* *al.,* 2007 | NR | NR |

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| **Author, Year** | **Discrimination or Calibration** | **Risk of Bias** |
| Gill, *et al.,* 2005 | **Reported AUROC for tGCS vs. mGCS vs. SMS (CI's not reported)**  ED intubation: 0.865 vs. 0.826 vs. 0.826  Neurosurgical intervention: 0.874 vs. 0.848 vs. 0.851  Brain injury: 0.826 vs. 0.789 vs. 0.791  Mortality: 0.906 vs. 0.894 vs. 0.878 | Low |
| Gill, *et al.,* 2006 | **Reported AUROC (95% CI) for tGCS vs. mGCS vs. SMS**  ED intubation: 0.83 (0.81 to 0.84) vs. 0.79 (0.78 to 0.80) vs. 0.79 (0.77 to 0.80)  Neurosurgical intervention: 0.86 (0.85 to 0.88) vs. 0.84 (0.82 to 0.85) vs. 0.83 (0.81 to 0.84)  Clinically significant brain injury (TBI): 0.83 (0.82 to 0.84) vs. 0.79 (0.78 to 0.81) vs. 0.79 (0.77 to 0.80)  Hospital mortality: 0.89 (0.88 to 0.90) vs. 0.88 (0.87 to 0.89) vs. 0.86 (0.86 to 0.89) | Low |
| Haukoos, *et* *al.,* 2007 | **Reported AUROC (95% CI) for tGCS vs. mGCS vs. SMS**  Intubation: 0.86 (0.85 to 0.87) vs. 0.81 (0.80 to 0.82) vs. 0.81 (0.80 to 0.82)  Brain injury: 0.76 (0.75 to 0.77) vs. 0.71 (0.70 to 0.72) vs. 0.71 (0.70 to 0.72)  Neurosurgical intervention: 0.83 (0.82 to 0.84) vs. 0.80 (0.79 to 0.81) vs. 0.80 (0.79 to 0.81)  Mortality: 0.92 (0.91 to 0.93) vs. 0.90 (0.89 to 0.91) vs. 0.89 (0.88 to 0.90) | Low |

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| **Author, Year** | **Study Design** | **Eligibility Criteria** | **Population Characteristics** | **Setting and Dates Assessments**  **Performed** | **N** | **Outcomes (Proportion with Outcome)** |
| Healey, *et al.,* 2003 | Retrospective cohort | Patients in the NTDB data set with complete GCS data. | Age: NR  Male: NR Race: NR  GCS score=15: 80% | USA  Trauma registry  1994 to 2001 | 202,255 | Mortality (NR) |
| Holmes, *et al.,* 2005 | Prospective cohort | Pediatric patients <18 years with blunt head trauma presenting to the ED.  Exclusion: children with trivial head trauma defined by falls from ground level or trauma resulting from walking or running into stationary objects if the only abnormal finding was a scalp laceration or abrasion, and children transferred who had undergone CT scanning before transfer. | Ages ≤2 years: 16%  Ages >2 years: 84%  Male: NR  Race: NR | USA, California (Davis)  Level 1 trauma center  1998 to 2001 | 2,043 | TBI, either on cranial CT scan (intracranial hemorrhage, hematoma, contusion, or cerebral edema) or in need of acute intervention (5%) |

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| **Author, Year** | **Glasgow Coma**  **Scale Used** | **Personnel**  **Performing Assessments and Where Assessed** | **Potential**  **Confounders** | **Results: Univariate** | **Method for Constructing**  **Multivariate Model** |
| Healey, *et al.,* 2003 | tGCS vs. mGCS (from tGCS) | Out-of-hospital, otherwise not described | Only diagnostic accuracy and discrimination reported; no adjustment performed | NR | NR |
| Holmes, *et al.,* 2005 | tGCS vs. mGCS (from tGCS) | Presentation to ED, otherwise not described | Only discrimination reported; no adjustment performed | NR | NR |

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| **Author, Year** | **Results: Multivariate** | **Measures of Diagnostic Accuracy** |
| Healey, *et al.,* 2003 | NR | NR |
| Holmes, *et al.,* 2005 | NR | NR |

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| **Author, Year** | **Discrimination or Calibration** | **Risk of Bias** |
| Healey, *et al.,* 2003 | **tGCS vs. mGCS**  AUROC (95% CI): 0.891 (0.888 to 0.894) vs. 0.873 (0.870 to 0.875), p=0.000  Misclassification: 4.9% vs. 5.1% | Low |
| Holmes, *et al.,* 2005 | **Reported AUROC (95% CI) tGCS vs. mGCS**  *TBI on cranial CT scan*  Ages ≤2 years: 0.72 (0.56 to 0.87) vs. 0.60 (0.48 to 0.72)  Ages >2 years: 0.82 (0.76 to 0.87) vs. 0.71 (0.65 to 0.77)  *TBI in need of acute intervention*  Ages ≤2 years: 0.97 (0.94 to 1.0) vs. 0.76 (0.59 to 0.93)  Ages >2 years 0.87 (0.83 to 0.92) vs. 0.76 (0.71 to 0.81) | Moderate |

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| **Author, Year** | **Study Design** | **Eligibility Criteria** | **Population Characteristics** | **Setting and Dates Assessments**  **Performed** | **N** | **Outcomes (Proportion with Outcome)** |
| Kupas *et al.*, 2016 | Retrospective cohort | Adults, age ≥18 years, with complete data available in the Pennsylvania Trauma System Foundation’s registry. | Age (median, years): 50  Male: 62.2%  White: 78.6%  Black: 13.9%  Asian: 0.9%  SBP ≥90 mm Hg: 95.6%  GCS score of 15: 74.8%  *Injury type*  -Blunt: 87.9%  -Penetrating: 8.4%  -Burn: 3.7% | USA, Pennsylvania  Level I, II, III, or IV trauma centers  1999 to 2013 | 370,392 | Mortality (5.7%)  ISS score of >15 (28.7%)  ISS score of >24 (12.4%)  ICU admission (39.8%)  Need for craniotomy (2.0%)  Intubation (7.1%)  Any surgery: intrathoracic, abdominal, vascular, or cranial surgery (8.3%)  Trauma care needed: ISS score of >15, ICU admission ≥24 hours, need for surgery, or death before discharge (40.7%) |

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| **Author, Year** | **Glasgow Coma**  **Scale Used** | **Personnel**  **Performing Assessments and Where Assessed** | **Potential**  **Confounders** | **Results: Univariate** | **Method for Constructing**  **Multivariate Model** |
| Kupas *et al.*, 2016 | tGCS vs. mGCS (from tGCS) | Out-of-hospital, otherwise not described | Only diagnostic accuracy and discrimination reported; no adjustment performed | NR | NR |

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| **Author, Year** | **Results: Multivariate** | **Measures of Diagnostic Accuracy** |
| Kupas *et al.*, 2016 | NR | **Test characteristics (95% CI) tGCS (score ≤13) vs. mGCS (score ≤5)**  *Mortality*  Sensitivity: 69.8% (69.2 to 70.4) vs. 67.3% (66.7 to 67.9)  Specificity: 88.1% (88.0 to 88.2) vs. 90.1% (90.0 to 90.2)  PLR: 12.88 (12.52 to 13.25) vs. 13.551 (13.183 to 13.920)  NLR: 0.76 (0.75 to 0.76) vs. 0.726 (0.722 to 0.730)  *ISS score >15*  Sensitivity: 31.3% (31.0 to 31.6) vs. 28.0% (27.7 to 28.3)  Specificity: 91.3% (91.2 to 91.4) vs. 92.8% (92.7 to 92.9)  PLR: 2.54 (2.52 to 2.56) vs. 2.56 (2.54 to 2.59)  NLR: 0.53 (0.53 to 0.54) vs. 0.51 (0.51 to 0.52)  *ICU admission*  Sensitivity: 27.3% (27.1 to 27.5) vs. 23.9% (23.7 to 24.1)  Specificity: 91.6% (91.4 to 91.8) vs. 92.7% (92.6 to 92.9)  PLR: 1.52 (1.52 to 1.53) vs. 1.51 (1.50 to 1.51)  NLR: 0.37 (0.37 to 0.38) vs. 0.37 (0.37 to 0.38)  *Intubation*  Sensitivity: 83.7% (83.3 to 84.2) vs. 81.3% (80.9 to 81.8)  Specificity: 90.0% (89.9 to 90.1) vs. 92.0% (91.9 to 92.1)  PLR: 28.62 (27.72 to 29.53) vs. 28.70 (27.85 to 29.55)  NLR: 0.62 (0.62 to 0.62) vs. 0.57 (0.57 to 0.58)  *Trauma center need*  Sensitivity: 28.2% (27.9 to 28.4) vs. 25.1% (24.9 to 25.3)  Specificity: 93.7% (93.6 to 93.8) vs. 95.0% (94.9 to 95.1)  PLR: 2.19 (2.17 to 2.20) vs. 2.21 (2.19 to 2.22)  NLR: 0.38 (0.37 to 0.38) vs. 0.35 (0.34 to 0.35)  *Surgery*  Sensitivity: 33.5% (33.0 to 34.0) vs. 30.5% (30.0 to 31.0)  Specificity: 86.5% (86.4 to 86.6) vs. 88.4% (88.3 to 88.5)  PLR: 2.81 (2.75 to 2.87) vs. 2.89 (2.83 to 2.96)  NLR: 0.87 (0.87 to 0.88) vs. 0.86 (0.86 to 0.87)  *Craniotomy*  Sensitivity: 51.4% (50.2 to 52.5) vs. 46.5% (45.4 to 47.7)  Specificity: 85.9% (85.8 to 86.0) vs. 87.8% (87.7 to 87.9)  PLR: 6.03 (5.76 to 6.30) vs. 5.88 (5.61 to 6.12)  NLR: 0.94 (0.94 to 0.94) vs. 0.94 (0.94 to 0.94) |

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| **Author, Year** | **Discrimination or Calibration** | **Risk of Bias** |
| Kupas *et al.*, 2016 | **Reported AUROC (95% CI) tGCS (score ≤13) vs. mGCS (score ≤5)**  ISS score of >15: 0.648 (0.646 to 0.650) vs. 0.606 (0.605 to 0.608), difference=0.042 (0.041 to 0.043)  ISS score of >24: 0.719 (0.716 to 0.721) vs. 0.680 (0.677 to 0.682), difference=0.039 (0.038 to 0.041)  Mortality: 0.831 (0.828 to 0.834) vs. 0.803 (0.800 to 0.806), difference=0.028 (0.026 to 0.030)  ICU admission: 0.625 (0.623 to 0.626) vs. 0.583 (0.581 to 0.584), difference=0.042 (0.041 to 0.043)  Intubation: 0.904 (0.902 to 0.907) vs. 0.884 (0.882 to 0.887), difference=0.020 (0.019 to 0.021)  Trauma center need: 0.641 (0.639 to 0.642) vs. 0.603 (0.602 to 0.604), difference=0.038 (0.037 to 0.039)  Surgery: 0.612 (0.608 to 0.615) vs. 0.597 (0.595 to 0.600), difference=0.014 (0.013 to 0.16)  Craniotomy: 0.724 (0.718 to 0.730) vs. 0.676 (0.670 to 0.682), difference=0.048 (0.044 to 0.052) | Moderate |

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| **Author, Year** | **Study Design** | **Eligibility Criteria** | **Population Characteristics** | **Setting and Dates Assessments**  **Performed** | **N** | **Outcomes (Proportion with Outcome)** |
| Ross, *et al.,* 1998 | Retrospective cohort | All patients ≥13 years transported directly to the trauma center.  Exclusion: patients seen initially at another hospital and transferred to the trauma center. | Age (mean, years): 37.1 (range: 13-95)  Male: 69%  Race: NR  Airway intubation in the field: 3.5%  Blunt mechanism of injury: 85%  ISS (mean): 14.4  ISS (median): 13  No head injury: 43.8%  AIS≤2 (concussion): 25%  AIS=3: 16.3% | USA, New Jersey  Level 1 trauma center  1994 to 1996 | 1,410 | Severe head injury (14.8%): AIS ≥4 or AIS=5  Mortality (6%) |

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| **Author, Year** | **Glasgow Coma**  **Scale Used** | **Personnel**  **Performing Assessments and Where Assessed** | **Potential**  **Confounders** | **Results: Univariate** | **Method for Constructing**  **Multivariate Model** |
| Ross, *et al.,* 1998 | tGCS vs. mGCS (from tGCS) | Out-of-hospital, otherwise not described | Effect of shock on neurologic status (patients, n=3, with SBP<90 mm Hg) | NR | NR |

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| **Author, Year** | **Results: Multivariate** | **Measures of Diagnostic Accuracy** |
| Ross, *et al.,* 1998 | NR | **Test characteristics (95% CI)\* tGCS (score ≤13) vs. mGCS (score ≤5)**  *AIS score =5*  Sensitivity: 93.33% (83.80 to 98.15) vs. 90.16% (79.81 to 96.30)  Specificity: 84.51% (82.46 to 86.40) vs. 85.40% (83.40 to 87.24)  PLR: 6.02 (5.23 to 6.94) vs. 6.17 (5.30 to 7.20)  NLR: 0.08 (0.03 to 0.20) vs. 0.12 (0.05 to 0.25)  PPV: 21.13% (16.38 to 26.55) vs. 21.83% (16.89 to 27.44)  NPV: 99.65% (99.11 to 99.90) vs. 99.48% (98.88 to 99.81)  *AIS score ≥4*  Sensitivity: 61.72% (54.76 to 68.34) vs. 60.77% (53.79 to 67.43)  Specificity: 85.47% (83.05 to 87.67) vs. 89.59% (87.73 to 91.26)  PLR: 4.25 (3.52 to 5.13) vs. 5.84 (4.79 to 7.12)  NLR: 0.45 (0.38 to 0.53) vs. 0.44 (0.37 to 0.52)  PPV: 48.68% (42.52 to 54.87) vs. 50.40% (44.05 to 56.73)  NPV: 90.91% (88.81 to 92.73) vs. 92.92% (91.29 to 94.33)  *Mortality*  Sensitivity: 71.28% (61.02 to 80.14) vs. 72.34% (62.15 to 81.07)  Specificity: 84.95% (82.91 to 86.84%) vs. 86.02% (84.03 to 87.85)  PLR: 4.74 (3.95 to 5.68) vs. 5.17 (4.31 to 6.21)  NLR: 0.34 (0.25 to 0.47) vs. 0.32 (0.23 to 0.45)  PPV: 25.28% (20.16 to 30.96) vs. 26.98% (21.61 to 32.91)  NPV: 97.64% (96.59 to 98.44) vs. 97.75% (96.73 to 98.53)  *Craniotomy*  Sensitivity: 63.16% (38.36 to 83.71) vs. 68.42% (43.45 to 87.42)  Specificity: 81.81% (79.68 to 83.81) vs. 82.82% (80.73 to 84.77)  PLR: 3.47 (2.42 to 4.98) vs. 3.98 (2.87 to 5.52)  NLR: 0.45 (0.25 to 0.81) vs. 0.38 (0.20 to 0.74)  PPV: 4.53% (2.36 to 7.78) vs. 5.16% (2.78 to 8.66)  NPV: 99.39% (98.74 to 99.75) vs. 99.48% (98.88 to 99.81) |

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| **Author, Year** | **Discrimination or Calibration** | **Risk of Bias** |
| Ross, *et al.,* 1998 | NR | Moderate |

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| **Author, Year** | **Study Design** | **Eligibility Criteria** | **Population Characteristics** | **Setting and Dates Assessments**  **Performed** | **N** | **Outcomes (Proportion with Outcome)** |
| Thompson, *et* *al.,* 2011 | Retrospective cohort | All adult and pediatric patients who presented to the ED and were included in the trauma registry | Age (median, years): 33 (IQR: 22-48)  Male: 71%  Race: NR  ISS (median): 9 (IQR: 4-17)  Out-of-hospital GCS score (median): 15 (IQR: 14-15) Mechanism of injury  -Blunt: 81%  -Penetrating, stab: 7%  -Penetrating, gunshot: 6%  -Other: 6% | USA, Colorado  Urban, Denver Health Medical Center  Level 1 trauma center  1999 to 2008 | 19,408 | Emergency tracheal intubation (18%)  Clinically meaningful brain injury (18%)  Need for neurosurgical intervention (8%)  Mortality (6%) |

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| **Author, Year** | **Glasgow Coma**  **Scale Used** | **Personnel**  **Performing Assessments and Where Assessed** | **Potential**  **Confounders** | **Results: Univariate** | **Method for Constructing**  **Multivariate Model** |
| Thompson, *et* *al.,* 2011 | tGCS vs. mGCS (from tGCS) vs. SMS (from tGCS) | Out-of-hospital, otherwise not described | Only diagnostic accuracy and discrimination reported; no adjustment performed | NR | NR |

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| **Author, Year** | **Results: Multivariate** | **Measures of Diagnostic Accuracy** |
| Thompson, *et* *al.,* 2011 | NR | **Test characteristics (95% CI) SMS=0 vs. SMS≤1**  *Primary analysis, with missing GCS data multiply imputed*  Emergency tracheal intubation  Sensitivity: 0.61 (0.56 to 0.66) vs. 0.67 (0.62 to 0.72)  Specificity: 0.65 (0.58 to 0.73) vs. 0.62 (0.56 to 0.68)  PLR: 1.75 (1.47 to 2.09) vs. 1.79 (1.58 to 2.03)  NLR: 0.60 (0.55 to 0.66) vs. 0.52 (0.47 to 0.58)  Brain injury  Sensitivity: 0.55 (0.51 to 0.59) vs. 0.62 (0.59 to 0.65)  Specificity: 0.64 (0.56 to 0.71) vs. 0.61 (0.54 to 0.67)  PLR: 1.53 (1.30 to 1.81) vs. 1.59 (1.38 to 1.83)  NLR: 0.70 (0.66 to 0.75) vs. 0.63 (0.58 to 0.67)  Neurosurgical intervention  Sensitivity: 0.66 (0.62 to 0.70) vs. 0.74 (0.70 to 0.77)  Specificity: 0.63 (0.55 to 0.70) vs. 0.59 (0.53 to 0.65)  PLR: 1.78 (1.52 to 2.08) vs. 1.82 (1.60 to 2.07)  NLR: 0.54 (0.50 to 0.59) vs. 0.44 (0.40 to 0.49)  Mortality  Sensitivity: 0.83 (0.75 to 0.91) vs. 0.86 (0.78 to 0.94)  Specificity: 0.63 (0.56 to 0.70) vs. 0.59 (0.54 to 0.65)  PLR: 2.25 (1.89 to 2.68) vs. 2.13 (1.92 to 2.37)  NLR: 0.27 (0.19 to 0.37) vs. 0.23 (0.15 to 0.34)  Composite outcome (any one of the outcomes)  Sensitivity: 0.53 (0.49 to 0.57) vs. 0.59 (0.55 to 0.63)  Specificity: 0.66 (0.58 to 0.74) vs. 0.64 (0.57 to 0.70)  PLR: 1.57 (1.30 to 1.89) vs. 1.63 (1.41 to 1.88)  NLR: 0.71 (0.67 to 0.76) vs. 0.64 (0.60 to 0.69)  *Sensitivity analysis, with missing GCS data excluded*  Emergency tracheal intubation  Sensitivity: 0.63 (0.62 to 0.65) vs. 0.69 (0.67 to 0.70)  Specificity: 0.61 (0.60 to 0.62) vs. 0.60 (0.59 to 0.61)  PLR: 1.62 (1.57 to 1.68) vs. 1.71 (1.66 to 1.76)  NLR: 0.60 (0.58 to 0.63) vs. 0.52 (0.50 to 0.55) |

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| **Author, Year** | **Discrimination or Calibration** | **Risk of Bias** |
| Thompson, *et* *al.,* 2011 | **Reported AUROC (95% CI) tGCS vs. mGCS vs. SMS**  *Primary analysis, with missing GCS data multiply imputed*  Emergency tracheal intubation: 0.70 (0.63 to 0.77) vs. 0.65 (0.60 to 0.70) vs. 0.65 (0.62 to 0.67)  Brain injury: 0.66 (0.60 to 0.71) vs. 0.61 (0.57 to 0.65) vs. 0.61 (0.58 to 0.64)  Neurosurgical intervention: 0.70 (0.64 to 0.77) vs. 0.66 (0.61 to 0.71) vs. 0.66 (0.64 to 0.69)  Mortality: 0.82 (0.74 to 0.90) vs. 0.76 (0.70 to 0.83) vs. 0.74 (0.70 to 0.77)  Composite (any one of the outcomes): 0.66 (0.60 to 0.72) vs. 0.61 (0.57 to 0.66) vs. 0.61 (0.58 to 0.64)  *Sensitivity analysis, with missing GCS data excluded*  Emergency tracheal intubation: 0.80 (0.79 to 0.81) vs. 0.77 (0.76 to 0.78) vs. 0.77 (0.76 to 0.78)  Brain injury: 0.75 (0.74 to 0.76) vs. 0.70 (0.69 to 0.71) vs. 0.70 (0.69 to 0.71)  Neurosurgical intervention: 0.79 (0.78 to 0.81) vs. 0.77 (0.75 to 0.78) vs. 0.77 (0.76 to 0.78)  Mortality: 0.90 (0.89 to 0.91) vs. 0.88 (0.87 to 0.89) vs. 0.87 (0.86 to 0.88)  Composite (any one of the outcomes): 0.77 (0.76 to 0.78) vs. 0.72 (0.72 to 0.73) vs. 0.72 (0.71 to 0.73) | Moderate |

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| **Author, Year** | **Results: Multivariate** | **Measures of Diagnostic Accuracy** |
| Thompson, *et al.* 2011  Continued |  | Brain injury  Sensitivity: 0.57 (0.56 to 0.59) vs. 0.63 (0.61 to 0.65)  Specificity: 0.60 (0.59 to 0.60) vs. 0.58 (0.58 to 0.59)  PLR: 1.42 (1.37 to 1.47) vs. 1.51 (1.46 to 1.55)  NLR: 0.72 (0.69 to 0.75) vs. 0.64 (0.61 to 0.67)  Neurosurgical intervention  Sensitivity: 0.68 (0.66 to 0.70) vs. 0.75 (0.73 to 0.77)  Specificity: 0.59 (0.58 to 0.60) vs. 0.57 (0.56 to 0.58)  PLR: 1.65 (1.59 to 1.72) vs. 1.74 (1.68 to 1.80)  NLR: 0.54 (0.50 to 0.59) vs. 0.44 (0.40 to 0.48)  Mortality  Sensitivity: 0.85 (0.83 to 0.87) vs. 0.88 (0.86 to 0.90)  Specificity: 0.59 (0.59 to 0.60) vs. 0.57 (0.56 to 0.58)  PLR: 2.08 (2.02 to 2.14) vs. 2.04 (1.99 to 2.10)  NLR: 0.26 (0.23 to 0.30) vs. 0.22 (0.18 to 0.25)  Composite outcome (any one of the outcomes)  Sensitivity: 0.55 (0.54 to 0.57) vs. 0.61 (0.59 to 0.62)  Specificity: 0.62 (0.61 to 0.63) vs. 0.61 (0.60 to 0.62)  PLR: 1.44 (1.39 to 1.48) vs. 1.54 (1.50 to 1.59)  NLR: 0.73 (0.70 to 0.75) vs. 0.65 (0.63 to 0.67) |

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| **Author, Year** | **Study Design** | **Eligibility Criteria** | **Population Characteristics** | **Setting and Dates Assessments**  **Performed** | **N** | **Outcomes (Proportion with Outcome)** |
| Van de Voorde, *et al.,* 2008 | Prospective cohort | TBI patients (defined as LOS in hospital >48 hours or death, and any brain AIS'90 score) ages 0-18 years admitted in 2005 to 1 of 18 participating hospitals.  Excluded if had a high AIS'90 score in any other body region that was thought to contribute significantly to outcome, if they were ictal or postictal on first GCS assessment of if data collection was insufficient. | Age (mean, years): 8.2 (SD 5.3)  Male: 59%  tGCS (median) 14.5  mGCS (median): 6  tGCS score=15: 50%  mGCS score=6: 60%  ISS (median): 16 | Belgium  Pediatric trauma registry (PENTA)  2005 | 96 | Mortality (10%) |

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| **Author, Year** | **Glasgow Coma**  **Scale Used** | **Personnel**  **Performing Assessments and Where Assessed** | **Potential**  **Confounders** | **Results: Univariate** | **Method for Constructing**  **Multivariate Model** |
| Van de Voorde, *et al.,* 2008 | tGCS vs. mGCS (from tGCS) | Best GCS on scene, or upon ED admission if no pre- hospital intervention | Only diagnostic accuracy and discrimination reported; no adjustment performed | NR | NR |

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| **Author, Year** | **Results: Multivariate** | **Measures of Diagnostic Accuracy** |
| Van de Voorde, *et al.,* 2008 | NR | **Test characteristics (95% CI)\* of mortality, sensitivity and specificity**  tGCS score <15: 100% (69.15 to 100) vs. 56.10% (44.70 to 67.04)  tGCS score <14: 100% (69.15 to 100) vs. 70.73% (59.65 to 80.26)  tGCS score <13: 100% (69.15 to 100) vs. 74.39% (63.56 to 83.40)  mGCS score <6: 100% (69.15 to 100) vs. 74.36% (63.21 to 83.58)  mGCS score <5: 100% (69.15 to 100.0) vs. 85.90% (76.17 to 92.74) |

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| **Author, Year** | **Discrimination or Calibration** | **Risk of Bias** |
| Van de Voorde, *et al.,* 2008 | NR | Moderate |

**Please see Appendix C. Included Studies for full study references.**

AIC= Akaike information criterion; AIS= Abbreviated Injury Scale; AUROC= area under the receiver operating characteristic curve; BP= blood pressure; CI= confidence interval; CT= computed tomography; ED= emergency department; EMS= emergency medical services; GCS= Glasgow Coma Scale; ICP= intracranial pressure; ICU= intensive care unit; IQR= interquartile range; ISS= injury severity score; LOS= length of stay; mGCS= motor scale of GCS; MRS= Modified Rankin Scale; MVC= motor vehicle crash; N= number; NA= not available; NAT= nonaccidental trauma; NLR= negative likelihood ratio; NPV= negative predictive value; NR= not reported; NTDB= National Trauma Data Bank; NTTP= National Trauma Triage Protocol; OR= odds ratio; PENTA= pediatric trauma registry; PLR= positive likelihood ratio; PPV= positive predictive value; RR= relative risk; SBP= systolic blood pressure; SC= Schwartz criterion; SD= standard deviation; SMS= 3-point simplified motor score; TBI= traumatic brain injury; tGCS= total GCS; vs.= versus

\*Calculated