# Glasgow Coma Scale/Score (GCS)

## INPUTS

|  |  |
| --- | --- |
| Best eye response  *If local injury, edema, or otherwise unable to be assessed, mark "Not testable (NT)"* | **Options:**   * Spontaneously (+4) * To verbal command (+3) * To pain (+2) * No eye opening (+1) * Not testable (NT) |
| Best verbal response  *If intubated or otherwise unable to be assessed, mark "Not testable (NT)"* | **Options:**   * Oriented (+5) * Confused (+4) * Inappropriate words (+3) * Incomprehensible sounds (+2) * No verbal response (+1) * Not testable/intubated (NT) |
| Best motor response  *If on sedation/paralysis or unable to be assessed, mark "Not testable (NT)"* | **Options:**   * Obeys commands (+6) * Localizes pain (+5) * Withdrawal from pain (+4) * Flexion to pain (+3) * Extension to pain (+2) * No motor response (+1) * Not testable (NT) |

## FORMULA

The Glasgow Coma **Score**is calculated by addition of the total points selected under each component (eye, verbal, motor) below, e.g. "15 points".

The Glasgow Coma **Scale** is comprised of the individual components, e.g. "E(4) V(5) M (6)".

## FACTS & FIGURES

|  |  |  |
| --- | --- | --- |
| Component | Response | Points |
| Eye | Eyes open spontaneously | +4 |
| Eye opening to verbal command | +3 |
| Eye opening to pain | +2 |
| No eye opening | +1 |
| Not testable\* | NT |
| Verbal | Oriented | +5 |
| Confused | +4 |
| Inappropriate words | +3 |
| Incomprehensible sounds | +2 |
| No verbal response | +1 |
| Not testable/intubated\* | NT |
| Motor | Obeys commands | +6 |
| Localizes pain | +5 |
| Withdrawal from pain | +4 |
| Flexion to pain | +3 |
| Extension to pain | +2 |
| No motor response | +1 |
| Not testable\* | NT |

\*Individual components may be not testable due to any of the following (note this is not a comprehensive list):

* **Eye:** local injury and/or edema.
* **Verbal:** intubation.
* **All (eye, verbal, motor):** sedation, paralysis, and ventilation eliminating all responses.

## EVIDENCE APPRAISAL

* The Modified Glasgow Coma Scale (the 15-point scale that has been widely adopted, including by the original unit in Glasgow, as opposed to the 14 point original GCS Scale) was developed to be used in a repeated manner in the inpatient setting to assess and communicate changes in mental status and to measure the duration of coma ([Teasdale 1974)](https://www.ncbi.nlm.nih.gov/pubmed/4136544).
* The evidence in 53 published reports on the reproducibility of the scale was synthesised in a systematic review by [Reith et al](https://www.ncbi.nlm.nih.gov/pubmed/26564211). 85% of the findings in higher quality studies showed substantial reliability as judged by the standard criterion of a kappa statistic (k) above 0.6. Reproducibility of the total GCS Score was also high, with kappa greater than 0.6 in 77% of observations. Education and training on usage of the scale resulted in A clear beneficial effect on reliability ([Reith 2016](https://www.ncbi.nlm.nih.gov/pubmed/26564211)).
* In its most common usage, the three sections of the scale are often summed to provide a summary of severity. The authors themselves have explicitly objected to the score being used in this way, and analysis has shown that patients with the same total score can have huge variations in outcomes, specifically mortality (GCS score of 4 predicts a mortality rate of 48% if calculated 1+1+2 for eye, verbal, and motor, a mortality of 27% if calculated 1+2+1, but a mortality of only 19% if calculated 2+1+1 ([Healey 2014](https://www.ncbi.nlm.nih.gov/pubmed/12707528)).

In summary, the Modified Glasgow Coma Scale provides a nearly universally accepted method of assessing patients with acute brain damage. Summation of its components into a single overall score loses information and provides only a rough guide to severity. In some circumstances, such as early triage of severe injuries, assessment of only a contracted version of the motor component of the scale, as in the Simplified Motor Scale (SMS) can perform as well the GCS and is significantly less complicated. However, the SMS may be less informative in patients with lesser injuries.