

AVPU vs. GCS

Which is better for EMS?

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Estimated Average Annual Number of TBI in the United States, 2002–2006



Traumatic Brain Injury

- Increased risk of Alzheimer's disease
- Males > females
- Mortality rate from blunt trauma with severe TBI is 30x than without





RESERVED –
QUARTER CENTURY
CLUB



What works well?



KISS

Keep. It. Simple. Stupid.



Guidelines for Prehospital Management of TBI

- Glasgow Coma Score

I. RECOMMENDATIONS

Strength of Recommendations: Weak.

Quality of Evidence: Low, primarily from Class III studies and indirect evidence.

and stabilized.

Brain Trauma Foundation Writing Team. 2007. Prehospital
Emergency Care 12(1) S1-S53



Glasgow Coma Scale

Pro

- Research tool
- High validity, good sensitivity to changes in LOC for adults

Con

- Poorly discriminatory
- Poorly predictive
- Low interrater reliability



Problems with GCS

- Neurosurgery inpatient scale
- 2 points lower
- Harder to learn
- Consistency

Bazarian, Jeffrey J. , Eirich, Melissa A. and Salhanick, Steven D.(2003) 'The relationship between prehospital and emergency department Glasgow coma scale scores', Brain Injury, 17: 7, 553 — 560



GCS vs. AVPU

- **Mild TBI:**
 - GCS 13-15
- **Moderate TBI:**
 - GCS 9-12
- **Severe TBI:**
 - GCS 3-8
- **Best eye response: (E)**
 - 1) None
 - 2) Eyes closed
 - 3) Voice
 - 4) Opens eyes
 - 5) Oriented
- **Best verbal response: (V)**
 - 1) None
 - 2) Sounds only
 - 3) Inappropriate words
 - 4) Disoriented
 - 5) Oriented
- **Best motor responses: (M)**
 - 1) None
 - 2) Extension (decerebrate)
 - 3) Abnormal flexion (decorticate)
 - 4) Withdraws
 - 5) Localizes
 - 6) Obeys
- **Alert**
 - E4, V4+, M5+ = GCS 13
- **Verbal**
 - E3, V4+, M5+ = GCS 12
- **Pain**
 - E2, V2+, M2 to 4 = GCS 6 to 8
- **Unresponsive**
 - E1, V1, M1 = GCS 3



Severe brain injury: 3-8



| 1 | 2 | 3 | 4 |
|------------|---------|----------|-------------|
| No opening | To pain | To voice | Spontaneous |



| 1 | 2 | 3 | 4 | 5 |
|------|------------------|---------------|----------|--------|
| None | Incomprehensible | Inappropriate | Confused | Normal |



| 1 | 2 | 3 | 4 | 5 | 6 |
|------|--------|------|----------|----------|------|
| None | Extend | Flex | Withdraw | Localize | Obey |

- **Pain**
 - E2, V2+, M2 to 4 = GCS 6 to 8
- **Unresponsive**
 - E1, V1, M1 = GCS 3



Moderate brain injury: 9-12



| 1 | 2 | 3 | 4 |
|------------|---------|----------|-------------|
| No opening | To pain | To voice | Spontaneous |



| 1 | 2 | 3 | 4 | 5 |
|------|------------------|---------------|----------|--------|
| None | Incomprehensible | Inappropriate | Confused | Normal |



| 1 | 2 | 3 | 4 | 5 | 6 |
|------|--------|------|----------|----------|------|
| None | Extend | Flex | Withdraw | Localize | Obey |

- **Verbal**
 - E3, V4+, M5+ = GCS 12
- (Tactile)
 - E2+, V4+, M5 = GCS 11



Minor brain injury: 13-15



| 1 | 2 | 3 | 4 |
|------------|---------|----------|-------------|
| No opening | To pain | To voice | Spontaneous |



| 1 | 2 | 3 | 4 | 5 |
|------|------------------|---------------|----------|--------|
| None | Incomprehensible | Inappropriate | Confused | Normal |

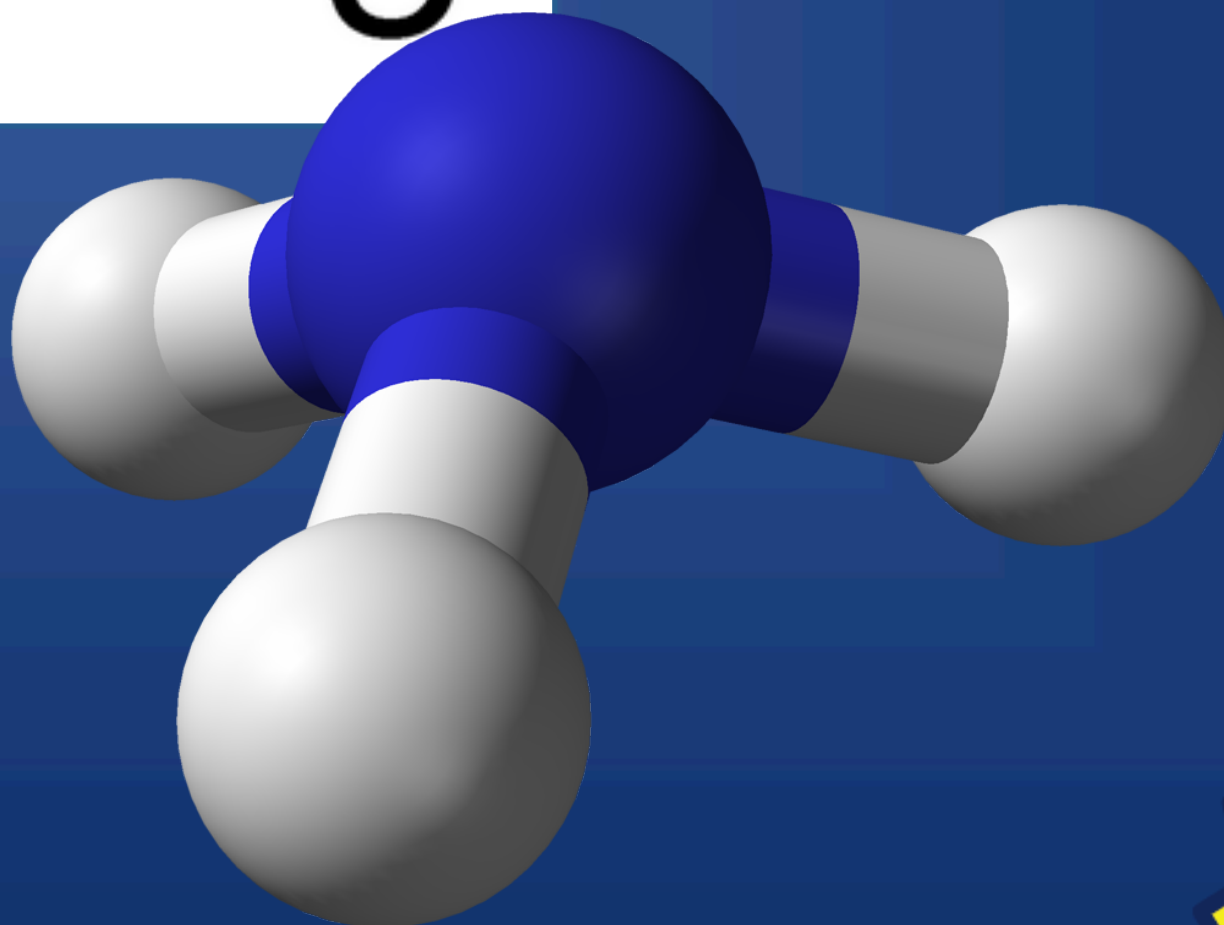


| 1 | 2 | 3 | 4 | 5 | 6 |
|------|--------|------|----------|----------|------|
| None | Extend | Flex | Withdraw | Localize | Obey |

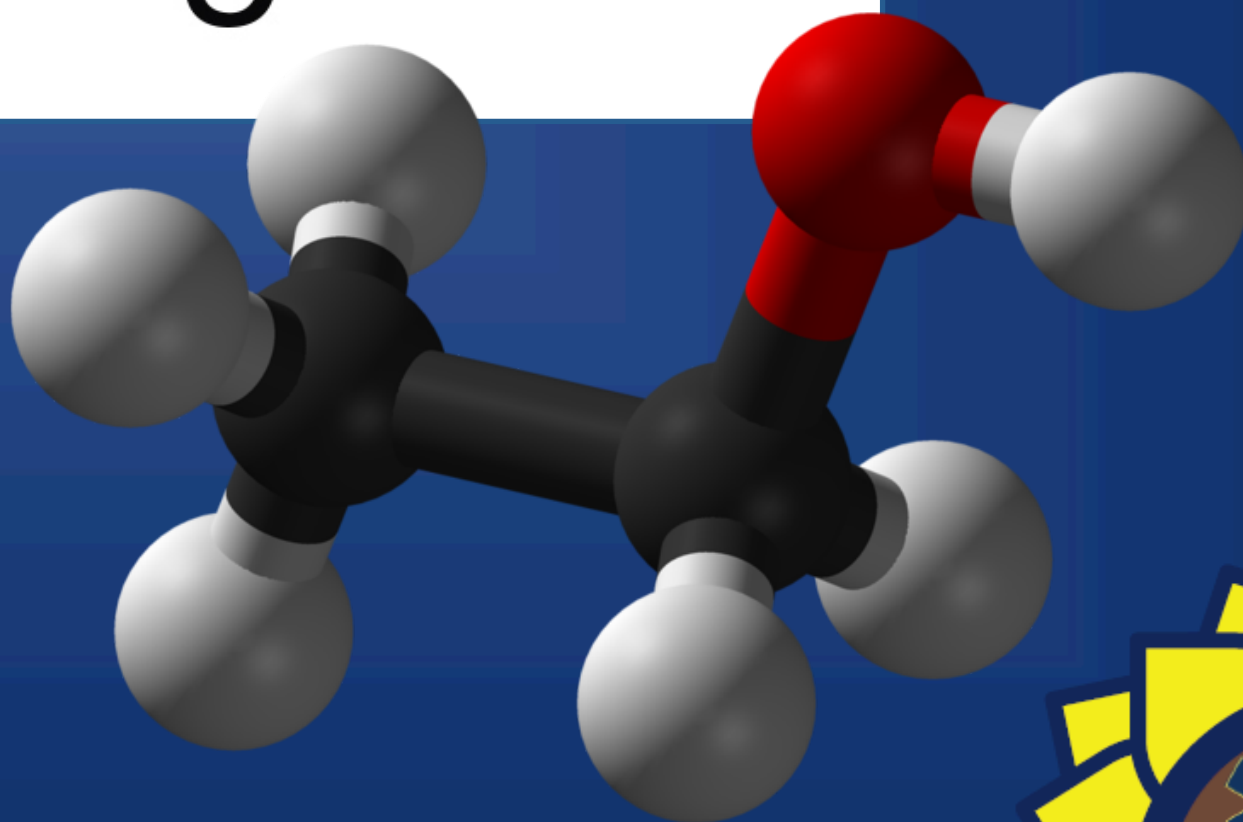
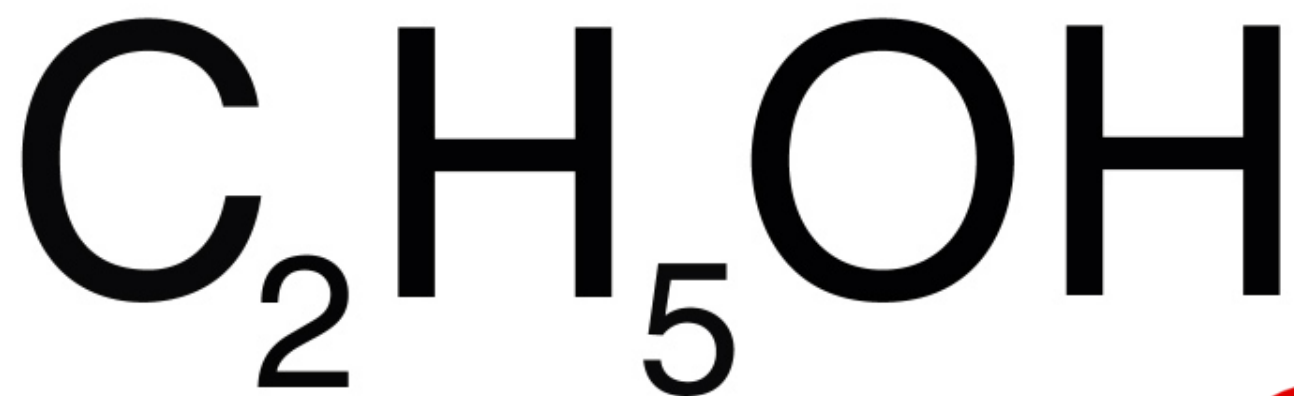
- **Alert**
 - E4, V4+, M5+ = GCS 13
- **Verbal**
 - E3, V4+, M5+ = GCS 12



NH_3









GCS vs. AVPU



| 1 | 2 | 3 | 4 |
|------------|---------|----------|-------------|
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| 1 | 2 | 3 | 4 | 5 | 6 |
|------|--------|------|----------|----------|------|
| None | Extend | Flex | Withdraw | Localize | Obey |

AVPU

| U | P | V | A |
|--------------|------|--------|-------|
| Unresponsive | Pain | Verbal | Alert |



When to measure?

- Initially
- Following resuscitation
- At specific time intervals



What matters?

- Early, aggressive management
- Avoid hypotension
- Avoid hypoxia



Summary

- EMS should use AVPU



References

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