

# Statewide Trends in ICP Monitor Use in 36,929 Patients with Severe TBI in Pennsylvania in the past 17 years

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## Introduction

While intracranial pressure monitoring has been historically used in patients with severe traumatic brain injury (GCS 8 or lower), recent data has questioned its efficacy in decreasing mortality in this patient population. Several studies have suggested that ICP monitoring is not superior to care based on imaging and clinical examination and leads to prolonged mechanical ventilation and ICU care.

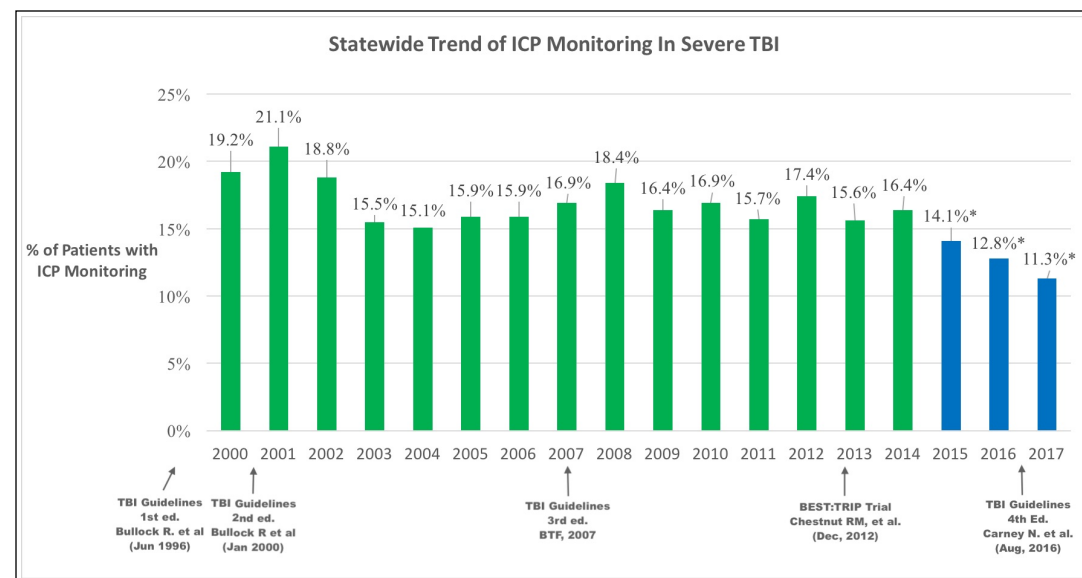
## Methods

We conducted a retrospective analysis of 36,929 patients with severe traumatic brain injury (TBI) collected by the Pennsylvania Trauma Systems Foundation. The statewide registry includes all patients greater than 18 years old with a diagnosis of TBI and Glasgow Coma Scale (GCS) of 8 or lower that were admitted from January 2000 to December 2017. Patients who were dead on arrival were excluded from the analysis.

Patient Characteristics	All patients n=36,929	ICP-guided Treatment n=6,024 (16.3%)	Clinical-based Treatment n=30,891 (83.7%)	p-value
Age	43.0±21.3	41.2±18.7	46.9±21.6	<0.001
Gender	73.6% males	76.3% males	73.1% males	<0.001
GCS score				
Mean	3.93±1.65	3.90±1.58	3.93±1.66	0.163
3	26,797 (72.6%)	4,315 (71.6%)	22,482 (72.8%)	
4	1,106 (3.0%)	238 (4.0%)	868 (2.8%)	
5	1,182 (3.2%)	246 (4.1%)	936 (3.0%)	
6	2,788 (7.6%)	461 (7.7%)	2,327 (7.5%)	
7	2,790 (7.6%)	501 (8.3%)	2,289 (7.4%)	
8	2,252 (6.1%)	263 (4.4%)	1,989 (6.4%)	
ISS	23.1±14.6	31.6±11.3	21.4±14.7	<0.001

## Results

Of the 36,929 patients in this study, 73.6% of them were males and the median age was 43.0±21.3 years old. A GCS of 3 was recorded in 72.6% of patients and 21.2% of patients had a GCS 6 or higher. An ICP monitor was placed in 17.8% of patients (n=1,704) in 2000-2004, 16.7% (n=1,815) in 2005-2009, 16.4% (n=1,787) in 2010-2014, and declined to 12.8% (n=719) from 2015-2017 (p<0.001). The most statistically significant decrease in ICP monitor use was noted from 2014 (16.4%) to 2015 (14.1%, p=0.042). The percent decrease in ICP monitoring from 2000-14 to 2015-17 was equivalent for patients with GCS scores of 3-5 (- 4.0%) and GCS 6-8 (- 4.6%).



## Conclusions

As more studies emerged that demonstrated limited benefit of ICP monitoring in improving care in patients with severe TBI, there was a significant statewide decline in use of ICP monitors after 2014. However, most of these studies were based on small patient populations, necessitating more randomized controlled trials to further elucidate the benefits and limitations of ICP monitoring.

## References

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