Introduction:

Methods:
We performed a retrospective observational study from Jan 2012 to Dec 2017 including adult blunt trauma patients with initial Glasgow Coma Scale (GCS) ≤ 14, clinical suspicion for TBI, endotracheal intubation and continuous capnography. We excluded interfacility transfers, penetrating TBI and cases treated for herniation (management includes hyperventilation). All patients were treated by a single air medical transport service in southwest Pennsylvania. Our primary exposure was depth-duration of EtCO2 <35mmHg (hypocarbia). Secondary outcomes were depth-duration of hypercarbia >45mmHg, and maximum depths of hypocarbia and hypercarbia. Our primary outcome was survival to discharge. Covariates were age, sex, initial GCS, shock index and first prehospital serum lactate. We performed unadjusted and adjusted logistic regression testing relationships between EtCO2 and outcome.

Results:
Overall, 148 patients were included and 113 (76%) survived. Overall, 104 (70%) were hypocarbic at least once. Median hypocarbia depth was 26 [IQR 18-30] mmHg, median hypocarbia duration was 15 [4 – 28] min, and median depth-duration was 60 [14 – 141] mmHg*min. Hypercarbia occurred in 56 (38%) patients. Median duration of hypercarbia short (0.5 [0 – 5] min) and median depth duration was only 2 [IQR 0 – 18] mmHg*min. Neither hypocarbia nor hypercarbia (maximum, duration or depth-duration) were associated with outcome in unadjusted or adjusted models. Age [OR; 0.96, 95% CI 0.94-0.98], initial GCS scores [OR; 1.12, 95% CI 1.01 to 1.25] and shock index [OR; 0.41 95% CI 0.19 to 0.88] were independent predictors of mortality.

Conclusion:
Among intubated blunt TBI patients, prehospital hyper- and hypoventilation do not appear to worsen outcomes.