What is the problem or challenge you identified? Colorado requires Level III and IV Trauma Centers to conduct a formal performance improvement program (PI), but provides limited support for program development. Trauma program managers and coordinators (TNC) in rural facilities however, rarely have experience in the development or management of a PI program. As a result, rural trauma centers are often challenged to evaluate trauma outcomes adequately.

Describe the intervention you developed/change you implemented to address the problem: After recognizing the gap in knowledge surrounding PI program development and quality benchmarking at rural trauma centers, we worked with TNCs at nine facilities to create PI filters that could evaluate the key processes of rural trauma centers. We built on definitions of key elements of Level III and Level IV Trauma Centers outlined in the American College of Surgeons Committee on Trauma (ACSCOT), Resources for Optimal Care of the Injured Patient (2014), including: 1) Prehospital care management; 2) Adherence to admission and transfer criteria; 3) Function of the trauma team; and 4) Emergent patient management. The following seven filters were identified: prehospital managed airway for patients with Glasgow coma scale (GCS) less than 9; adherence to trauma team activation criteria; evidence of physician team leader presence within 20 minutes of activation; patient with GCS < 9 in the ED: intubated in less than 20 minutes; ED LOS less than 4 hours from patient arrival to transfer; adherence to admission criteria outlined in facility’s scope of care; documentation of GCS on arrival, discharge, or with change of status.

How did you measure the effects of the change? An excel data collection template was then created to collect data on each PI filter. TNCs at each facility were responsible for completing the template every quarter and sending it to the research team over a password-protected, encrypted email server for analysis. This was a retrospective observational study over one year from January 1, 2016 through December 31, 2016 at one Level III and eight Level IV Trauma Centers across rural Colorado. We included trauma patients admitted to or transferred-out of the Trauma Centers and excluded patients only seen in the emergency department (ED) and discharged home. Seven PI filters were analyzed by quarter using Cochran-Armitage trend tests. Two-tailed tests with alphas of 0.05 were used on all tests. 924 patients were captured in the 2016 template; 55% were transferred out of the facility, 43% were admitted, and 1% died. Average compliances across all facilities per filter were: 67% compliance to prehospital managed airway for patients with GCS < 9; 90% compliance to trauma team activation criteria; 98% compliance for physician leader responses within 20 minutes; 57% compliance for patients with a GCS < 9 intubated in ED < 20 minutes; 77% compliance with patients transferred out of the initial facility in less than four hours; 75% compliance with appropriately documented GCS scores. There was a significantly decreasing compliance trend over time for ED LOS < 4 hours (Figure 1A, P-Trend=0.0417) and there was a significantly increasing trend toward compliance with appropriate documentation of GCS over time (P-trend < 0.001, Figure 1B). Activation criteria compliance was trending towards significance (P-trend=0.08). All other filters did not show any significant compliance trends over time. The average compliance score of the filters across all facilities was 81.4%.
How did you sustain the change? In this on-going PI project, we have established an initial set of seven PI filters based on key elements of rural trauma centers and on ACSCOT recommendations. Our data suggests that educational efforts should focus on more efficient and timely intubation among patients with severe traumatic brain injuries (TBI) in the ED. We also must better understand if “ED LOS < 4 hours” is an appropriate metric for less critical patients. Additionally, we found these trauma centers are routinely tracking trauma care processes, and a large majority of facilities are adhering very well to their trauma team activation criteria and scope of care. Moving forward, this data will be used to develop specific compliance thresholds, in order to identify areas for improvement and create corrective action plans as necessary.