Title: Evaluation of Prehospital Patient Care Performance among Advanced Life Support Providers in West Virginia.

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Introduction: Advanced life support providers care for similar acuity patients, however there is a paucity of research comparing the performance of different advanced life support (ALS) certification levels. As outlined by the state office, an Advanced Care Technician (ACT) can provide Basic Life Support (BLS) along with some intermediate levels of Advanced Life Support. Paramedics can provide all forms of BLS and ALS.

Objective: The objective of this study was to compare documentation quality and patient care performance of certified Paramedics versus Advanced Care Technicians in West Virginia.

Methods: This retrospective observational study examined all 911 call data and EMS provider data for West Virginia in 2016. This study focused on the information that was obtained via Prehospital Care Report (PCR) submissions that involved a Paramedic or an ACT. Study data were obtained from the West Virginia State EMS Data System located within the EMS Performance Improvement Center at the University of North Carolina - Chapel Hill. Quality of documentation was analyzed using data quality scores. These scores were calculated based on the number of errors on a PCR. Every data error results in a one point increase in data quality scores, therefore lower data quality scores represent PCRs with fewer data entry errors. T-tests were used to evaluate statistically significant differences in data quality scores. Rapid Acute Physiology Scores (RAPS) is a validated severity scale used to measure patient physiologic status (Rhee, 1987). RAPS are reported on a scale of 0-16. A comparison of first and last RAPS can be used as a proxy for patient care performance. When comparing first RAPS to the final RAPS measure, equal scores represented calls where patients experienced no change in their physiologic status over the course of the EMS call. Lower final RAPS scores represented an improvement in their condition. An increase in RAPS scores represented patients who experienced a deterioration in their physiologic status during the EMS call. For the analysis, the change in RAPS was dichotomized as improved or no change vs. worsened. Chi-squared and Fisher's exact tests, where appropriate, were used to analyze a statistically significant difference for the change in RAPS. Analysis was stratified by call type (total calls, trauma calls, cardiac arrest, cardiac chest pain, ST Elevated Myocardial Infarction [STEMI], stroke).

Results: In 2016, there were 117,306 calls that involved an Advanced Care Technician or a Paramedic. Paramedics were the highest provider level on 112,790 (96.2%) of the calls, and ACTs were the highest for the remaining 4,516 (3.8%). There was no statistically significant difference between the overall data quality scores for Paramedics and ACTs (2.4 vs. 2.3, respectively; p-value = 0.195). This result was also reflected in the data quality scores for the documentation of trauma calls (2.4 vs. 2.4, respectively; p-value = 0.908), cardiac arrest calls (3.9 vs. 5.0, respectively; p-value = 0.357), cardiac chest pain calls (2.3 vs. 2.4, respectively; p-value = 0.605), STEMI calls (3.4 vs. 4.1, respectively; p-value = 0.704), and stroke calls (2.8 vs. 2.9, respectively; p-value = 0.630). A chi-squared analysis was performed to evaluate the change in patient physiologic status during the EMS call. There was no statistically significant difference in the overall change in RAPS between Paramedics and ACTs (p-value = 0.333). The analysis for overall performance for Paramedics showed that 96,859 (85.9%) of patients experienced an improvement or no change in their condition. Comparatively, 3,855 (85.4%) of ACT patients experienced an improvement or no change in their condition. This result was also reflected in the RAPS for trauma calls (85.6% vs. 85.3%, respectively; p-value = 0.830), cardiac arrest calls

(85.6% vs. 95.0%, respectively; p-value = 0.235), cardiac chest pain calls (85.8% vs. 84.3%, respectively; p-value = 0.354), STEMI calls (84.6% vs. 85.7%, respectively; p-value = 0.933), and stroke calls (85.4% vs. 88.7%, respectively; p-value = 0.153).

Conclusion: Overall, there was no statistically significant difference in the quality of documentation assessed by data quality scores or the patient care performance levels between Paramedics and ACTs when assessed using the change in RAPS.

REFERENCES

Rhee, Kenneth J., et al. "The Rapid Acute Physiology Score." *The American Journal of Emergency Medicine,* vol. 5, no. 4, 1987, pp 278-282.

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