Title: Evaluating the level of care provided to EMS patients in Virginia when a paramedic was on-scene

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Introduction: The National EMS Scope of Practice Model provides defined parameters of various duties or services that may be provided by a person with specific credentials with the goal of providing guidance to states in determining the scope of practice for state credentialed EMS clinicians. However, statewide assessments of the utilization of credentialled EMS clinicians based on the level of care provided are limited.

Objective: The objective of this study was to evaluate the level of care provided to patients who were treated and transported by Virginia EMS agencies during 9-1-1 responses and intercepts which had a paramedic on-scene.

Methods: This retrospective study evaluated all EMS events submitted between July 1 and December 31, 2021 to the Virginia EMS Data Repository, provided by ESO (Austin, TX). Inclusion criteria were: 1) a response type documented as a 9-1-1 response or intercept, 2) documentation of a paramedic on-scene, 3) successful passage of state data validation (in the NEMSIS 3.4 standard), and 4) a disposition consistent with patient treatment and transport. Virginia Office of EMS (VAOEMS) staff reviewed all procedures and medications within the analytical dataset to determine the minimum provider certification level required in their state for the delivery of each intervention. Each intervention was categorized as either Basic Life Support (BLS), Advanced Life Support (ALS), or Paramedic Only, based on the Virginia EMS Scope of Practice and Virginia EMS Formulary. Each EMS event was then evaluated to determine if a paramedic-level provider was required based on the interventions performed. The top five most frequently documented EMS Provider Primary Impressions were compared among events where a paramedic-only level intervention was performed and those where a paramedic-only level skill was not performed. The top five most frequently documented procedures and medications were described. Descriptive statistics were calculated.

Results: During the study period, there were 889,605 EMS events submitted to Virginia that passed state schematron validation. Of those, 76.2% (678,107) were documented as 9-1-1 response (n=677,711) or Intercept (n=396). After excluding EMS events that did not meet the inclusion criteria, 158,257 encounters were found to have a paramedic on-scene and an intervention documented in the prehospital care report and were included in the analysis. Of the records with an intervention reported, 15.5% (24,499) had only BLS- or ALS-level interventions documented. The top five provider impressions recorded when a BLS- or ALS-level intervention occurred were: angina pectoris (n=1,599, acute respiratory distress syndrome (n=1,576), altered mental status (n=1,244), weakness (n=1,239), and chest pain (n=777). The top five types of provider impressions recorded when a paramedic-only level intervention occurred (n=133,758)

included: weakness (n=6,796), disorders of the circulatory system (n=6,166), altered mental status (n=5,580), acute respiratory distress syndrome (n=3,970), and injury (n=3,784). The top five provider impressions recorded when no interventions occurred (n=89,880) were: weakness (n=5,818), acute pain (n=5,190), generalized abdominal pain (n=4,217), back pain (n=2,924), and injury (n=2,395). The top five most frequently documented paramedic-level procedures performed by paramedics were: electrocardiogram (ECG) monitoring (n=31,433), 3-lead ECG (n=26,584), ECG analysis (n=4,910), manual defibrillation (n=3,846) and intubation, not otherwise specified (n=2,073). The top five ALS-level procedures performed by advanced emergency medical technicians (AEMTs) were: insertion of an intravenous line (n=10,320), intraosseous cannulation (n=765), venous blood draw (n=352), intravenous cannulation (n=281), and continuous positive airway pressure (n=131). The top five BLS-level procedures performed by EMTs were: 12-lead ECG (n=6,824); continuous assessment of patient status (n=2,450); assist ventilations via bag valve mask (n=1,465); assessment of vital signs, not otherwise specified (n=1,437), and blood glucose measurement (n=1,425). The top five paramedic-level medications administered by paramedics were: Epinephrine 0.1 mg/ml (Epi 1:10,000) (n=15,816), fentanyl (n=10,717), Ondansetron (Zofran) (n=8,408), Midazolam (n=3,016), and sodium bicarbonate (n=2,526). The top five ALS-level medications administered by AEMTs were: normal saline (n=2,069), glucose 100 MG/ML injection (n=193), Diphenhydramine (Benadryl) (n=68), Lactated Ringer's Solution (n=30), and Dextrose 50% (D50) (n=27). Finally, the top five BLS-level medications administered by EMTs were: oxygen (n=4,522), aspirin (n=753), Albuterol (n=393), naloxone (Narcan) (n=314, and nitroglycerin sublingual tablet (n=290).

Conclusion: More than 4 of every 10 EMS transport events where there was a paramedic on-scene did not have a paramedic-level intervention performed (although paramedic-level assessments and decision making could not be captured by the current study). There was little difference in providers' primary impressions among events where a paramedic-level intervention was performed and where a paramedic level skill was not performed.

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