

AMBULANCE TRANSPORTS TO CRISIS CENTERS

SESSION LAW 2014-100, SECTION 12H.32

LEGISLATIVE REPORT



**DEPARTMENT OF HEALTH AND HUMAN SERVICES,
DIVISION OF MEDICAL ASSISTANCE**

March 1, 2015

BACKGROUND

Session Law 2014-100, Section 12H.32 requires the Department of Health and Human Services, Division of Medical Assistance (DMA) to:

“...study the practice of reimbursing for ambulance transports that divert individuals in mental health crisis from hospital emergency departments to alternative appropriate locations for care. The Department shall study existing pilot programs in North Carolina, as well as other states, and shall specifically study expansion of the Wake County Emergency Medical Services (EMS) Advanced Practice Paramedics pilot program. The study shall do the following:

- (1) Propose necessary Medicaid and mental health policy changes.*
- (2) Identify funding needs.*
- (3) Identify available funding sources.*
- (4) Identify any other actions that would be necessary to facilitate implementation.*

The Department shall report its findings and recommendations to the House Appropriations Subcommittee on Health and Human Services and the Senate Appropriations Committee on Health and Human Services by March 1, 2015.”

SUMMARY

The North Carolina Department of Health and Human Services (DHHS) has examined the Wake County EMS Advanced Practice Paramedics pilot and believes it is good public policy for the behavioral health system. It provides quality patient care, is cost effective and creates a more integrated system. The DHHS continues to evaluate how best to move this promising pilot forward so that it is sustainable and can be replicated in other areas. This report includes information on the Wake County pilot, other Advanced Practice Paramedics programs, an overview of funding considerations, recommendations, and remaining issues to be resolved.

WAKE COUNTY EMS ADVANCED PRACTICE PARAMEDICS

Since 2009, Wake County Emergency Medical Services (EMS) has utilized Advanced Practice Paramedics (APP) to:

- (1) Reduce the occurrence of or minimize medical crises for persons with specific medical conditions known to benefit from close medical monitoring;
- (2) Redirect care for people with mental health or substance abuse crises to facilities other than the emergency room when no other medical emergency exists; and
- (3) Ensure that an additional experienced paramedic is available on critical level calls by responding alongside paramedic ambulances.¹

APPs may evaluate a patient along with paramedics from a responding ambulance to help determine if the patient would benefit by treatment at another facility. For appropriate patients, the APP will determine the best alternative treatment location and arrange for the patient's

¹ <http://www.wakegov.com/ems/about/staff/Pages/advancedpracticeparamedics.aspx>

transportation and admission. APPs use their own cars and are considered non-transport vehicles, but ambulance transport to the emergency room is always an option if individuals request other medical evaluation or treatment.

Diversion of patients in non-transport vehicles presents considerable risk and liability. For example, these vehicles are not equipped to handle potentially violent patients. Thus, the APP assesses the entirety of the situation on-scene and makes recommendations for transport. Options include, but are not limited to, law enforcement transportation, family/friend transportation, on-site evaluation by Mobile Crisis Management teams, or transport van (e.g., the Healing Place of Wake County will come and pick up substance abuse patients).

Wake County sees the value of this intervention as two-fold: one clinical and the other financial. From the clinical perspective, patients receive the right care at the right place at the right time. The goal of the APP program is to ensure that patients move directly to the care venue that is most appropriate for their condition. From the financial perspective, patients have historically traveled by EMS to an emergency department, thus yielding both an EMS and an emergency department charge. Patients who are transported to an alternative destination do not yield an emergency department charge and also yield a reduced EMS charge. Additional information reported by the Wake County program can be found in the attached abstract.

Offering concurrent patient evaluation and an alternative means of transport to alternative sites of care at the time of an EMS response can reduce the number of emergency room visits and hospital stays. Wake EMS does not have payer source for beneficiaries transported to alternative locations by APPs because Wake County cannot bill Medicare, Medicaid, or private insurance for these charges. The program has been supported by private grant funding. Analysis suggests that of the traditional EMS transports, Medicaid is a small percentage. Further data collection and analysis is necessary to determine whether Medicaid beneficiaries comprise a large number of behavioral health transports.

EXISTING PROGRAMS IN OTHER STATES

Minnesota

In 2012, a bill passed in the Minnesota legislature to establish reimbursement through the state's Medicaid program for a range of common community paramedic-style activities. The bill, SF 1543, followed 2011 legislation that defined community paramedics in law and directed the state to identify services to be covered by Medicaid. CMS granted final approval in February 2013.²

Community paramedics assist in the care of beneficiaries who:

- Receive hospital emergency department services three or more times in four consecutive months within a twelve month period;
- Are identified by their primary care provider as at risk of nursing home placement;
- May require set up of services for discharge from a nursing home or hospital; and
- May require services to prevent readmission to a nursing home or hospital.

²See <http://www.emsworld.com/article/10913443/medicaid-reimbursement-for-community-paramedics-in-minnesota>

The following services are not covered:

- Travel time
- Mileage
- Facility fee
- Services related to hospital-acquired conditions or treatments.³

California

In January 2015, California began its Community Paramedicine Pilot at twelve sites across the state. The sites will utilize community paramedics to follow up with patients recently discharged from the hospital, provide transportation to urgent care or mental health clinics, provide hospice support, provide follow up treatment of tuberculosis, and assist individuals who frequently utilize emergency medical services to establish care with a primary care physician. The pilot will run through 2017 and will be evaluated by the University of California at San Francisco.⁴

NORTH CAROLINA MEDICAID AMBULANCE TRANSPORTION SERVICES

The North Carolina Medicaid State Plan outlines the covered services and reimbursement methodologies approved by the federal Centers for Medicare and Medicaid Services (CMS). North Carolina's State Plan (Attachment 3.1-A.1, Page 18) outlines the requirements for emergency ambulance transportation services. Emergency ambulance transportation is only covered when determined medically necessary.⁵ Medical necessity is indicated when the patient's condition is such that any other means of transportation would endanger the patient's health. Ambulance transportation is not considered medically necessary when any other means of transportation can be safely utilized.

It further clarifies that emergency transportation by an ambulance to a physician's office is covered only if all the following conditions are met:

- (1) The patient is en route to a hospital.
- (2) There is medical need for a professional to stabilize the patient's condition.
- (3) The ambulance continues the trip to the hospital immediately after stabilization.

Therefore under the existing North Carolina State Plan, diversion from hospital emergency departments to alternative appropriate locations for care is not allowed for ambulance transportation. North Carolina would need to submit a State Plan Amendment or waiver to the Centers for Medicare and Medicaid Services (CMS) to change current coverage and reimbursement policies. However, it is unclear whether such change would be approved within the context of federal regulations.

³ See

http://www.dhs.state.mn.us/main/idcplg?IdcService=GET_DYNAMIC_CONVERSION&RevisionSelectionMethod=LatestReleased&dDocName=dhs16_177475

⁴See

<http://www.emsa.ca.gov/Media/Default/PDF/2014%20Community%20Paramedicine%20Announcement%20Release%2012-17-14.pdf>

⁵ See North Carolina Medicaid State Plan, Attachment 3.1-A.1, Page 18: <http://www.ncdhhs.gov/DMA/plan/sp.pdf>.

Federal regulations address Medicare coverage of ambulance transportation services, but not Medicaid. Medicare covers ambulance services where medical necessity and the “origin and destination” requirements are met. Specifically, 42 CFR 410.40(e) outlines three types of qualifying facilities to which Medicare covers ambulance transportation:

“[f]rom any point of origin to the nearest hospital, Critical Access Hospital (CAH) , or Skilled Nursing Facility (SNF) that is capable of furnishing the required level and type of care for the beneficiary’s illness or injury. The hospital or CAH must have available the type of physician or physician specialist needed to treat the beneficiary’s condition.”

No alternative types of facilities such as mental health urgent care or physician offices are listed. However, under special circumstances needed to stabilize a patient, an ambulance may temporarily stop at a physician’s office en route to the hospital, CAH or SNF. Medicare will also cover ambulance transport to a dialysis facility.

It is the opinion of the North Carolina Attorney General’s Office that although there are no federal Medicaid regulations addressing state reimbursement for ambulance transportation, Medicaid follows Medicare coverage when the regulations are silent on Medicaid. In the absence of a federal law change, diversion to an alternative location for behavioral health emergencies would have to be provided by a non-ambulance transport.

However, there may be opportunities to expand community paramedic programs that use transports other than ambulances to behavioral health providers, expanding on what is currently being piloted in Wake County.

The table below shows SFY 2014 ambulance transportation statistics for Medicaid beneficiaries. The average cost per ambulance claim for all diagnoses was \$298.96. The average cost per ambulance claim for behavioral health diagnoses was \$92.78.

SFY2014 Medicaid Ambulance Transportation Utilization and Expenditures

Transportation Diagnosis	Total Number of Claims	Total Claims Expenditures
All Diagnoses	65, 102	\$19,462,650
Behavioral Health Crisis	2,520	\$233,800

If the behavioral health transports would be more appropriately diverted to behavioral health providers rather than emergency departments, there is opportunity to increase positive care outcomes and decrease overall costs.

DIVISION OF MENTAL HEALTH CRISIS SOLUTIONS INITIATIVE MINI GRANTS

The Division of Mental Health, Developmental Disabilities, and Substance Abuse Services (DMH/DD/SAS) also recognizes the valuable role that local Emergency Medical Services (EMS) personnel play in the assessment and intervention of individuals in behavioral health crisis. Notwithstanding potential Medicaid funding challenges, the Crisis Solutions Initiative has prioritized finding solutions other than Medicaid funding for this practice. As mentioned above

with Wake County, some EMS departments have developed advanced training for their paramedics, partnerships with other community based providers, and mutually agreed upon protocols successfully divert behavioral health consumers in crisis to alternative destinations other than hospital emergency departments. However, outside of local funding or grant funding, no current source of revenue exists to support this form of Community Paramedicine.

DMH/DD/SAS partners with the NC Office of Emergency Medical Services (OEMS) to pilot and assess “Community Paramedicine Behavioral Health Crisis Response.” A limited amount of federal Mental Health and Substance Abuse Block Grant funds are available for two strategies:

- Assess interest, readiness, and support within other communities for further demonstration of the model by allocating \$5,000 capacity building mini-grants to Local Management Entity Managed Care Organizations (LME/MCOs) which are willing to reimburse local EMS agencies for advanced paramedic training in behavioral health crisis response. Develop local partnership policies and procedures that would allow diversion to non-emergency department destinations.
- Create a model to implement reimbursement between Local Management Entity Managed Care Organizations (LME/MCOs) and EMS agencies. The model will include a State-funded clinical policy service definition, define the contract parameters between LME/MCOs and EMS organizations, and establish a reimbursement rate structure.

To date, seven Crisis Solutions Initiative mini-grants have been allocated and one is pending final review. The counties awarded EMS programs include: Durham, Forsyth, McDowell, Rockingham, Brunswick, Guilford, and Halifax. Alliance Behavioral Healthcare wants to support sustainability of the service, and Onslow County EMS and CoastalCare have more recently established a similar service model. The LME/MCO and EMS director in each of the seven counties will prepare a report on the use of funds and readiness for further implementation within 30 days of the end of State fiscal year 2015.

The draft service definition includes standards and requirements for the agencies, the individual paramedics, and the provision of the service. DMH/DD/SAS and OEMS work with the Wake and Onslow County teams on contracting strategies and reimbursement rates, especially since Wake County EMS has piloted its Advanced Practice Paramedic pilot for several years and has sample data. In collaboration with the LME/MCOs and DMH/DD/SAS, the participating EMS agencies have agreed to standardize and refine data elements. Data elements currently include patient information, clinical information, destination information, and points in time. EMS captures the point in time at which the paramedic determines that a patient is medically cleared and may be a candidate for behavioral health intervention as the start time for the Behavioral Health (BH) event. The event ends when EMS clears the scene—having arranged for a community based BH provider to assist—or when the patient is delivered to a BH provider. Identification of payer source and whether the primary presenting need is mental health, substance use, or intellectual/development disability are two examples of data elements that will need to be added. The workgroup is also looking at reimbursement rate structures that might be akin to “treat, no transport” options in the existing EMS array.

Existing program data do not show a duplication of service across Mobile Crisis responses and LME/MCO care coordination services. Furthermore, the behavioral health crisis assessment and intervention service is not initiated unless EMS has already been dispatched to a call via the 911

system. The Crisis Solutions Workgroup will continue to review similar services to assure that there is no duplication of Medicaid funded services.

NORTH CAROLINA POLICY OPTIONS

1. Attempt to have Medicaid Reimburse for ambulance transportation to alternative health care locations.

This option could be undertaken if General Assembly directs the submission of a Medicaid State Plan Amendment or waiver pursuant to G.S. 108A-54.1A to CMS for this purpose. Without a State Plan Amendment or waiver from CMS, North Carolina's Medicaid Program cannot reimburse ambulance transportation for diversion to behavioral health clinics.

In order to determine the financial impact of such a proposal, the Medicaid program would need to analyze sample data to determine the number, frequency, and rates paid for behavioral health emergencies in which Medicaid enrollees are transported by ambulances to emergency departments, meet with the appropriate industry associations and stakeholders, and agree upon a methodology for reimbursement.

DMA would also need to consider the cost of programming changes required in NC Tracks to allow appropriate provider enrollment and claims payment.

2. Examine the expansion of Advanced Practice Paramedics pilot programs

The APP program is broader than ambulance diversion in behavioral health crises. An in-depth cost-benefit analysis of whether the expansion of North Carolina's Advanced Practice Paramedics pilot could be cost effective within the Medicaid program is needed. This additional analysis is needed to determine whether any APP services may be duplicative of services currently provided or reimbursed by other means, and if so, which approach is preferable. This analysis could be conducted by DHHS's Division of Medical Assistance, Division of Mental Health, Developmental Disabilities, and Substance Abuse Services, and Office of Emergency Medical Services.

Similar funding considerations would need to be undertaken if this pilot program were expanded, including additional Medicaid or Mental Health costs and information technology change costs. Any implementation may also need appropriation State Plan Amendments or waivers approved by CMS.

3. Examine allowing EMS agencies to utilize existing "treat, no transport" billing codes for mental health assessments.

This examination would entail whether the cost of expanding coverage of EMS services to "treat, no transport" billing codes would be offset due to a reduction in Emergency Department charges for Medicaid beneficiaries. Actual implementation could be accomplished with direction by the General Assembly and Medicaid clinical coverage policy change.

APPENDIX

Table 49 Jarvis

Indication	Method	Patients	Successes	Attempts	Overall success	Success per attempt	First-pass success
Cardiac Arrest	DL	120	77	171	64%	45%	43%
Cardiac Arrest	VL	226	201	292	89%	69%	73%
All Others	DL	69	47	103	68%	46%	42%
All Others	VL	99	95	120	96%	79%	79%
All Cause	DL	189	124	274	66%	45%	43%
All Cause	VL	325	296	412	91%	72%	75%

(VL) devices have been investigated as a means of improving success among paramedics, primarily on manikin models. Little research exists on VL vs direct laryngoscopy (DL) by paramedics in real patients and no research has investigated the specific King Vision device by paramedics on first-pass success and overall success in this population. This suburban EMS system adopted the King Vision as the sole intubation method in adults to address poor intubation success on October 1, 2012 as part of their quality improvement program.

Objectives: To evaluate the effect of implementing the King Vision VL on first-pass success, overall success, and success per attempt when compared with DL.

Methods: We performed a retrospective analysis of prospectively collected data from our electronic patient care reports between October 1, 2010 and December 12, 2013. We analyzed the three metrics of intubation success before (DL) and after implementation of VL. Each of these metrics was further analyzed based on the indication for intubation: cardiac arrest and all others.

Results: Success on all three metrics was significantly ($p < 0.001$) improved with VL as compared with DL for both cardiac arrest and other indications, as well as for both indications combined. (Table 49)

Conclusion: In this suburban EMS system, paramedics were able to improve all success rates for all indications using the King Vision VL. This is the first study to demonstrate this improvement with the King Vision VL compared to DL.

50 Investigation of Intravenous Hydroxocobalamin Compared to Control for Hemorrhagic Shock Resuscitation in a Swine Model

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Background: Traumatic hemorrhage is the cause of over 40% of civilian and military deaths and is often due to abdominal or thoracic hemorrhage which is difficult to treat, especially in the prehospital environment. The ideal resuscitative treatment would be a small volume, portable drug that improves blood pressure and survival. Hydroxocobalamin, which has been shown to increase systolic blood pressure (sBP), may provide benefit.

Objectives: To compare sBP over time from the beginning of treatment or no treatment in animals that have had 30% of their blood volume removed (Type III shock).

Methods: Twenty swine (45-55 kg) were anesthetized, intubated, and instrumented with continuous femoral and pulmonary artery pressure monitoring. Animals were hemorrhaged a total of 20 mL/kg over a 20 minute period. Five minutes after hemorrhage, animals were randomly assigned to receive 150 mg/kg intravenous (IV) hydroxocobalamin solubilized in 180 mL of saline or no treatment and monitored for 60 minutes thereafter. A sample size of 10 animals per group was determined based on a power of 80% and an alpha of 0.05 to detect an effect of size of at least 0.25 difference (one standard deviation) in sBP between the groups. SBP and secondary outcome data were analyzed using repeated measures MANOVA.

Results: There were no significant differences between the IV hydroxocobalamin and no treatment groups at baseline or at shock (HR 118 vs. 108 bpm; sBP 41 vs. 41 mm Hg; MAP 30 vs. 30, mm Hg). The overall MANOVA model detected a significant difference by time between groups ($p < 0.05$) after treatment. Post hoc analysis indicated IV hydroxocobalamin produced a significant increase in sBP, mean arterial pressure (MAP), and systemic vascular resistance (SVR) compared to no treatment at 60 min (sBP 75 vs. 55 mm Hg; MAP 60 vs. 43 mm Hg; SVR 1316 vs. 882 dyne-sec-cm⁻⁵). Moreover, heart rate in control animals increased significantly (HR 157 bpm) compared to hydroxocobalamin-treated animals (HR 116 bpm), suggesting physiologic compensation for decreasing sBP and MAP in the untreated group. Serum lactate significantly increased in the untreated group (3.4 mmol/L) compared to the hydroxocobalamin-treated group (1.3 mmol/L).

Conclusion: Intravenous hydroxocobalamin improved blood pressure and reduced serum lactate compared to no treatment in a hemorrhagic shock model. Furthermore, the volume of hydroxocobalamin required to produce a beneficial effect is considerably less than standard-care resuscitation fluids currently recommended.

51 An Advanced Practice Paramedic Program Can Safely and Effectively Divert Acute Mental Health Patients from the ED to a Community Mental Health Center

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Background: Emergency departments (ED) are overburdened with patients with acute mental health crises. Increased involvement of EMS in the care of these patients could reduce ED utilization and costs.

Objectives: To describe the effect on ED use and costs of a novel, advanced practice paramedic (APP) program that educates paramedics to perform field assessments on patients with acute mental health crises and diverts eligible patients to a community mental health center (WakeBrook) instead of the ED. We hypothesized that this mobile integrated healthcare program would reduce ED use and lower costs.

Methods: We performed a prospective cohort study of a county-wide APP program implemented in 2010. Twenty paramedics underwent a 50-hour training program in acute mental health. These APPs provided supplemental EMS response to any 9-1-1 medical dispatch identified as an acute mental health crisis. Patients were eligible to be transported to a dedicated 24/7 acute crisis unit at WakeBrook instead of the ED if the APP confirmed a primary, acute mental health crisis. Patients were excluded for emergency medical conditions as per approved EMS protocols. We used descriptive statistics to determine the proportion of patients who were diverted to WakeBrook. Any savings in time or costs were estimated using local ED lengths of stay and hospital psychiatric admissions.

Results: APPs provided the initial EMS response to 1,503 calls over a 1-year period. Of the 1,503 patient encounters, 514 (34.2%, 95% CI 31.8-36.6) met diversion eligibility criteria, and 315 (61.2%, 95% CI 57.0-65.4) of those eligible agreed to be transported to WakeBrook instead of the local ED. Only four (1.3%, 95% CI 0.1-2.6) patients transported to WakeBrook were referred back to the ED, none of whom subsequently

required medical intervention. Among the patients treated at WakeBrook, 199/315 patients (63.2%, 95% CI 57.8-68.3) were treated and discharged home with mental health follow-up. We estimate the program saved 2,448 ED bed hours and 100 hospitalizations and reduced costs of care by \$500K.

Conclusion: A county-wide APP program for acute mental health issues allowed a significant number of patients to be diverted to a community mental health setting instead of the ED. Successful broader implementation of such a program could have a big effect on the volume of patients seen in the ED with acute mental health disorders.

52 Prehospital and En Route Air Medical Cricothyroidotomy Performed in the Combat Setting: A Prospective, Multicenter, Observational Study
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Background: Surgical cricothyroidotomy is an infrequent, life-saving intervention. Published data include a single small (n=11) prospective civilian study, and a limited number of retrospective combat cases.

Objectives: To describe the survival rate, complications, and lifesaving interventions associated with cricothyroidotomies performed in prehospital and en route care combat settings.

Methods: The Life Saving Intervention (LSI) study is a prospective, IRB-approved, multicenter trial examining LSIs performed in the prehospital combat setting. We prospectively recorded LSIs performed on patients in theater transported to six combat hospitals. Trained site investigators evaluated patients on arrival and recorded demographics, vital signs, and LSIs performed. LSIs were predefined and include cricothyroidotomies, chest tubes, intubations, tourniquets, and other procedures. From the large dataset, we analyzed patients who had cricothyroidotomies performed. Descriptive statistics or Wilcoxon test (non-parametric) were used for data comparisons; significance was p<0.05.

Results: Of the 1927 patients enrolled, 34 patients had cricothyroidotomies performed (1.8%). Median age was 24 (IQR 22.5-25), 97% were male. Mechanisms of injury were blast (79%), penetrating (18%), and blunt (3%); 83% had major head and/or facial injuries. Median GCS was 3 (IQR 3-7.5) and 7 patients had GCS > 8. Cricothyroidotomy was successful in 82% of cases (determined by onsite physician). Reasons for failure included left main stem intubation (1), subcutaneous passage (1), and unsuccessful attempt (4). Five patients had prehospital basic airway interventions. Unsuccessful endotracheal intubation preceded 15% of the cricothyroidotomies. Of the patients who had the provider type recorded (n=24), six had cricothyroidotomies by combat medics (pre-evacuation), and 18 by evacuation helicopter medics. Of these 24, 21 had complete data sets, and 52% (n=13) of these survived to hospital discharge. The patients with cricothyroidotomies had more LSIs than non-cricothyroidotomy patients (4 versus 2 LSIs/patient, p<0.0011).

Conclusion: In our prospective, multicenter study, evaluating cricothyroidotomy in combat, survival was higher than previously reported. In addition, most cricothyroidotomies were performed by the evacuation helicopter medic rather than the prehospital combat medic.

53 The Effect of Chest Compression Release Velocity on Outcomes From Out-of-hospital Cardiac Arrest
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Background: Previous studies have demonstrated significant relationships between CPR quality metrics and survival to hospital

discharge from out-of hospital cardiac arrest (OHCA). Recently a new metric, chest compression release velocity (CCRV), has been associated with improved survival from OHCA.

Objectives: To determine the impact of CCRV on clinical outcomes from OHCA.

Methods: We performed a retrospective review of prospectively collected data on all treated adult OHCA occurring over a one year period (Jan 2012 - Jan 2013) in two Canadian EMS agencies. CPR metrics of chest compression fraction (CCF), compression rate, compression depth, shock pause duration, and CCRV were abstracted from impedance channel measurements during each resuscitation. Cases of public access defibrillation, EMS witnessed arrest, and those missing any Utstein variable or discharge status data were excluded. We performed a multivariable regression analysis to determine the effect of CCRV on survival to hospital discharge. Secondary outcome measures were the impact of CCRV on return of spontaneous circulation (ROSC) and neurologically intact survival (Modified Rankin Score ≤3).

Results: Among 908 treated OHCA, 611 met inclusion criteria. The median (IQR) age was 71.7 (60.7, 81.6) with 395 (64.6%) being male. 140 (22.9%) presented in ventricular fibrillation, 122 (20%) pulseless electrical activity, and 349 (57.1%) asystole. The median (IQR) CPR quality metrics were: CCF 0.81 (0.73, 0.85), compression rate 105/minute (101, 115), compression depth 49.9 mm (42.5, 56.7), pre-shock pause 13.5 secs (8, 19), and post-shock pause 3.5 secs (2.8, 5). The median (IQR) CCRV (mm/sec) amongst 49 survivors was 135.9 (115.4, 156.5) compared to 120 (102.9, 140) in 562 non survivors (p=0.009). When adjusted for CPR metrics and Utstein variables, the odds of survival to hospital discharge for each 5 mm/sec increase in CCRV was 1.02 (95% CI: 0.97, 1.08). Similarly the odds of ROSC and neurologically intact survival were 1.02 (95% CI: 0.99, 1.05) and 1.03 (95% CI: 0.98, 1.08), respectively.

Conclusion: When adjusted for Utstein variables and CPR quality metrics, CCRV was not significantly associated with outcomes from OHCA. Our findings may have been affected by the overall survival rate in our study cohort.

54 Intubation Success Rates By EMS Providers In A Simulated Difficult Airway Using A Low-cost Disposable Video Laryngoscopy System
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Background: Video-assisted laryngoscopy (VAL) has revolutionized management of the difficult airway in the ED. The most significant barrier to prehospital implementation has been cost, with individual devices costing in upwards of \$10,000. The VividTrac video-assisted laryngoscopy (VIVID) device provides a disposable, low cost (\$80) option for EMS.

Objectives: To prospectively evaluate EMS provider performance in managing the simulated adult difficult airway comparing traditional direct laryngoscopy (DL) with the VIVID device.

Methods: The study was a prospective, crossover study using EMT-Paramedic and EMT-Intermediate EMS providers of Norfolk Fire Rescue (annual call vol. 31,000) in Norfolk, VA. Study participants viewed a 6-minute training video outlining the use of the VIVID device. Subjects then entered the simulation lab and were provided hands-on instruction with high-fidelity mannequins. Subjects were asked to intubate high-fidelity mannequins using DL and VIVID. Feedback was provided by instructors for both techniques. At the conclusion of the education module, medics were evaluated in a simulated difficult airway scenario using both techniques. The primary measures were intubation success, time to endotracheal tube insertion, grade of laryngoscopic view obtained (Cormack-Lehane scale), and operator's assessment of intubation difficulty.

Results: Ninety-two EMS providers participated in the study. Intubation success rates were 85% (95% CI 76, 91) with DL and 100% with VIVID (95% CI 96,100; p <0.0001). Time to successful intubation for DL compared to VIVID was 66 seconds and 21 seconds respectively (p <0.0001). Grade of laryngoscopic view obtained with DL was 2.1