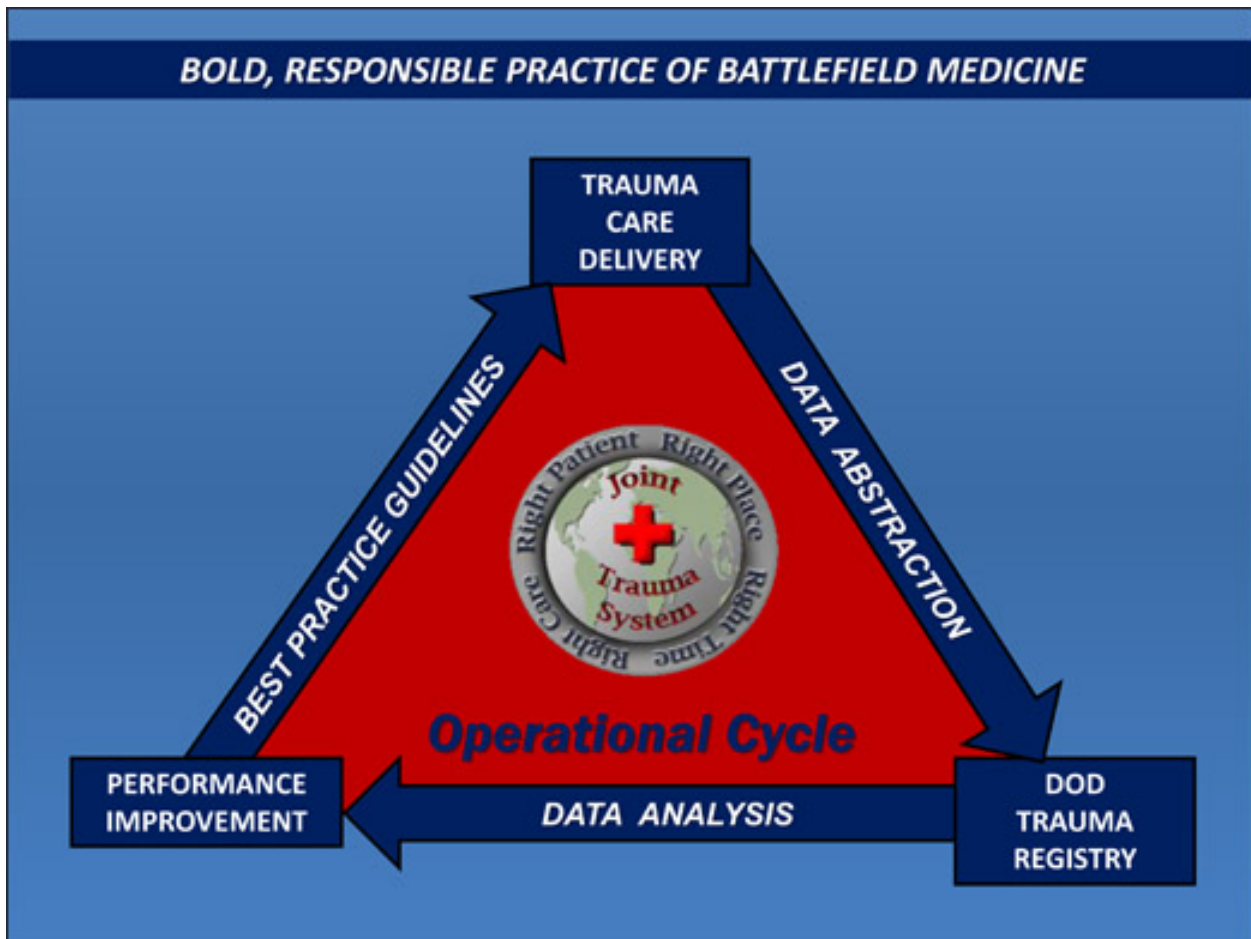


Committee on En Route Combat Casualty Care  
(CoERCCC)



Journal Watch

4th Quarter

2017

## Journal Watch Key Terminology Searched:

Emergency medical services  
Acute coronary syndrome  
Emergency care  
Aeromedical evacuation  
Traumatic brain injury  
Substances for disinfection  
Standardized operating procedures  
Forward MEDEVAC  
Trauma  
Helicopter  
Transportation Vibration  
Spinal cord injury  
Physically demanding occupation  
Casualty Distribution

Resuscitation  
Myocardial infarction  
Telemedicine  
Inflammation  
Air traffic  
Highly infectious diseases  
Combat  
Joint trauma system  
MRAP  
Porcine model  
Airway management  
ST-segment elevation  
Task analysis  
Casualty Evacuation

Treatment efficacy  
Pre-hospital  
Hypobaria  
Neuronal cell death  
Disinfection of aircraft  
Stabilization  
FLYP  
PECC  
SCI  
Shock  
Guideline  
Employment standards  
Vibration

## **Aeromedical evacuation-relevant hypobaria worsens axonal and neurologic injury in rats after underbody blast-induced hyperacceleration.**

[Proctor JL](#)<sup>1</sup>, [Mello KT](#), [Fang R](#), [Puche AC](#), [Rosenthal RE](#), [Fourney WL](#), [Leiste UH](#), [Fiskum G](#).

### **Author information**

1 From the Department of Anesthesiology (J.L.P., K.T.M., G.F.), University of Maryland School of Medicine, Program in Trauma (R.F., R.E.R.), R. Adams Cowley Shock Trauma Center, University of Maryland Medical Center; U.S. Air Force Center for the Sustainment of Trauma and Readiness Skills (R.F.); Department of Anatomy and Neurobiology (A.C.P.), Department of Emergency Medicine (R.E.R.), University of Maryland School of Medicine, Baltimore; and School of Engineering (W.L.F., U.L.H.), University of Maryland College Park, College Park, Maryland.

### **Abstract**

**BACKGROUND:** Occupants of military vehicles targeted by explosive devices often suffer from traumatic brain injury (TBI) and are typically transported by the aeromedical evacuation (AE) system to a military medical center within a few days. This study tested the hypothesis that exposure of rats to AE-relevant hypobaria worsens cerebral axonal injury and neurologic impairment caused by underbody blasts.

**METHODS:** Anesthetized adult male rats were secured within cylinders attached to a metal plate, simulating the hull of an armored vehicle. An explosive located under the plate was detonated, resulting in a peak vertical acceleration force on the plate and occupant rats of 100G. Rats remained under normobaria or were exposed to hypobaria equal to 8,000 feet in an altitude chamber for 6 hours, starting at 6 hours to 6 days after blast. At 7 days, rats were tested for vestibulomotor function using the balance beam walking task and euthanized by perfusion. The brains were then analyzed for axonal fiber injury.

**RESULTS:** The number of internal capsule silver-stained axonal fibers was greater in animals exposed to 100G blast than in shams. Animals exposed to hypobaria starting at 6 hours to 6 days after blast exhibited more silver-stained fibers than those not exposed to hypobaria. Rats exposed to 100% oxygen (O<sub>2</sub>) during hypobaria at 24 hours postblast displayed greater silver staining and more balance beam foot-faults, in comparison with rats exposed to hypobaria under 21% O<sub>2</sub>.

**CONCLUSION:** Exposure of rats to blast-induced acceleration of 100G increases cerebral axonal injury, which is significantly exacerbated by exposure to hypobaria as early as 6 hours and as late as 6 days postblast. Rats exposed to underbody blasts and then to hypobaria under 100% O<sub>2</sub> exhibit increased axonal damage and impaired motor function compared to those subjected to blast and hypobaria under 21% O<sub>2</sub>. These findings raise concern about the effects of AE-related hypobaria on TBI victims, the timing of AE after TBI, and whether these effects can be mitigated by supplemental oxygen.

PMID: 28452879 DOI: [10.1097/TA.0000000000001478](#)

## Accuracy of prehospital triage protocols in selecting severely injured patients: A systematic review.

[van Rein EAJ](#)<sup>1</sup>, [Houwert RM](#), [Gunning AC](#), [Lichtveld RA](#), [Leenen LPH](#), [van Heijl M](#).

### Author information

1 From the Department of Traumatology (E.A.J.V.R., A.C.G., L.P.H.L., M.V.H.), University Medical Center Utrecht, Utrecht, The Netherlands; Utrecht Trauma Center (R.M.H.), Utrecht, The Netherlands; and Regional Ambulance Facilities Utrecht (R.L.), RAVU, Utrecht, The Netherlands.

### Abstract

**BACKGROUND:** Prehospital trauma triage ensures proper transport of patients at risk of severe injury to hospitals with an appropriate corresponding level of trauma care. Incorrect triage results in undertriage and overtriage. The American College of Surgeons Committee on Trauma recommends an undertriage rate below 5% and an overtriage rate below 50% for prehospital trauma triage protocols. To find the most accurate prehospital trauma triage protocol, a clear overview of all currently available protocols and corresponding outcomes is necessary.

**OBJECTIVES:** The aim of this systematic review was to evaluate the current literature on all available prehospital trauma triage protocols and determine accuracy of protocol-based triage quality in terms of sensitivity and specificity.

**METHODS:** A search of Pubmed, Embase, and Cochrane Library databases was performed to identify all studies describing prehospital trauma triage protocols before November 2016. The search terms included "trauma," "trauma center," or "trauma system" combined with "triage," "undertriage," or "overtriage." All studies describing protocol-based triage quality were reviewed. To assess the quality of these type of studies, a new critical appraisal tool was developed.

**RESULTS:** In this review, 21 articles were included with numbers of patients ranging from 130 to over 1 million. Significant predictors for severe injury were: vital signs, suspicion of certain anatomic injuries, mechanism of injury, and age. Sensitivity ranged from 10% to 100%; specificity from 9% to 100%. Nearly all protocols had a low sensitivity, thereby failing to identify severely injured patients. Additionally, the critical appraisal showed poor quality of the majority of included studies.

**CONCLUSION:** This systematic review shows that nearly all protocols are incapable of identifying severely injured patients. Future studies of high methodological quality should be performed to improve prehospital trauma triage protocols.

**LEVEL OF EVIDENCE:** Systematic review, level III.

PMID: 28452898 DOI: [10.1097/TA.0000000000001516](https://doi.org/10.1097/TA.0000000000001516)

## **Inefficacy of standard vital signs for predicting mortality and the need for prehospital life-saving interventions in blunt trauma patients transported via helicopter: A repeated call for new measures.**

[Liu NT](#)<sup>1</sup>, [Holcomb JB](#), [Wade CE](#), [Salinas J](#).

### **Author information**

1 From the U.S. Army Institute of Surgical Research (N.T.L., J.S.), Fort Sam Houston; and Center for Translational Injury Research, Department of Surgery (J.B.H., C.E.W.), University of Texas Health Science Center at Houston, Houston, Texas.

### **Abstract**

**BACKGROUND:** The aim of this study was to investigate the efficacy of traditional vital signs for predicting mortality and the need for prehospital lifesaving interventions (LSIs) in blunt trauma patients requiring helicopter transport to a Level I trauma center. Our hypothesis was that standard vital signs are not sufficient for identifying or determining treatment for those patients most at risk.

**METHODS:** This study involved prehospital trauma patients suffering from blunt trauma (motor vehicle/cycle collision) and transported from the point of injury via helicopter. Means and standard deviations for vital signs and Glasgow Coma Scale (GCS) scores were obtained for non-LSI versus LSI and survivor versus nonsurvivor patient groups and then compared using Wilcoxon statistical tests. Variables with statistically significant differences between patient groups were then used to develop multivariate logistic regression models for predicting mortality and/or the need for prehospital LSIs. Receiver-operating characteristic (ROC) curves were also obtained to compare these models.

**RESULTS:** A final cohort of 195 patients was included in the analysis. Thirty (15%) patients received a total of 39 prehospital LSIs. Of these, 12 (40%) died. In total, 33 (17%) patients died. Of these, 21 (74%) did not receive prehospital LSIs. Model variables were field heart rate, lowest systolic blood pressure, shock index, pulse pressure, and GCS components. Using vital signs alone, ROC curves demonstrated poor prediction of LSI needs, mortality, and nonsurvivors who did not receive LSIs (area under the curve [AUC], AUCs: 0.72, 0.65, and 0.61). When using both vital signs and GCS, ROC curves still demonstrated poor prediction of nonsurvivors overall and nonsurvivors who did not receive LSIs (AUCs: 0.67, 0.74).

**CONCLUSION:** The major implication of this study was that traditional vital signs cannot identify or determine treatment for many prehospital blunt trauma patients who are at great risk. This study reiterated the need for new measures to improve blunt trauma triage and prehospital care.

### **LEVEL OF EVIDENCE:**

Therapeutic/care management, level IV.

PMID: 28452878 DOI: [10.1097/TA.0000000000001482](https://doi.org/10.1097/TA.0000000000001482)

## Criteria and models for the distribution of casualties in trauma-related mass casualty incidents: a systematic literature review protocol.

[Khajehaminian MR](#)<sup>1</sup>, [Ardalan A](#)<sup>2,3</sup>, [Hosseini Boroujeni SM](#)<sup>1</sup>, [Nejati A](#)<sup>1</sup>, [Keshtkar A](#)<sup>4</sup>, [Foroushani AR](#)<sup>5</sup>, [Ebadati E OM](#)<sup>6</sup>.

### Author information

1 Department of Health in Emergencies and Disasters, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran.

2 Department of Health in Emergencies and Disasters, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran. [aardalan@tums.ac.ir](mailto:aardalan@tums.ac.ir).

3 Harvard Humanitarian Initiative, Harvard T.H. Chan School of Public Health, Cambridge, USA. [aardalan@tums.ac.ir](mailto:aardalan@tums.ac.ir).

4 Harvard Humanitarian Initiative, Harvard T.H. Chan School of Public Health, Cambridge, USA.

5 Department of Biostatistics and epidemiology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran.

6 Department of Mathematics and Computer Sciences, Kharazmi University, Tehran, Iran.

### **Abstract**

**BACKGROUND:** One of the most critical practices in mass casualty incident management is vacating the victims from scene of the incident and transporting them to proper healthcare facilities. Decision on distribution of casualties needs to be taken on pre-developed policies and structured decision support mechanisms. While many studies tried to present models for the distribution of casualties, no systematic review has yet been conducted to evaluate the existing models on casualty distribution following mass casualty incidents. A systematic review is therefore needed to examine the existing models of patient distribution and to provide a summary of the models. This systematic review protocol is aimed to examine the existing models and extracting rules and principles of mass casualty distribution.

**METHODS:** This study will comprehensively investigate existing papers with search phrases and terms including "mass casualty incident", distribution, evacuation, and Mesh terms directly corresponding to search phrases. No limitations on the type of studies, date of publication, or language of the relevant documents will be imposed. PubMed, Web of Science, Scopus, and Google Scholar will be searched to access the relevant documents. Included papers will be critically appraised by two independent reviewers. The data including incidents type, scene characteristics, patient features, pre-hospital resources, and hospital resources will be categorized. Subgroup analysis will be conducted when possible.

**DISCUSSION:** To the best of our knowledge, no study has yet addressed the effects and interaction of contributing factors on the decision-making processes for casualty's distribution. This is the first study that comprehensively assesses and critically appraises the current models of casualty distribution. This study will provide evidences about models and criteria for casualty distribution following mass casualty incidents.

### **SYSTEMATIC REVIEW REGISTRATION:**

PROSPERO Registration Number: CRD42016049115.

PMID: 28701204 PMCID: [PMC5508483](#) DOI: [10.1186/s13643-017-0538-z](#)

## Extracorporeal Membrane Oxygenation and Interfacility Transfer: A Regional Referral Experience.

[Ranney DN](#)<sup>1</sup>, [Bonadonna D](#)<sup>2</sup>, [Yerokun BA](#)<sup>1</sup>, [Mulvihill MS](#)<sup>1</sup>, [Al-Rawas N](#)<sup>3</sup>, [Weykamp M](#)<sup>1</sup>, [Gunasingha RM](#)<sup>1</sup>, [Bartz RR](#)<sup>3</sup>, [Haney JC](#)<sup>1</sup>, [Daneshmand MA](#)<sup>4</sup>.

### Author information

1 Department of Surgery, Duke University Medical Center, Durham North Carolina.

2 Perfusion Services, Duke University Medical Center, Durham North Carolina.

3 Department of Anesthesiology, Duke University Medical Center, Durham North Carolina.

4 Department of Surgery, Duke University Medical Center, Durham North Carolina. Electronic address: mani.daneshmand@dm.duke.edu.

### **Abstract**

**BACKGROUND:** The number of adults referred to high-volume centers for extracorporeal membrane oxygenation (ECMO) is increasing. Outcomes of patients requiring transport are not well characterized, and referral guidelines are lacking. This study describes the experience and outcomes of a single high-volume center.

**METHODS:** A retrospective study was performed that included adults undergoing ECMO between June 2009 and December 2015. Patient characteristics and outcomes were acquired from the medical record. Logistic regression was used to identify predictors of survival to hospital discharge. The Kaplan-Meier method was used to depict rates of survival.

**RESULTS:** Of 133 patients, 77 (57.9%) underwent venoarterial (VA) ECMO and 56 (42.1%) underwent venovenous (VV) ECMO. Median transport distance was 88.8 miles (range 0.2-1,434 miles). Median duration of support was 6 days (range, 1-32.5 days). Age older than 60 years, pulmonary hypertension, and body mass index (BMI) greater than 30 were associated with worse survival to discharge for VA ECMO; a history of hypertension and presence of left ventricular (LV) vent were associated with better survival. Age older than 60 years and diabetes were associated with worse survival to hospital discharge for VV ECMO. Survival to decannulation was 66.2% and 76.8%, and to hospital discharge it was 48.1% and 69.6% for VA and VV ECMO, respectively. Of hospital survivors, Kaplan-Meier estimates of 1-year survival were 82.4% and 95.5% for VA and VV, respectively.

**CONCLUSIONS:** Outcomes are favorable after transport to high-volume ECMO centers. Guidelines and infrastructure for short- and long-distance ECMO transport is imperative for the efficient and successful management of these patients.

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PMID: 28673618 DOI: [10.1016/j.athoracsur.2017.04.028](https://doi.org/10.1016/j.athoracsur.2017.04.028)

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