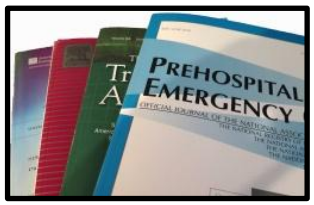
International Prehospital Medicine Institute



IPHMI Literature Review

Keeping You Up to Date with Current EMS Literature and Studies

Vol. 9.1

1. **Agency-Level Turnover Rates of Emergency Medical Service Clinicians and Their Characteristics.** Kurth JD, Powell JR, Gage CB, et al. *JACEPOpen* 2026;7:100418 Full text available on-line at: https://doi.org/10.1016/j.acepjo.2026.100418
2. **Airway Management with a Supraglottic Airway Device During Resuscitation by Basic Life Support Providers: A Systematic Review.** Debaty G, Johnson NJ, Perkin G, et al. *Resuscitation* 2026;227:111152
3. **Adult and Pediatric Emergency Medical Services Ambulance Response Times.** Hayes JM, Chandran K, Peters GA, et al. *J Emerg Med* 2026;89:72-75.
4. **Whole-Blood Transfusion from Empiricism to Evidence: A Narrative Review.** Torres CM, Jenkins D, Sakran JV. *JAMA Surg*. 2026;161(9):945-951.

1. Agency-Level Turnover Rates of Emergency Medical Service Clinicians and Their Characteristics.

Kurth JD, Powell JR, Gage CB, et al. *JACEPOpen* 2026;7:100418 Full text available on-line at: https://doi.org/10.1016/j.acepjo.2026.100418

Estimates of EMS clinician turnover vary from 6% to 30%. The delivery of prehospital medical care depends upon the strength and stability of its workforce.

This is a 2-year (2020 to 2022) retrospective study that looked at EMS clinicians and agencies in 9 states that required National EMS certification to obtain and maintain licensure. EMS licensure/certification is valid for two years with a standard start/recertify date of March 31st. This enabled them to follow a cohort of the EMS clinicians through a single two-year re-certification cycle. They sought to evaluate agency-level turnover. The primary outcome measure was agency-level mean turnover rate as defined as “stayed” or “left”. Left included a change in recorded agency or not recertifying.

The study evaluated 20,881 EMS clinicians from 1,137 EMS agencies with a median number of clinicians per agency of 30. The median age of the clinicians was 31. The overall, adjusted mean agency-level turnover rate was 17.4% with a large variability in adjusted agency level mean turnover rate ranging from 4.1% to 39.5%. When evaluated by agency type, turnover rates varied from 14.3% in fire agencies to 23.6% in private agencies. In looking at clinician demographics, they found that younger EMS clinicians were leaving private services, more males were leaving fire agencies (consistent with high male population in fire agencies), higher educated clinicians were leaving governmental non-fire and more 9-1-1 service leaving fire agencies.

One of the limitations of this study is that in only looking at clinicians in 9 states they cannot extrapolate their results across agencies elsewhere. They note that large studies including more representative samples are not feasible without a national data set of all EMS clinicians. They suggest that uniform use of the 12-digit national EMS ID might serve in this role in the future. They go on to say

that the large variability found in their study could be different than what would be found across the rest of the United States. This study also cannot account for clinicians working at multiple agencies.

This study shows that there is significant variability in EMS clinician turnover in the various agency types that provide EMS response. Unfortunately, this study did not examine the reasons for the turnover rates. Turnover may depend on factors such as agency type, agency characteristics, agency culture and workplace characteristics. The authors suggest that a centralized EMS clinician database would help and allow for tracking of the EMS workforce.

2. **Airway Management with a Supraglottic Airway Device During Resuscitation by Basic Life Support Providers: A Systematic Review.** Debaty G, Johnson NJ, Perkin G, et al. *Resuscitation* 2026;227:111152

Quality and adequacy of ventilation during cardiopulmonary resuscitation by professional rescuers is one of the pillars of successful resuscitation. In the out-of-hospital setting, ALS providers have long used endotracheal intubation as the main adjunct to establish a patent airway and pathway to effective ventilation. Until the last decade, BLS providers relied on a simple bag-mask device (BVM) after placement of an oral or nasal airway to provide ventilation. In many cases, bag-mask ventilation has often been suboptimal. Recently, more BLS providers have been trained to utilize supraglottic airways (SGA) as a primary device during resuscitation efforts.

This study (commissioned by the International Liaison Committee on Resuscitation (ILCOR)) involved a systematic literature review of multiple databases to identify and evaluate the available literature assessing the efficacy of BVMs versus supraglottic airways used by BLS providers during resuscitation from out-of-hospital cardiac arrest. The authors screened a total of 11,310 papers of which sixteen (16) studies met the predetermined inclusion criteria to be enrolled in the review. Three (3) were randomized trials and thirteen (13) were observational studies focused on the use of SGA's by BLS-trained providers. Outcome measures included survival with a favorable neurologic out-come, survival at discharge or at 30days, ROSC, emesis, chest compression and ventilation success.

No demonstrated advantage of SGA over BVM across all reliable, measurable outcomes was identified. Unfortunately, both the randomized trials and the observational studies demonstrated a low level of evidence.

There are a number of limitations to this review. There may be bias in the various publications, especially since unpublished studies and presented abstracts were excluded. The included publications used multiple types of SGA. First responders were also not included in any of the publications that were reviewed; only ambulance personnel were included.

This review was unable to demonstrate any outcome benefit of SGA compared to BVM ventilation when performed by BLS providers. While SGA insertion by BLS ambulance providers has been studied, few studies evaluated patient outcomes based on SGA types or intervention by first responders and most studies were low quality. Further high-quality studies are needed.

3. **Adult and Pediatric Emergency Medical Services Ambulance Response Times.** Hayes JM, Chandran K, Peters GA, et al. *J Emerg Med* 2026;89:72-75.

The routine use of lights and sirens for ambulance response to a request for medical assistance is associated with increased risk of motor vehicle crashes with only a modest decrease in the response time. Recent position papers from the National Association of EMS Physicians, the American College of Emergency Physicians, among others, have recommended decreased use of lights and sirens whenever

possible. With this study, the authors hoped to "describe current EMS response times across the US, stratified by urbanicity and patient age".

The authors conducted a cross-sectional study of the 2023 National EMS Information System (NEMSIS) Public-Release Research dataset. The data were submitted by 14,369 EMS agencies in 54 US states and territories. The study included all 9-1-1 ground EMS responses in which a patient contact was made and urbanicity was available. Interfacility and air transport activations were excluded. They also excluded activations they deemed to be outliers with response times ≥120 minutes, EMS dispatch time ≥60 minutes, or transport times ≥ 180 minutes. The primary outcome measure was EMS response time for each activation, in minutes, from time of dispatch to arrival at the patient's side.

The study evaluated 32,247,001 EMS activations. The median overall response time across the nation was 7.1 minutes with the response times in urban areas faster at 7.0 minutes and wilderness responses at 9.0 minutes. They noted that pediatric patients had slightly faster (less than a minute difference) average response times than adults and one in ten patients had response times longer than 15 minutes.

Median response times in different urban environments varied by as much as 2 minutes. While median response times in urban and suburban areas were generally similar to previous studies that evaluated 2013 and 2015 data, overall urban and suburban response times increased by about 1 minute and decreased in rural areas by 4-5 minutes compared to prior estimates. They consistently observed median response times longer than 6 minutes in urban settings and suggested that additional clinical benefit may be seen with shorter response times to some time-sensitive emergencies.

This study is limited in that NEMSIS provides a convenience sample of EMS data and does not include the response time of other public safety emergency responders such as police and fire departments that may provide needed medical interventions. In addition, and perhaps most importantly, patient outcomes could not be assessed to help determine the effect of response time on patient outcome.

This review showed that response times vary across urbanicities and that about one in ten patients experiences a response time longer than 15 minutes. While this study highlights the importance of optimizing emergency response, response time, while easily measured, needs to be correlated with patient outcome.

4. **Whole-Blood Transfusion from Empiricism to Evidence: A Narrative Review.** Torres CM, Jenkins D, Sakran JV. *JAMA Surg*. 2026;161(9):945-951.

For over a century, blood transfusions have been successfully used in the resuscitation of trauma patients. The advancement of transfusion therapy for trauma has been highly influenced by and progressed out of necessity due to military conflict. Soon after the discovery of blood typing in the early 1900's and the success of blood transfusions in World Wars 1 & 2 through the Vietnam War era, whole blood became the standard for hemorrhagic shock care. Following the Vietnam War, resuscitation via blood components in 1:1:1 ratios (red blood cells, plasma & platelets) became prevalent. This move to component therapy was based on logistical needs for duration of blood storage, distribution and supply preservation. During the recent Iraq and Afghanistan conflicts, the military began to move away from blood component transfusions back toward the simplicity of whole blood therapies.

This study undertook a literature review of the available literature comparing the effectiveness, primarily via mortality rates, of whole blood versus blood component resuscitation with a focus toward pre-hospital initiation of transfusion therapy. They also grouped low-titer group O whole blood (LTOWB) and fresh whole blood (FWB) together as "whole blood".

They found that much of the current literature is observational in nature and lacks standardization however the following conclusions were identified. Coagulopathy is corrected quicker with whole blood administration with a decreased need for additional blood products. One study in particular, supported by other similar civilian trauma center studies, reported a 4-times increased survival rate with a 60% reduction of transfusions when whole blood was given versus component therapy.

Patient selection may also contribute to whole blood transfusion survival rates. Patients with hypotension did better with whole blood versus blood component therapy and the benefit increased with the patient's shock severity.

The authors also looked at the effect of unmatched RhD-positive blood transfusions on women of childbearing age and subsequent pregnancies of RhD-negative birthing parents and their perinatal child. It is important to consider that without the unmatched blood transfusion given during their resuscitation, these women may not have survived to bear children. They state that the current literature reports a <0.4% perinatal death rate due to hemolytic disease of the fetus and newborn.

This paper also looked at equity in access to pre-hospital blood products. They acknowledge that the geographical areas where blood products may do the most good are in areas where it is hardest to provide. A systematic response to this problem involves pre-hospital, hospital, trauma center and blood bank collaboration. This collaboration involves ease of access, storage and administration of blood products while all participants act as good stewards of the available blood supply. Again, whole blood may have an advantage as a single entity to be stored, administered and shared as opposed to the multiple units needed for component blood transfusion therapy.

The biggest limitation of this paper is the quality and standardization of the primarily observational studies reviewed by the authors. Work still needs to be done in the civilian sector regarding whole versus component blood transfusions and which to use when.

This paper provides an excellent review of blood as a resuscitative fluid and should be read by all who are considering implementing prehospital blood therapy. As prehospital trauma care advances and includes transfusion therapies, EMS organizations should work collaboratively with their local hospitals, trauma centers and blood banks to build a system of resuscitative care. Whole blood may be the best option for ease of use, storage, administration and most importantly, reducing mortality in hypotensive patients suffering from hemorrhagic shock.