

WHEN WORLDS COLLIDE Unique Safety Challenges of EMS Operations

By Jeffrey White

As an OSH professional, you can become a member of a professional organization to stay current in your specific area of expertise. What about those whose profession involves multiple areas in a largely unregulated industry with multiple agency standards that must be followed?

Welcome to the world of emergency medical services (EMS). It is an industry that attempts to mitigate transportation issues, emergency response issues, lifting and moving ergonomics issues, patient safety, fatigue and shift work, to name a few individual areas that must be managed together.

Starting in the industry's early stages operating out of funeral homes, EMS crews were called to a scene to load a patient to be transported as expeditiously as possible to the nearest hospital. Over the past roughly 40 years, EMS has evolved in scope and breadth of responsibility into a healthcare enigma that, in many ways, is still finding its footing.

The care in the field has evolved over the years into a truly critical part of the healthcare chain. Medications and procedures have continuously increased positive outcomes for patients. The difficulty for safety professionals is finding a way to manage patient safety in a dynamic environment and transportation safety in a known high-risk environment, all while following local and federal guidelines, where applicable. Many non-OSHA states have challenges with county and city agencies following OSHA regulations when it is not required because of cost; county and city agencies are to follow what the local government has set forth, which is often based on cost, not standard. For many, the only standard they operate under is "this is how we have always done it."

As an industry, EMS has no real governmental oversight. It is a conglomeration of state EMS offices responsible for certification, licensure and protocols: National Highway Traffic Safety Administration standards for ambulance design and roadway operations, OSHA regulations for base sites and worker safety, best practice healthcare procedures, and varying levels of certifications working together on the same units. All of this must come together to provide patient care at 3:00 a.m. in the snow on the side of the road.

Thus, EMS has an incredibly diverse set of circumstances that make safety management challenging. The difficulty is that the vast majority of EMS do not have true safety professionals managing safety for them.

The author serves as director of safety for HealthNet Aeromedical Services, based in Charleston, WV. The company operates 10 aeromedical aircraft and 32 ground ambulances dedicated to interfacility transports for its owner hospitals. It also provides management oversight for a county-run 9-1-1 service with two units. West Virginia is a non-OSHA state, but as a private entity cooperatively owned by the three academic medical centers in the state, the company falls under federal OSHA guidelines, while county and city EMS agencies do not. This puts the organization in a unique situation in that it is setting a higher standard in the industry in the state and working to improve standards nationally. The company's safety officer and safety director can work with the owner hospitals to put safety practices into place that cross into the in-hospital world, as well as into the field. Some of the programs the company has put in place are unique in the world of EMS. Following are several examples of these innovative programs.

Fatigue Management

In the EMS industry, fatigue is one of the most concerning areas for crew and patient safety. OSHA defines an extended or unusual shift as "any shift that incorporates more continuous hours, requires more consecutive days of work, or requires work during the evening" (OSHA, n.d.). Many of the standard calculations in industrial hygiene are calculated for 8- or 12-hour shifts. For example, the time-weighted average that applies to noise and dust exposure is typically calculated over an 8-hour shift. Some adjustments can be made, but many still do not extend into 24- and 36-hour shifts. The Brief and Scala method can be used to adjust values such as threshold limit

value. Many agencies sometimes work 12-, 24- or even 36-hour shifts with no real restrictions for many EMS crews or agencies. EMS crews spend much of this time driving long distances, and they must make critical patient-care decisions while on long shifts with little or interrupted sleep.

Fortunately for some, voluntary accreditation programs have set standards; however, these are voluntary programs. HealthNet is accredited to Commission on Accreditation of Medical Transport Services (CAMTS), which has fatigue management criteria. The company cannot allow a crew member to work a regular shift if the individual has not had at least 10 hours of time off from work or volunteer activities prior to that shift. This CAMTS standard ensures that crews arrive to work rested to mitigate the risk early in the shift.

The problem is that the company is the only ground provider in the state with this requirement. The EMS industry has been accustomed to going from job to job for years. Now, fatigue management during the shift is open to how we want to manage it. Many agencies allow crew members to work as many back-to-back shifts as they would like. The issue is that many in EMS workers are not paid a high wage, so they rely on overtime to make ends meet. According to Bureau of Labor Statistics (BLS, 2020b), the median income for EMTs and paramedics in 2019 was \$35,400 per year (\$17.02 per hour). Many hold multiple jobs in case the overtime supply at their primary employer slows down. This is a recipe for fatigue disaster. Many EMS agencies across the country do not have a written plan; they manage sleep by telling crews to sleep when they can. In the 9-1-1 environment, it is impossible to say no to a call because of fatigue, so many crews work extended shifts on no sleep.

How do we fix this problem? Many agencies have moved to 12-hour shifts but allow crews to pick up as many other shifts as they want. This allows agencies

to claim they are a 12-hour shift company, but employees are still working 24- or 36-hour shifts, and the agency is not managing fatigue. Looking at the research, however, this may not be the answer. Several studies have shown that 12-hour shifts are just as fatigue-causing as a 24-hour shift for EMS crews due to the unpredictable call volumes and irregular rest patterns (Patterson et al., 2019; Weaver et al., 2015).

What makes the company unique is its fatigue time-out policy. The organization utilized data from its first 18 months of ground operations to verify when crews were getting tired and taking a safety time-out to rest. The ground volume is much higher than the aeromedical volume so the company could not use a blanket fatigue management policy for both. Based on this data, the agency found that most crews hit their fatigue mark at 14 hours of windshield time. "Windshield time" is a company term that crews use to determine when they should take a safety time-out. If the transport is local (within 30 miles of base), the windshield time is calculated as time en route to time clear. If it is a long distance (more than 30 miles from base), the windshield time is calculated as time en route to the receiving facility multiplied by two. Crews are expected to efficiently utilize downtime throughout the shift. For each 2-hour period of in-service time between calls, a total of 1 hour is subtracted from the current windshield time total. This encourages crews to rest whenever possible.

The company developed its safety time-out policy for ground crews knowing that after 17 hours of wakefulness, humans function as if their blood alcohol level is 0.5 (Russo et al., 2005), combined with a typical sleep cycle of 90 minutes. When a crew reaches 13 hours of windshield time, they are placed out of service for a period of 120 minutes (2 hours) and are expected to do nothing but sleep during that period. This allows the crew to complete one full sleep cycle to minimize sleep inertia prior to reaching a dangerous operating level based on wakefulness time. This process is almost unheard-of in West Virginia and much of the industry.

In the healthcare system, EMS is viewed as a third service, so reimbursement rates are extraordinarily low compared to operating costs. Many private EMS agencies depend on every call they receive. This puts them in the

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position of being reluctant to say no to any facility that calls for an interfacility transport because that facility might call another agency next time. In the 9-1-1 environment, crews cannot say no to an emergency. HealthNet's ability to say no to hospitals as a nonprofit organization allows the company to focus on safety issues that other agencies do not take the risk to focus on.

The company has found a way to manage this in the 9-1-1 county agency for which it provides management service. If the crews need a time-out, the local volunteer fire departments that cover the county are notified that they will be responding to the company's area. This is a win-win, as it allows the company's crews to sleep and allows the volunteer departments to bill for the call and reimburse much-needed revenue. This is also something unique in many areas because, again, most agencies need every call they can get and have a hard time working together. Many are trying to figure out a way to manage fatigue in their areas but have not found what works in their system. The system HealthNet uses works for the company now but can always be improved.

Driver Training

Over-the-road truckers are considered professional drivers and complete more than 100 hours of education with age restriction and mandatory driving hours. Many in EMS take an emergency vehicle operations course (EVOC) that is 16 to 24 hours long with a few practical stations and substantial on-the-job training. Many crew members across the country complete an EMT course at age 18 and are put in an ambulance and sometimes tasked with driving hundreds of miles one way through multiple states. It is no wonder the incident rate is so high. We take someone who has never driven anything larger than a passenger vehicle and put them in a 5- or 6-ton vehicle and let them run Code 3 response (lights and siren). According to BLS (2020a), in 2018 transportation fatalities accounted

for 44% of all fatal workplace incidents in West Virginia. Studies show that the increased risk with little time saved does not warrant the use of Code 3 response (Watanabe et al., 2019).

This is another area where the organization has taken steps to be above industry standards. The organization's driving program is an ANSI-compliant program. The company manages fatigue before and during shifts and utilizes in-cab and in-patient compartment cameras with video and audio recording capability. In addition to fatigue management, the cameras are used for operational quality audits, incident and complaint investigations and internal education. The company has a Health Insurance Portability and Accountability Act-compliant program in place for involving the medical director when an employee is prescribed a new medication that has any associated fatigue warnings after employment begins. Crews are required to attend the company-specific EVOC course within 6 months of hire. The course discusses the specific type of vehicles the company operates, vehicle limitations and vehicle pivot points, and employees are trained on the areas that data has shown the most incidents. This course is conducted by the safety department and includes safe lifting and moving practices with available equipment on the unit. Random in-person and video review quality improvement verifications are conducted quarterly, including detailed incident investigations and lessons learned published to the entire company.

Risk Assessment

One of the company's most unique tools is its transport risk assessment that is utilized for any transport more than 30 miles from the crew's base. The 30-mile radius is designated as local area and should be mostly known to the crews. Outside of that area, the crews may not be familiar with hazards such as construction, tight streets or

underpasses and weather breaks (areas where the weather is known to get worse or better).

Crews complete a seven-question risk assessment and, based on the score, involve the team lead or safety department to determine whether enough risk can be mitigated to safely transport the patient from the referring to the receiving facility. The questions assess the driver's fatigue level; shift duration; severe weather; round-trip distance; time spent on transports during the current shift; road type and condition; and crew fatigue. For questions addressing weather and road conditions, the company provides a hyperlink to the 5-1-1 traffic camera system for every surrounding state that it transports so crews can get a real-time look at conditions on their route of travel before leaving.

If risk cannot be mitigated to a safe level, the company declines the transport until it can be safely completed. Many agencies take the patient regardless of risk, often due to financial or competitive pressure; this can often place the patient at risk. Ultimately, the patient will need to get to the receiving facility, which typically provides a higher level of care or a specialty that is not available at the referring facility; however, to ensure the safety of the crew and patient, the team must ensure that as much risk as possible has been mitigated before leaving. This may require the EMS provider to decline the transport; this can be a tremendous education point for many facilities because it is not typical for the industry. While it can be frustrating for the facility, ultimately it is the right thing to do for the patient.

Preventing Musculoskeletal Injuries

With musculoskeletal injuries being the most common cause of injury, the company emphasizes proper body mechanics (Reichard & Jackson, 2010). However, EMS personnel face unique situations that other industries do not. General industry workers have tools and equipment, multiple team members and room to move. Other healthcare settings have lifts, movement devices and team members. For EMS personnel, however, the typical situation is often just two workers trying to lift patients in tight, confined areas. Imagine a patient who weighs more than 500 lb having fallen in the bathroom of a narrow trailer, and a two-person EMS crew trying to lift the

individual off of the floor onto a carrier, then load the patient into an ambulance for transport. This is the unfortunate reality for EMS personnel across the country. HealthNet's patient loading injury rate is zero because every ground unit is equipped with a hydraulic patient loading system. This system removes the need for a crew to lift a patient into or out of an ambulance.

Injuries occur during the process of transferring patients to facility beds and into their homes. For the time, the initial hire academy briefly discussed body mechanics, but this was not helping the incident rate; the company needed a program that could help. The organization enlisted the help of a graduate student, a former EMT who conducted ergonomic lifting and moving training for one of the owner hospitals, to develop an EMS-specific lifting and moving training program (Kennedy et al., 2019). The program includes scenarios and competencies to help employees understand the training.

The company now teaches a body mechanics section in the new hire academy and has incorporated a patient movement section into the emergency vehicle operations course that ties the two aspects together. The corporate health and wellness program provides employees discounted memberships at various gyms around the state to encourage employees to work on strength training. The hope is that employees will maintain their functional strength and flexibility to decrease the risk of injury while at work.

Conclusion

These are just a few examples of what the organization is doing to manage safety in a dynamic industry where multiple areas of safety concern intersect. Many programs employed by the company are unique among most ground EMS agencies. The goal is to elevate the standard of safety in the industry across the U.S., allowing other agencies that request it to utilize the program or modify it for their own areas. HealthNet is transparent with its safety practices and will share its data and programs with other agencies. There is nothing propri-

etary in safety; as long as everyone goes home, that is all that matters. **PSJ**

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