

## **So You Want To Drive an Ambulance?**

**By Lee Burns, BS, EMT-P**

While on a recent shift, I was sitting in the ED completing paperwork when I heard a neighboring ambulance being dispatched to a call for a 25-year-old man with a lacerated finger. The information said the injury was located between two fingers, and with prearrival instructions, the bleeding was controlled. Dispatch advised the ambulance crew that the call was a priority-one Bravo, which refers to a lights and siren response from a BLS ambulance, with no other responding units.<sup>1</sup>

Upon arriving at the scene, the ambulance crew found the injured person waiting outside with his hand bandaged and the bleeding controlled. They reported to the ED that the patient had sustained a small laceration to the skin on the webbed part between two fingers. Patient documentation indicated a minor laceration with no life-threatening complications. Amazingly, while the crew advised the hospital of the patient's condition and their impending arrival, their rig's sirens could be heard in the background. When the ambulance arrived at the ED, the emergency lights were flashing and the siren was still in operation. As they unloaded the patient, I saw him sitting comfortably on the stretcher with his hand bandaged.

There are heavy responsibilities associated with being an emergency vehicle operator. The above case illustrates these responsibilities not being taken seriously. Driving an ambulance under any condition, emergency or otherwise, does not provide immunity from any laws. All emergency vehicle operators must understand the legal liability and moral obligation of performing their duties responsibly. They must understand state and local laws, as well as agency policies pertaining to the operation of their vehicle under emergency conditions. Additionally, they must be aware that they can be held financially and legally liable for their actions. Failure to act carefully and responsibly cannot be hidden behind lights and sirens.

### **What Is An Emergency?**

Webster's World Dictionary defines an emergency as "a sudden, generally unexpected occurrence requiring immediate attention." The EMS community generally believes that an emergency exists when the situation, illness or injury threatens life and/or limb. It can even be stretched to include a negative impact upon the future of the patient's quality of life. The problem for EMS providers is that this definition can differ from the one patients use when they call for EMS assistance.

One definition that includes all possibilities is that an emergency exists when the patient and their family or friends can no longer adequately deal with the situation at hand. Just because the situation is not an emergency in the eyes of the responder, does not make it any less of a crisis event to the patient. The patient must be the priority when an EMS agency is committed to respond. Because it is so difficult to have a concrete definition of an emergency, it is important to have pre-arrival instructions and a system like Priority Dispatch in place. Using Priority Dispatch, each call can be objectively assigned a response pattern, increasing the safety of the responders, the public and the patient. This system is also a more effective utilization of existing EMS resources.

### **Legalities of Driving a Rig**

Most states have traffic laws that allow special privileges for vehicles involved in an emergency response. For example, states may allow operators of these vehicles to drive through red lights and stop signs, drive the wrong way on a one-way street, exceed the maximum posted speed limits, or stop, stand or park in areas where parking is normally prohibited.<sup>2</sup> However, all of these privileges come with the requirement that the vehicle be operated in a safe and controlled manner, and that emergency vehicle operators consider the safety of all other people using the roads, including motorists and pedestrians.

As an example, the State of Vermont Statute (VSA) says that "the foregoing provisions shall not relieve the driver of an authorized emergency vehicle from the duty to drive with due regard for

the safety of all persons, nor shall such provisions protect the driver from the consequences of his reckless disregard for the safety of others."<sup>3</sup>

In this context, due regard means operating in a safe manner considering all of the possibilities that may be encountered. If an ambulance driver proceeds through an intersection against a red light after slowing down to a safe speed and ensuring that it is safe to proceed, he has exercised due regard. On the other hand, if the driver slows at the red light, proceeds and subsequently strikes any other object (vehicle, pedestrian, utility pole or structure), he has failed to use due regard. As a result, he could be charged with any number of traffic violations, including recklessness, vehicular assault or manslaughter. Because the driver failed to consider the traffic or obstacles and ensure safe passage before continuing through a controlled intersection, he did not display good judgment and failed to proceed in due regard.

Most state laws do not explicitly state, but rather imply, that if the emergency vehicle operator hits something or causes an accident, injury or property damage, they have failed to use due regard. One would think that ambulances operating with lights and siren would arrive significantly faster than rigs not operating under lights and siren. However, a study conducted by the East Carolina School of Medicine seems to suggest otherwise.

The study sampled 50 ambulance responses in Greenville, NC. Ambulances that were sent to a call without red lights and sirens and that obeyed the posted speed limits and traffic signals arrived, on average, 43 seconds after vehicles that used emergency warning devices, a difference that has been shown not to be clinically significant.<sup>4</sup>

### **Accidents Not Uncommon**

Based on studies published by Dr. Jeffrey Clawson of Medical Priority Consultants, in Salt Lake City, UT, there are approximately 12,000 ambulance-related crashes annually in the United States. Clawson's studies estimate that there is about one fatality for every 100 crashes, or 120 deaths annually in the U.S.

An individual will be involved in a motor vehicle accident at least once in 10 years, and has a 30% chance of sustaining a permanent disability resulting from that accident. EMS providers are at a 50% greater risk of being involved in a crash while on duty. Unfortunately, these crashes often involve members of the public. In many cases, the emergency vehicle strikes another vehicle, injuring or killing an occupant of either vehicle.

A study of all ambulance crashes in New York state from 1991-1996 showed that, on average, there were 385 accidents involving ambulances each year.<sup>5</sup> The 1996 report indicates that there were 392 reported ambulance crashes, from which there were two fatalities and 707 injuries, an average of about two injuries per crash. The 1996 data also found that 89% of the accidents occurred between 7 a.m. and 11 p.m.; 63.8% during daylight hours; 77% on straight and level roadways; 55.4% on dry road conditions; 47.2% during clear weather; and 41.1% at right angle intersections.

One would expect most accidents to occur late at night when a driver is tired, or during poor weather conditions, when road conditions are bad. However, in all of those situations, drivers tend to be at a heightened sense of awareness and more cautious, and as a result, fewer crashes occur at those times. The results of the New York study seem to indicate that predictable, stable road conditions give drivers a false sense of security.

### **Ambulance Construction**

Knowledge of basic ambulance construction can help drivers perform their duties properly and remain safe on the road.

Most ambulances are manufactured on van, recreational vehicle or straight truck chassis. Ambulances manufactured on recreational vehicle chassis (Type III) are typically rated for an average of 10,000 lb. maximum gross vehicle weight (GVW).<sup>6</sup> The GVW includes the vehicle, fuel, contents and passengers. The chassis manufacturer includes seat belts for the driver and the front seat passenger. Newer model chassis contain driver and passenger air bags and rear wheel anti-lock braking systems. The ambulance manufacturer adds seat belts for the crew in the

patient compartment, as well as padding on corners and ceiling rails and other parts of the compartment interior.

Despite these built-in safety features, ambulances have some common problems. As larger vehicles, they tend to have a higher center of gravity, which makes them difficult to corner at moderate speeds, and increases their probability of rolling over. Moreover, because they are larger, they carry more weight, which means it takes longer to stop.

Each manufacturer places specific weight limitations on its vehicles. However, when a service takes delivery of an ambulance, stocks the vehicle and places it in operation, it frequently pays little attention to its weight; often, vehicles are at the edge of their maximum GVW. This does not even take into consideration the weight of the passengers and patients. Proof that this occurs can be seen in a review of service maintenance records, which often reveal that ambulances tend to wear out tires, brakes and front-end compartments at an abnormal rate.

To resolve some of the above weight issues, several vehicle manufacturers have constructed trucks with higher GVW ratings. For example, the Freightliner, International and Ford Super Duty chassis are all rated for higher GVW maximums.

When writing specifications for a new emergency vehicle, the agency or individual making the purchase can delineate the configuration of the cabinets and the location and type of hardware used. Specifications should consider possible safety risks. For example, cabinets located above the bench seat can be a hazard. If the vehicle runs over a large bump, emergency personnel inside are likely to strike their heads on the underside of these cabinets.

Likewise, latching hardware should be secure and convenient for easy access but low in profile to minimize injury potential. This will prevent objects from falling out of compartments and striking the crew or patient.

If the vehicle stops suddenly, someone sitting on the crew bench can slide forward and either strike the front wall or be stopped by the arm rest at the front of the bench. One ambulance manufacturer has placed a bench-to-ceiling padded barrier at the head of the crew bench. If the vehicle stops suddenly, the EMS provider would slide into the padded barrier instead of striking the arm rest or front wall or falling into the curb side door stairwell.

Most EMS organizations contribute to potential personal injuries among their crews by storing unsecured equipment and supplies on the counter tops, crew bench or floor of the ambulance. They leave compartment doors open or unlatched, do not adequately maintain stretcher mounting brackets and allow the interior of their vehicles to wear without routine maintenance or repair. Their philosophy might be: "Why fix a latch, when bandage tape works just as well for less time and money?" What they don't realize is that any unsecured item can become a dangerous projectile in the event of sudden deceleration.

## **Use of Warning Devices**

Most emergency response vehicles use visual and audible warning devices. These are intended to identify the emergency vehicle to the general public. Visual devices include flashing, strobing and rotating lights, reflective markings and the vehicle's color. Audible equipment includes sirens and air horns. In many states, the minimum number of warning devices and their configuration and use are legislated in the vehicle code.

In the case of visual devices, research has indicated that 90% of sensory response is to visual stimuli.<sup>7</sup> To be effective, these devices must attract attention, immediately identify the vehicle, allow other motorists to determine the speed at which it is moving and be able to tell its direction of travel.

Ideally, lights should flash in an irregular pattern and alternate colors. Some colors tend to be more effective than others. For example, white lights are good at distances, while red and blue lights are poor in dark or very bright conditions, but work well when used with other lights. Yellow lights are good at distances and tend to mark vehicles well at scenes.<sup>8</sup> The use of reflective tape, such as Scotchlite or Reflexite, assists in determining vehicle shape and size and also improves vehicle visibility.

A study in the Journal of the American Optometric Association indicates that lighter-colored fire apparatus, specifically lime yellow, were involved in 50% fewer crashes than those painted darker

colors, such as traditional red.<sup>9</sup> Lighter colors like yellow, lime green and white have less color density and tend to reflect light better, which therefore makes the vehicles more visible. Unfortunately, the colors most frequently used--orange, red, blue and black--have the greatest densities.

One's perception can also be affected by the number of lights and colors on the vehicle. Too many lights and colors create a "camouflaging"<sup>10</sup> effect, in which the vehicle blends into its surroundings.

Audible devices include electronic sirens in a variety of different tones. Most sirens are produced with tones that wail, yelp or create high/low and phasor sounds. Vehicles are also equipped with loud speakers, and in many cases, air horns.

The New York City Fire Department studied the effectiveness of audible tones. The results of the study indicated that audible devices are more limiting than their visual counterparts. A motorist's ability to hear different siren tones depended on factors such as the type of car and the quality of its soundproofing, whether the windows were open or closed, the use of fans or air conditioning inside the vehicle, the volume of the vehicle's interior sound system and the position and distance of the emergency vehicle. The most effective range for the wail tone of a siren was only 25-40'.<sup>11</sup>

The study concluded that in order to improve the effectiveness of sirens, tones should be changed at intersections and speakers should be located at car heights.

Above all, to be effective, emergency lights and sirens must produce the appropriate response from the public, which is to "pull to the right lane of traffic and come to a complete stop until such emergency vehicle has passed."<sup>12</sup>

### **Use of Safety Devices**

Many studies have determined that the use of seat belts in other vehicles significantly reduces the severity of injuries sustained in crashes and the number of deaths on highways. While seat belts seem to be appropriate for use in ambulances, they are not required by law in every state. For example, the New York State Vehicle and Traffic Law exempts ambulances from the mandatory use of seat belts.

EMS organizations wishing to use restraint devices on their vehicles must develop policies requiring crews to wear seat belts, particularly the driver and front seat passenger. Additionally, agencies should adopt policies for securing loose equipment and supplies kept on dashboards and patient compartment counter tops and should also ensure that interior vehicle storage compartment doors are kept closed when the ambulance is in motion so that nothing falls on the crew or patient. Most importantly, the service needs to secure heavy items, such as oxygen cylinders, cardiac monitors, suction machines, drug bags and jump kits, which can become missiles in the event of a crash.

Aside from policy development, it is crucial that continuous preventive maintenance be performed on all vehicles. A well-maintained ambulance is less likely to be involved in a crash than one with poor brakes or a worn front end. Preventive maintenance should also include ensuring that all passive restraint systems and safety devices are functional.

### **Educating Drivers**

EMS agencies must also take action to educate their emergency vehicle operators in order to reduce accidents and prevent injuries and property damage. A New York City study found that after mandatory driver education, an ambulance service experienced a 50% reduction in all types of crashes.<sup>13</sup>

Many training programs are available, and can be purchased through vendors or state or local municipalities, which may have programs open for enrollment. An agency may also develop its own training course to meet the needs of its staff.

Whatever the choice, the best programs combine classroom and practical skills driver training. During classroom training, students become familiar with the laws, principles and techniques of handling an emergency vehicle safely. Then, during practical skills training, they become familiar with some of the special skills required for driving and handling an emergency vehicle in a

controlled environment. As with any training program, mentoring with an expert is important for the learning process. A mentor can provide a new driver with feedback and corrective advice before they are placed on a public highway.

### **Enhancing Public Awareness**

Since ambulances on an emergency run operate around other vehicles, the general public must be educated on how to appropriately respond to them. Most state laws dictate that a motorist must yield the right of way to an ambulance or other emergency vehicle running lights and siren by moving their vehicle to the right shoulder and stopping.

Aside from knowing how to handle, approach and pass an emergency vehicle, the public also needs to know how to pass a stopped vehicle at a scene. Additionally, they need to be reminded not to park or stand in fire lanes or impede access to other emergency vehicles. How many times have cars been lined up in front of the neighborhood grocery store while someone "runs in for a few little things?"

Interactive public information or education programs are the most appropriate and effective method for EMS agencies to teach the general public how to respond to vehicles engaged in an emergency response.

### **System Improvements**

It makes sense for the EMS community to institute driving performance improvements on a system-wide basis. Changes in response patterns can be achieved at the agency, medical direction and dispatching levels.

Individual agencies must develop policies and procedures that specifically address the operation of emergency vehicles. These policies may include prerequisites for driving an emergency vehicle, including behavioral expectations; overall responsibility for the vehicle and crew; driver training and education; acceptable uses of the vehicle; agency rules for driving and parking vehicles; driving skill retention or recertification; routine vehicle check and maintenance; disciplinary procedures; and procedures in the event of an accident.

Medical direction plays an important role in the provision of prehospital care, and it may also affect the way in which the service responds to an EMS request. Any decisions that change response protocols should be reviewed and approved by the agency or system medical director. The medical director should have input regarding an issue as important as the mode of response, despite the fact that it may not appear to directly affect patient care.

For example, many medical experts believe that time is a crucial element in the recovery of strokes. As such, they would advocate that the EMS response be made as fast as possible for these emergencies. However, in its dispatch program, Medical Priority Consultants, of Salt Lake City, UT, has determined that a possible stroke without "priority symptoms" (diminished level of consciousness, chest pain, difficulty in breathing) does not warrant a hot response. In the medical community, opinions vary widely on this issue.

In EMS systems, response patterns tend to be determined by a centralized dispatching point. If this point utilizes a priority dispatch system, dispatchers are trained to make an educated determination as to the severity of the call and then send the appropriate vehicles and equipment to the scene.

For example, Medical Priority's dispatch system is based on a specified line of questioning that assists the call taker in determining the nature and severity of the situation. With that knowledge, the dispatcher can send the necessary resources in an appropriate response mode. If the information received indicates the call is serious or life-threatening, the response is hot. If the call is not serious, the response is cold. Using this system, or one like it, can reduce the amount of time vehicles use red lights and sirens in less serious or non-emergent incidents.

### **Conclusion**

Emergency vehicle drivers need to be educated, careful and alert in order to perform their duties effectively. The public deserves the best possible emergency service, and that service includes the ability to drive safely. Every driver of an emergency vehicle must have the moral and legal responsibility to operate their vehicle with "due regard for the safety of all persons."<sup>14</sup>

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