R&D yields new standard for safer ambulances

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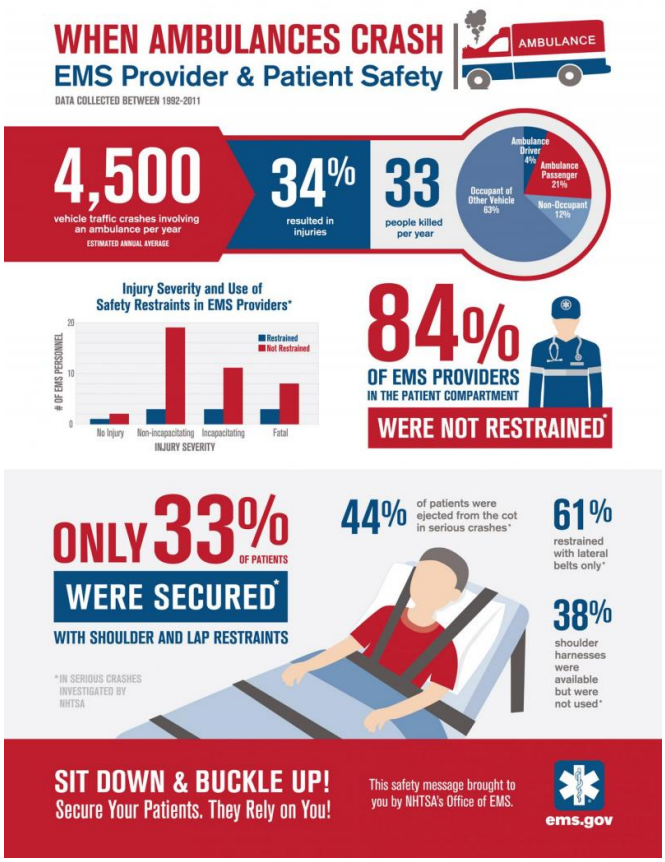

An infographic detailing the dramatic injury and death statistics associated with ambulance crashes during a 20-year period (1992-2011). Credit: National Highway Traffic Safety Administration (NHTSA), U.S. Department of Transportation

Thanks to a newly updated standard for ambulance design based on research and development by the National Institute of Standards and Technology (NIST) and two federal partners, emergency runs should soon be much safer for paramedics and other first responders.

Emergency medical service (EMS) providers riding in the back of current-design ambulances are at high risk of injury or death during a crash or an evasive traffic maneuver if they're not using restraints. However, they often complain that restraints make it difficult to access and treat patients while in route to a hospital.

Trading off protection for function often comes at a price. Between 1992 and 2011, the National Highway Traffic Safety Administration (NHTSA) estimates there was an average of 4,500 vehicle crashes involving ambulances annually, a third of which resulted in injuries. The crash statistics also show that 84 percent of EMS providers riding in the patient compartment were not restrained and only 33 percent of patients were secured with both shoulder and lap restraints.

To maximize safety without compromising effectiveness, NIST, the Department of Homeland Security (DHS) Science and Technology Directorate (DHS S&T), and the National Institute of Occupational Safety and Health (NIOSH) developed design guidelines for ambulance patient compartments.

These guidelines were recently used by the National Fire Protection Association (NFPA) to update NFPA 1917, "Standard for Automotive Ambulances," a recognized voluntary consensus standard used by manufacturers designing ambulance components and complete vehicles. The changes to NFPA 1917 were adopted by the association's members in June 2015; the revised standard—NFPA 1917, 2016 Edition—is now available via the NFPA website.

"With the new design standards, emergency personnel should be able to do nearly 95 percent of their tasks while properly restrained," says Jennifer Marshall, homeland security program manager in NIST's Special Programs Office.

Marshall says the updated NFPA 1917 details safety, efficiency and ergonomic improvements for compartment configuration. It also includes

recommended specifications for seating and restraints, equipment mounting, patient cot retention, communications equipment, controls and switches, interior surfaces and storage, ventilation, illumination, and waste and sharps (needles) disposal.

"For the first time, we now have a voluntary consensus standard that includes testing and performance requirements from a crash perspective," Marshall says. "Those requirements range from 'soft' recommendations, such as countertops and work surfaces designed to keep items from falling off, to 'hard' directives such as how the patient cot and caregiver seat are positioned."

Submitted to NFPA by NIST and NIOSH, the new ambulance design guidelines were developed following an exhaustive four-year R&D effort. Data were gathered through many methods, including surveys, focus groups, interviews with individual EMS workers, visits to equipment manufacturers and EMS stations, computer simulations and crash tests.

NFPA 1917, 2016 Edition, will go into effect on Jan. 1, 2016. NIST and its partners are now working with ambulance component and vehicle manufacturers, the National Association of State EMS Officials, trade organizations and state and federal government entities to increase awareness and foster understanding of how to improve ambulance safety using voluntary consensus standards.

Provided by National Institute of Standards and Technology