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SEARCHING FOR AMBULANCE SAFETY: WHERE IS THE LITERATURE?

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Objective: To identify epidemiology, risk management, and engineering publications regarding ambulance transport safety, ambulance collisions, morbidity, mortality, and adverse events resulting from ambulance collisions.

Methods: Using MEDLINE (January 1, 1966, to June 1, 2005), a review was conducted to identify articles relating to ambulance collisions or ambulance safety. Non-peer-reviewed articles were excluded from analysis. Automotive databases were searched to meet these criteria in addition to consultation with ambulance automotive safety expertise to identify additional engineering publications. Total fatal ambulance collisions, injuries, and fatalities (incidence per 100 million miles traveled) were estimated for each relevant study and costs were identified.

Results: Identified via MEDLINE were 29 epidemiologic papers, five risk management papers, one peer-reviewed ergonomic paper, four editorials, and one peer-reviewed engineering paper. Identified via the other search approaches were six peer-reviewed engineering papers, two standards, two guidelines, one report, one technical symposium's proceedings, one specification, and two editorials. The data reviewed demonstrated that approximately 5,136 collisions, six fatal collisions, 11 fatalities, and 1,453 injuries occurred per 100 million miles traveled. Risk factors identified were use of warning lights and sirens, drivers with a prior collision history, lack of use of restraints by personnel, and driving through red lights at intersections. Ambulance collisions were the highest liability cost in emergency medical services (EMS).

Conclusions: Ambulance transport is hazardous and adverse vehicle events are expensive. Even though the majority of ambulance safety literature is very recent, most studies fail to use a common denominator to characterize rates of incidents, injuries, and fatalities. This is especially problematic when attempting to compare studies across time, different services, and different geographic regions. Furthermore, there is an overall failure of the MEDLINE electronically indexed database to integrate important peer-reviewed engineering articles addressing ambulance safety. Studies reviewed suggest that enforcement of driving regulations, changing ambulance operators' behavior, and head protection and improved engineering of the rear compartment may reduce injuries, fatalities, and financial costs associated with collisions. Given the high cost and the frequency of these adverse events, ensuring standard common denominators in epidemiologic studies and improving access to the engineering literature may assist the process for making positive change within the industry.

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