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SPECIAL CONTRIBUTIONS

Injury Prevention: Is There a Role for Out-of-hospital Emergency Medical Services?

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ABSTRACT

Objective: To review the literature for options for integrating injury prevention into the role of out-of-hospital emergency medical services (EMS).

Data Sources: Computerized searches of the English-language literature from 1966 through 1994 were conducted using the MEDLINE and National Association of EMS Physicians (NAEMSP) databases. These were supplemented by hand searches of pertinent journals not indexed on MEDLINE or by NAEMSP and the reference lists of retrieved articles. Key words searched included *emergency medical services, accident, injury, prevention, and safety.*

Article Selection: The review included all articles that described the experience of EMS organizations or individuals providing primary injury prevention (PIP) services or that proposed EMS PIP activities.

Synthesis: PIP EMS experiences and PIP activities proposed for EMS included: preventing injuries in EMS providers, serving as role models, identifying persons at risk for injury, providing prevention counseling, collecting injury data, surveying residences and institutions for injury risks and hazards, conducting educational programs and media campaigns, and advocating legislative changes that promote injury prevention. Few studies have evaluated the effectiveness of EMS PIP activities.

Conclusion: As changes in the market compel health care systems to focus more on prevention, EMS organizations and individual providers may be assuming new injury prevention roles. Some EMS systems in many parts of the country have incorporated PIP into their work. It is necessary, however, to determine which PIP roles are effective and how they will be supported.

Key words: emergency medical services; accident; injury; prevention; safety.

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The goal of primary injury prevention (PIP) is to keep an injury from ever occurring.^{1,2} This is in contrast to secondary and tertiary prevention, whose acute care and rehabili-

tation activities are aimed at an injury that has already occurred. Presently, the mission of most emergency medical services (EMS) organizations and individual providers is secondary pre-

vention: rendering acute care to out-of-hospital patients with sudden or unexpected injuries or illnesses. Due in large part to changes in reimbursement, many health care systems are focusing more on wellness and prevention.³⁻⁷ Should EMS follow the lead of other health professionals and focus on PIP?

Many in EMS have proposed that PIP services be integrated into the traditional role of EMS in providing out-of-hospital emergency medical care.⁸⁻¹³ As early as the mid-1980s, editorials in the *Journal of Emergency Medical Services (JEMS)* were advocating injury and trauma preven-

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tion for EMS agencies.^{8,9} In a 1985 *JEMS* editorial, one author stated that “trauma prevention is an appropriate, productive and often rewarding part of EMS Prevention is the right side of the issue—EMS has a special role to play.”⁹ A more recent *JEMS* editorial stated that “EMS personnel are in a unique position with regard to providing community-centered awareness programs” and “prevention education.”¹⁰ The Institute of Medicine concluded, in its report on EMS for children, that “sustained efforts at prevention have the potential to be the most effective EMS intervention.”^{14,15} A 1993 *JAMA* editorial called for enhanced training in injury prevention for health professionals at all levels.¹⁶

Before resources are expended for new interventions or health services, the relevant literature should be reviewed systematically.¹⁷ The purpose of this study was to examine the literature regarding a PIP role for out-of-hospital EMS. This literature search was conducted primarily for a national consensus project examining the role of EMS in injury prevention. The findings of this literature review were prepared for the national consensus panel studying the role of EMS in injury prevention in August 1995. Subsequently, in February 1996, the Consensus Statement on the EMS Role in Primary Injury Prevention¹⁸ was presented to the National Highway Traffic Safety Administration (NHTSA) and the Maternal and Child Health Bureau (MCHB) by the National Association of EMS Physicians (NAEMSP). The findings can be used by EMS leaders and decision makers contemplating the integration of injury prevention into the day-to-day activities of their EMS systems.

DATA SOURCES

We conducted computerized searches of the English-language literature from 1966 through 1994 using 2 databases: 1) MEDLINE, which is maintained by the National Library of

■ **TABLE 1** Peer-reviewed and Indexed Articles of Emergency Medical Services (EMS) Involved in Primary Injury Prevention (PIP) Activities

Author/Reference*	State	PIP Activity
Auerbach et al. 1987 ²¹	TN	Preventing injury in EMS providers
Gerson et al. 1992 ²⁶	OH	Identifying persons at risk for injury
Tintinalli 1993 ²⁵	(U.S.)	Preventing injury in EMS providers
Wofford et al. 1994 ³⁹	NC	Identifying persons at risk for injury; injury data collection

*For complete reference citations, see the reference list.

■ **TABLE 2** Non-indexed or Non-peer-reviewed Articles of Emergency Medical Services (EMS) Involved in Primary Injury Prevention (PIP) Activities

Author/Reference*	State	PIP Activity
Arters 1988 ²⁰	NM	Preventing injury in EMS providers
Elling 1989 ²²	NY	Preventing injury in EMS providers
Cook et al. 1991 ²³	PA	Preventing injury in EMS providers
Gerson et al. 1991 ²⁷	OH	Identifying persons at risk for injury
Krumperman 1993 ²⁸	NY	Identifying persons at risk for injury
Anonymous 1994 ⁴⁴	VA	Educational program
Harrawood et al. 1994 ⁴⁰	FL	Injury data collection, educational program, surveying residences for injury risk, media campaign
Minall 1994 ⁴³	NY	Educational program

*For complete reference citations, see the reference list.

Medicine; and 2) an EMS database maintained by the NAEMSP. Key words searched include *emergency medical services, injury, accident, prevention, and safety*. These computerized searches were supplemented by hand searches of all the issues of 2 pertinent EMS journals: *Prehospital and Disaster Medicine* and *JEMS* through 1994. The latter journal is neither peer-reviewed nor on MEDLINE or the NAEMSP database. In addition, we manually searched the reference lists of retrieved articles and made requests to key informants for pertinent articles.

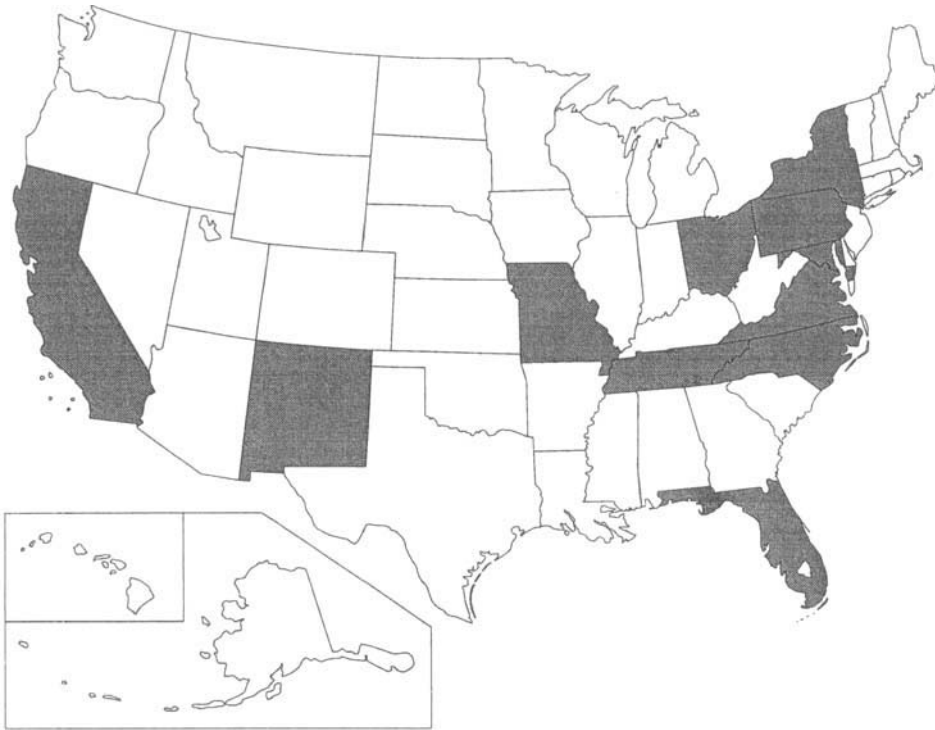
ARTICLE SELECTION

We reviewed all articles, including editorials and commentaries, that either described the experiences of EMS organizations or individual providers in providing PIP services or proposed EMS PIP activities. Abstracts, when available, were reviewed, and complete articles were read and reviewed. We searched articles for EMS PIP roles described or proposed. There were 33 identified articles addressing the role of EMS in

injury prevention. Twelve articles were found in peer-reviewed journals; 4 of which were studies involving EMS and PIP experiences (Table 1), 8 of which were commentaries or editorials proposing EMS PIP activities. Twenty-one articles were in non-peer-reviewed journals; 8 of which described EMS PIP activities (Table 2), 13 of which were commentaries or editorials proposing EMS PIP roles. Three of the 33 articles included evaluation data.

SYNTHESIS

The literature search revealed 33 articles, editorials, and commentaries describing the involvement of EMS organizations and individual providers in a variety of PIP experiences and activities or proposing EMS PIP roles in many parts of the country. Figure 1 shows the distribution of states with EMS PIP activities cited in the literature. We found 9 categories of PIP activities either described or proposed, which included: preventing on-the-job injuries in EMS providers, serving as role models of safety and prevention, identifying



■ **FIGURE 1.** Highlighted states represent those with emergency medical services primary injury prevention activities cited in the literature.

persons at risk for injury, acting as one-on-one counselors, collecting injury data, surveying residences and institutions for injury risks and hazards, developing and conducting educational programs and media campaigns, and advocating legislative changes that promote prevention of injuries (Table 3). These 9 categories of PIP activities for EMS are detailed below. Each EMS PIP activity was described or proposed in one or more articles, and some articles described or proposed more than one EMS PIP activity.

Injury Prevention for EMS Providers: A number of articles described programs aimed at preventing injuries in EMS providers, and one state dedicated an annual EMS conference to issues of providers' wellness.¹⁹ Concern for the fitness of EMS providers caused one EMS director in Hobbs, NM, to initiate a mandatory fitness program for EMS providers.²⁰ The goal of the "Hobbs plan" was to re-

duce injuries on the job by improving cardiovascular fitness and stress management. As a measure of the program's success, a decrease in sick-day utilization was noted after the program was instituted.

Ambulance crashes are a concern for the profession and pose increased risk of injury to providers.^{21,22} A study of seat belt use by EMS providers found that providers did not use restraints in the back of the ambulance a large percentage of the time.²³ The article included suggestions for increasing seat belt use by providers such as evaluating the position of equipment and the location of the seat in the back of the ambulance.

One of the major injury problems for EMS providers is back injuries.²⁴ The authors of one commentary described the components of a back injury prevention program that included adequate preemployment screening, prevention training, physical strengthening, and ways to minimize hazards.²³ The article reported that one ambulance service in San Jose, CA,

reduced its workers' back injury rate after implementing a preemployment screening program.

Emergency medical services providers are sometimes called to situations that place them at risk for violence-related injuries. A 1992 survey study of EMS providers in 19 states concluded that although the potential for injury to EMS providers from violent persons is widespread, no mechanism exists for assessing or identifying a situation or person that may pose a risk to EMS providers.²⁵ The article recommended establishing protocols for managing violent patients and training in self-defense and assessment skills for violent scenes.

Serving as an Example: One commentary suggested that EMS providers can serve as role models of safety and injury prevention by wearing seat belts in the ambulances and their own vehicles. They hypothesize that EMS providers may have an impact on the safety behavior of other citizens.⁸ Others believe that EMS providers have an obligation to be role models. In an editorial commenting on the lack of seat belt use by EMS providers, it was asked, "how can we criticize the very patients we are transporting for the injuries they sustained by not wearing seat belts while we are bouncing about the back of the ambulance risking similar injuries?"²³

Identifying Persons at Risk for Injury: A prospective study in Akron, OH, looked at the capability and benefit of paramedics identifying elders at risk for environmental, social, medical, or mental problems that would warrant referral.^{26,27} The program was a collaborative effort among EMS, the fire department, the local hospitals' EDs, and the agency on aging. The authors concluded that paramedics can identify elders at risk and can serve as an important referral linkage to agencies that serve the elder population.

In 2 other EMS systems, risk identification has been actively inte-

grated into EMS education. The Syracuse EMS system devotes 10% of its training to developing skills in recognition of at-risk factors, with subsequent plans for intervention and referrals to social services, especially for elders.²⁸ The Bureau of EMS in Missouri has established a relationship with the state division of aging to educate EMS personnel and facilitate reporting and investigation of cases of elder abuse. The goal of this program is the reduction of such incidents through early intervention and prevention.²⁹

One-on-one Prevention Counseling:

It is argued that face-to-face contact between individuals and the EMS provider may be the best way to teach people about the importance of injury prevention devices and activities.⁸ For example, EMS providers can provide knowledge about seat belt use and safety to those who do not wear them. Two commentaries stressed the need for EMS providers to become “environmental observers” who document observations from the scene.^{30,31} It was suggested that in cases of child abuse or domestic violence, trained observational skills may place the EMS responders in a unique situation to provide counseling or suggest a referral.³²⁻³⁴ The providers can offer domestic violence hotline numbers to victims, especially to those refusing transport to a medical facility. The authors of one commentary provided a list of specific signs of domestic violence of which EMS providers should be familiar.³⁰ Another commentary provided tips on how EMS providers can best help battered women avoid future violence.³⁵

Injury Data Collection: In the literature, the EMS system is viewed as a rich source of important injury data. To maximize the utility of EMS data, the authors of one article proposed that EMS be integrated into a region-wide health monitoring and referral system.³⁶ Under such a system, a regional center would centralize health

information from various hospitals and health care organizations, social service organizations, governmental and law enforcement agencies, and legislative bodies. In an established infrastructure for interagency networking and data exchange, the EMS system would be an important public interface and would provide information about injury monitoring, including “near-injury” incidents, as well as effectiveness of prevention efforts. An editorial accompanying the article noted that this type of approach would make EMS agencies become proactive and preventive rather than reactive, as is often the case with the current EMS systems.³⁷

Two articles, one a commentary and one a study, proposed the use of computerized EMS data collection by EMS systems to establish injury frequency distributions³⁸ and community surveillance³⁹ to better plan interventions. A retrospective surveillance study in North Carolina evaluated the usefulness of computerized EMS data to determine rates of falls among elders.³⁹ The study used data collected by EMS personnel, but did not verify the accuracy of the data.

Some EMS systems have developed specific injury data collection systems. An epidemic of submersion injuries in Pinellas County, FL, prompted the EMS system to implement a drowning prevention program that involved the establishment of a registry for collecting drowning injury data.⁴⁰ The Maryland Institute for Emergency Medical Services Systems (MIEMSS), which coordinates the statewide EMS/trauma care system, established an injury prevention and surveillance program in the mid-1980s.⁴¹

Injury Risk Surveys: Different from identifying persons at risk for injury during an emergency care situation, offering surveys of homes and other locations for circumstances that put persons at risk for injury is another PIP role that some EMS agencies have undertaken. As part of their

■ **TABLE 3** Primary Injury Prevention Activities for Emergency Medical Services (EMS) Cited in the Literature

Preventing injury in EMS providers
Serving as role models of safety
Identifying persons at risk for injury
Providing prevention counseling
Collecting injury data
Surveying residences/institutions for injury risk and hazards
Conducting educational programs
Developing media campaigns
Advocating legislative changes

drowning prevention program, the Pinellas County EMS, with the help of local fire departments, organized free home-pool safety surveys.⁴⁰ One author recommends that EMS join forces with automobile dealers at county fairs or other community gatherings to offer free inspections of cars to see that safety belts are used properly and that infant car seats are installed and used appropriately.⁸

Educational Programs: Sponsoring and conducting educational programs on injury prevention for community groups such as school classes and audiences at civic events represent a frequently recommended PIP role for EMS. The recommended topics range from general injury prevention to motor vehicle safety and the role of violence in injury. Collaborative efforts with other public service agencies are urged.⁴²

The Pinellas County drowning registry revealed that children <3 years old in residential pools under adult supervision were at greatest risk for drowning.⁴⁰ To target that risk group, an annual April Pools Day was established where EMS providers conduct infant and child CPR classes and educate parents and children on water safety.

In a pilot program called KISS (Kids, Injuries, and Street Smarts),⁴³ New York City (NYC) EMS providers participated in an educational program of injury and violence prevention that targeted junior high school students. More than 100 EMS em-

ployees volunteered for 24 available KISS positions, which, according to the article, demonstrated the willingness of many EMS providers to participate in PIP activities. The program and curriculum were designed by a NYC EMS paramedic and the project was coordinated by NYC EMS, Harlem Hospital, and the New York City Health and Hospital Corporation. There has been no formal evaluation of the effectiveness of the program, but program organizers plan to use trauma registry data to determine whether pediatric trauma patients had prior exposure to the KISS school program.

Voices Against Violence is a program established by EMS providers in Richmond, VA, in response to increasing violence in their community.⁴⁴ EMS providers are being trained to speak to the community about violence prevention and to educate youth groups on violence avoidance techniques, which include building self-esteem and conflict resolution.

Media Campaigns: As part of their drowning prevention program, the Pinellas County EMS system implemented a media campaign.⁴⁰ The campaign used a variety of venues, including local newspaper articles, a press conference, television programs and public service announcements, radio interviews, and the placement of water safety information in county utility bills. There was no assessment of the campaign's effectiveness.

Advocacy: Lobbying for legislation that promotes injury prevention is a role that has been incorporated into the Maryland EMS system.⁴¹ Individuals from MIEMSS have participated in lobbying efforts to increase the legal drinking age, to lower the blood alcohol level for drinking while intoxicated, and to pass laws mandating seat belt use in their state. One editorial urged EMS providers to become involved politically in their communities by writing to legislators

in support of laws that promote safety, by joining local traffic safety councils, and by supporting organizations such as Mothers Against Drunk Drivers.⁴⁵ Another commentary noted that EMS providers have affected public safety by documenting motor vehicle crash frequency on certain roadways, then successfully advocating for stoplights and road signs.³⁸

Scientific Evidence: In this literature review, no article was found in the peer-reviewed literature that examined the effectiveness of EMS's carrying out PIP activities with regard to actual prevention of injuries. Three articles did include evaluation data, only one of which is in a peer-reviewed journal. Harrawood et al.'s article detailing the Pinellas County drowning prevention program in the non-peer-reviewed journal *JEMS* described the results of their evaluation, which found a 48% decrease in submersion injuries after the implementation of their prevention program.⁴⁰ There was, however, no control group for comparison.

Krumperman's article in *JEMS* described the program in which EMS providers were given orientation training in recognition of persons at risk for injury and taught how to make referrals to social services. The article did not look at effectiveness, but did note that within 19 months of initiating the program, 50 referrals were made by EMS providers.²⁸ There was no discussion about the appropriateness of the referrals.

The study of paramedics' ability to recognize elders at risk in Akron, OH, by Gerson et al. in *Annals of Emergency Medicine* used the program's usefulness to patients or caregivers as the main study outcome. The researchers found that 63% of 197 elder persons reported to be at risk received an assessment by the local agency on aging. The program was useful for 94 or almost half of the 197 patients identified, and usefulness was defined as the elder per-

son's receiving services.²⁶ There was no evaluation of the ability of the EMS providers to identify at-risk elders, i.e., how many of at-risk elders who required identification were actually identified by the EMS providers.

DISCUSSION

Our search for material either describing experiences of or proposing activities for EMS agencies or individual EMS professionals in PIP uncovered relatively few articles given the large number of articles in the injury field and the growing interest in injury prevention. While some articles have been published in non-peer-reviewed journals, there is a paucity of articles in the peer-reviewed literature, especially ones evaluating the effectiveness of EMS PIP interventions. The literature reviewed, however, did help guide the national consensus group studying the role of EMS in PIP, and thus can provide some guidance for possible roles for EMS agencies and individual EMS professionals. We found that some EMS systems in many parts of the country have been active in the area of injury prevention.

Primary injury prevention by emergency services is not a new concept. The fire service pioneered fire prevention, and fire companies spend much of their working time on fire prevention activities. EMS systems, in general, have not been as aggressive as the fire service in PIP activities. This may be explained by the "busy" nature of EMS systems. In contrast to fires, which in most cities are sporadic and infrequent, medical emergencies keep many EMS providers rushing from one patient call to another with very little downtime.

The lack of downtime in some EMS systems raises the question of how PIP activities can be accomplished by busy EMS systems. Should EMS agencies hire a specialist who concentrates solely on PIP activities, or should all members of the

EMS agencies be PIP specialists? Depending on resources and needs, this may vary from community to community. In many places the EMS system is staffed by volunteers. Can volunteers be expected to do more?

Another question is, will the EMS individual providers care about PIP? The KISS program in NYC, which recruited EMS providers who volunteered their time, is encouraging evidence that some individual EMS providers do care about PIP.⁴³ Further encouraging proof of the interest in PIP by EMS is that the New Mexico Emergency Medical Services for Children (EMSC) project recently funded 10 proposals for community injury prevention projects submitted by EMS agencies.⁴⁶

Two trends may accelerate the involvement of EMS in PIP activities. First is the acquisition of small EMS agencies by larger corporations. As EMS becomes more of a profit or revenue-oriented "business," EMS organizations may return some of their revenues, in the form of proactive programs, back to the community. A second trend is the operation of EMS agencies by managed care organizations (MCOs). These organizations have a need to keep their contracted population healthy, which in turn keeps the MCO, as a business, healthy. PIP is a potentially cost-effective way to keep the population from requiring expensive acute care and rehabilitation services. With cost savings as a potential benefit, MCOs may be eager to invest in PIP activities and research. As MCO employees, EMS professionals will likely find themselves in the role of data collectors and providers of information about how to keep an injury from ever occurring to both community groups and individual patients.

Emergency medical services providers, being the first responders to the site of injuries, have a unique role in the health care system. They are daily witnesses to injuries and their causes and view the "raw" data of injuries, unlike the ED staff, who

have second-hand accounts of events, or the injury epidemiologist, who has third-hand accounts. EMS providers may be the only witnesses of domestic violence or child abuse episodes, or they may observe, while carrying out their primary mission of providing acute care, situations in the environment that put individuals at risk for injury. Thus, even if EMS systems are unable to undertake specific PIP projects, they can have an injury prevention role as collectors and recorders of the "raw" data.

Unlike many hospitals, EMS systems often provide care to a distinct population. For example, an EMS system may be the only out-of-hospital emergency care agency for a city, county, or region. This also provides that agency with a special opportunity to collect and assimilate population-based data. Last⁴⁷ defines population-based as "pertaining to a general population defined by geopolitical boundaries; this population is the denominator and or sampling frame." Population-based EMS data can be used as the basis for or as a supplement to an injury surveillance system. EMS input into injury data collection could have far-reaching utility for designing future effective PIP activities. A comprehensive data collecting system involving EMS systems would allow EMS to be an integral part in guiding preventive interventions and then monitoring their effectiveness.

Research is needed to determine how best to integrate PIP activities into the acute care role of EMS and to assess the effectiveness of EMS PIP activities. As this area of work for EMS matures, it will require evaluation, which is very difficult to conduct. The challenges include the number of variables necessary to control for risk adjustment and the difficulty in finding a comparable control community.

Is there a role for out-of-hospital EMS in PIP? While data supporting the effectiveness of EMS in PIP are lacking and there are those who will

not agree with us, we believe there are rational reasons why EMS should be involved in PIP. The injury control literature suggests that PIP programs that are narrowly focused, though have a multifaceted design, are most effective.^{48,49} In addition, legislative⁵⁰ and engineering⁵¹ interventions are more successful than educational efforts.⁵² EMS systems will need to be selective about which PIP activities they undertake and how they will evaluate them given EMS's limitations of time and resources. Collaboration with other agencies or public health departments on PIP initiatives may be sensible. Notwithstanding, as health care systems focus more on wellness and prevention, EMS systems are in a unique and ideal position to make contributions to PIP and to help reduce the number of preventable injuries in the population.

CONCLUSION

As changes in the market compel health care systems to focus more on prevention, EMS organizations and individual providers may be assuming new injury prevention roles. Our literature search found that some EMS systems in many parts of the country already have been involved in PIP, and several commentaries and editorials advocate PIP for EMS. However, no assessment of effectiveness of programs was found. It is necessary, therefore, to determine which roles are effective and how they will be supported.

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REFERENCES

1. Avery JG. Accident prevention—injury control—injury prevention or whatever? *Injury Prev.* 1995; 1:10–1.
2. Fletcher RH, Fletcher SW, Wagner EH. *Clinical Epidemiology: The Essentials*. ed 2. Baltimore, MD: Williams and Wilkins, 1988, p 158.
3. Skolnick AA. Injury prevention must be part of nation's plan to reduce health care costs, say control experts. *JAMA.* 1993; 270: 19–24.
4. Martinez R. Injury prevention: a new perspective. *JAMA.* 1994; 272:1541–2.
5. Lee PR. Advancing America's health. *JAMA.* 1995; 273:248–9.
6. Davidson RJ. The community where reform rolls on. *JAMA.* 1995; 273:255.
7. Myrick JA. Systems approaches in emergency medical services: the history, the impact, and the future. *J Soc Health Syst.* 1992; 3(4):37–47.
8. Hoffman KD, Kemmerer SW, O'Brien J. Motor vehicle trauma injury prevention. *J Emerg Med Serv.* 1986; 11(8):30–3.
9. Wolff B. Prevention: the right side of the issue [editorial]. *J Emerg Med Serv.* 1985; 10(10):4–5.
10. Criss E. Unlocking the future: EMS must choose a path [editorial]. *J Emerg Med Serv.* 1994; 19(12):23–4.
11. Hedges JR. Preparing for the future. *Prehosp Disaster Med.* 1995; 10:15–6.
12. Miller DR. A transition to prevention: a vision for change. *Ambulance Industry J.* 1994; 14(3):26–7.
13. Ogborn CJ. Childhood injury and emergency medical services for children. *Curr Opin Pediatr.* 1994; 6:321–3.
14. Institute of Medicine. *Emergency Medical Services for Children*. Washington, DC: National Academy Press, 1993, p 258.
15. Weinberg JA, Medearis DN. Emergency medical services for children: the report from the Institute of Medicine. *Pediatrics.* 1994; 93: 821–3.
16. Skolnick AA. Experts reveal national plan for injury control [editorial]. *JAMA.* 1993; 270:24.
17. Petiti DB. *Meta-Analysis Decision Analysis and Cost Effectiveness Analysis*. New York: Oxford University Press, 1994, p 4.
18. National Highway Traffic Safety Administration. *Consensus Statement on the EMS Role in Primary Injury Prevention*. Washington, DC: US Government Printing Office, 1996.
19. Wolff B, Facey MR, Burke D. Responder wellness. *J Emerg Med Serv.* 1988; 13(11): 24–7.
20. Arters LB. Physical fitness for EMS providers. *J Emerg Med Serv.* 1988; 13(1):50–5.
21. Auerbach PS, Morris JA, Phillips JB, Redlinger SR, Vaughn WK. An analysis of ambulance accidents in Tennessee. *JAMA.* 1987; 258:1487–90.
22. Elling R. Dispelling myths on ambulance accidents. *J Emerg Med Serv.* 1989; 14(7): 60–4.
23. Cook RT, Meador SA, Buckingham DB, Groff LV. Opportunity for seatbelt usage by ALS providers. *Prehosp Disaster Med.* 1991; 6:469–71.
24. Terribilini C, Dernocouer K. Save your back: injury prevention for EMS providers. *J Emerg Med Serv.* 1989; 14(10):34–41.
25. Tintinalli JE. Violent patients and the prehospital provider. *Ann Emerg Med.* 1993; 22: 1276–9.
26. Gerson LW, Schelble DT, Wilson JE. Using paramedics to identify at-risk elderly. *Ann Emerg Med.* 1992; 21:688–91.
27. Gerson LW, Hoover R, McCoy S, Palmisano B. Linking the elderly to community services. *J Emerg Med Serv.* 1991; 16(6):45–48.
28. Krumperman KM. Filling the gap: EMS social service referrals. *J Emerg Med Serv.* 1993; 18(2):26–32.
29. Fitch J. Stopping elderly abuse. *J Emerg Med Serv.* 1986; 11(4):50–3.
30. Schiapone FM, Salber PR. Hitting close to home: domestic violence and the EMS responder. *J Emerg Med Serv.* 1994; 19(2): 112–6.
31. Garcia WA. Know your patient. *J Emerg Med Serv.* 1985; 10(5):30–5.
32. Dernocouer K. Maltreatment of children. *J Emerg Med Serv.* 1983; 8(2):22–7.
33. Dernocouer K. Understanding the problem. *J Emerg Med Serv.* 1983; 8(3):40–7.
34. Miller R. Child abuse: should the prehospital care provider get involved? *J Emerg Med Serv.* 1985; 10(11):32–4.
35. Meoli M. Helping the battered woman help herself. *J Emerg Med Serv.* 1994; 19(2): 116.
36. Hsiao AK, Hedges JR. Role of emergency medical services systems in regionwide health monitoring and referral. *Ann Emerg Med.* 1993; 22:1696–702.
37. MacLean CB. The future role of emergency medical services systems in regionwide health monitoring and referral [editorial]. *Ann Emerg Med.* 1993; 22:1743–6.
38. Hauswald M, Drake C. Innovations in emergency medical services systems. *Emerg Med Clin North Am.* 1990; 8:135–44.
39. Wofford JL, Heuser MD, Moran WP, Schwartz E, Mittelmark MB. Community surveillance of falls among the elderly using computerized EMS transport data. *Am J Emerg Med.* 1994; 12:433–7.
40. Harrawood D, Gunderson MR, Fravel S, Cartwright K, Ryan JL. Drowning prevention: a case study in EMS epidemiology. *J Emerg Med Serv.* 1994; 19(6):34–41.
41. Shankar BS, Dischinger PC, Cowley RA. The evolution of injury prevention and surveillance at MIEMSS. *Md Med J.* 1988; 37: 565–70.
42. Metcalf LD. Advances in the prevention of injuries and their effect on emergency medical services. *Med Instrum.* 1988; 22:146–50.
43. Minall GL. Wounded by violence: can a KISS make it better? *J Emerg Med Serv.* 1994; 19(1):61–8.
44. Anonymous. Voices against violence. *J Emerg Med Serv.* 1994; 19(7):98.
45. Ptacnik DJ. Trauma prevention through public education. *J Emerg Med Serv.* 1987; 12(3):6–7.
46. Monahan C. New Mexico EMSC encourages EMTs to conduct community injury prevention projects. *Emerg Med Serv Child Newslett.* 1995; 8(2):8.
47. Last JM. *A Dictionary of Epidemiology*, ed 2. New York: Oxford University Press, 1988, p 100.
48. National Committee for Injury Prevention and Control. Injury prevention: meeting the challenge. *Am J Prev Med.* 1989; 5:72–80.
49. DiGuiseppe CG, Rivara FP, Koepsell TD, Polissar L. Bicycle helmet use by children: evaluation of a community-wide helmet campaign. *JAMA.* 1989; 262:2256–61.
50. McSwain NE, Bells A. Motorcycle helmets—medical costs and the law. *J Trauma.* 1990; 30:1189–97.
51. Walton WW. An evaluation of the poison prevention packaging act. *Pediatrics.* 1982; 69: 363–70.
52. Wright M, Rivara FP, Ferse D. Evaluation of the think first head and spinal cord injury prevention program. *Injury Prev.* 1995; 1(2): 81–5.