

STATE OF COLORADO

A REASSESSMENT
OF
EMERGENCY MEDICAL
SERVICES

NOVEMBER 11-13, 1997

National Highway Traffic
Safety Administration
Technical Assistance Team

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BACKGROUND

Injury is the leading cause of death for persons in the age group one through 44 as well as the most common cause of hospitalizations for persons under the age of 40. The financial costs of injuries are staggering: injuries cost billions of dollars in health care and social support resources. In 1990, for example, the lifetime costs of all injuries were estimated at \$215 billion annually. These estimates do not include the emotional burden resulting from the loss of a child or loved one, or the toll of severe disability on the injured person and his or her family. Each year nearly 50,000 people lose their lives on our nation's roads, and approximately 70 percent of those fatalities occur on rural highways. The National Highway Traffic Safety Administration (NHTSA) is charged with reducing accidental injury on the nation's highways. NHTSA has determined that it can best use its limited resources if its efforts are focused on assisting States with the development of integrated emergency medical services (EMS) programs that include comprehensive systems of trauma care.

To accomplish this goal, in 1988 NHTSA has developed a Technical Assistance Team (TAT) approach that permitted States to utilize highway safety funds to support the technical evaluation of existing and proposed emergency medical services programs. Following the implementation of the Assessment Program NHTSA developed a Reassessment Program to assist those States in measuring their progress since the original assessment. The Program remains a tool for states to use in evaluating their Statewide EMS programs. The Reassessment Program follows the same logistical process, and uses the same ten component areas with updated standards. The standards now reflect current EMS philosophy and allow for the evolution into a comprehensive and integrated health management system, as identified in the 1996 *EMS Agenda for the Future*. NHTSA serves as a facilitator by assembling a team of technical experts who demonstrate expertise in emergency medical services development and implementation. These experts demonstrate leadership and expertise through involvement in national organizations committed to the improvement of emergency medical services throughout the country. Selection of the TAT is also based on experience in special areas identified by the requesting State. Examples of specialized expertise include experience in the development of legislative proposals, data gathering systems, and trauma systems. Experience in similar geographic and demographic situations, such as rural areas, coupled with knowledge in providing emergency medical services in urban populations is essential.

The Colorado Department of Transportation, Office of Transportation Safety, in concert with the Colorado Department of Public Health and Environment, Emergency Medical Services and Prevention Division requested the assistance of NHTSA. NHTSA agreed to utilize its technical assistance program to provide a technical reassessment of the Colorado Statewide EMS program. NHTSA developed a format whereby the EMS office staff coordinated comprehensive briefings on the EMS system.

The TAT assembled in Denver, Colorado, on November 11-13, 1997. For the first day and a half, over 25 presenters from the State of Colorado, provided in-depth briefings on EMS and trauma care, and reviewed the progress since the 1988 Assessment. Topics for review and discussion included the following:

General Emergency Medical Services Overview of System Components

- Regulation and Policy
- Resource Management
- Human Resources and Training
- Transportation
- Facilities
- Communications
- Trauma Systems
- Public Information and Education
- Medical Direction
- Evaluation

The forum of presentation and discussion allowed the TAT the opportunity to ask questions regarding the status of the EMS system, clarify any issues identified in the briefing materials provided earlier, measure progress, identify barriers to change, and develop a clear understanding of how emergency medical services function throughout Colorado. The team spent considerable time with each presenter so that they could review the status for each topic.

Following the briefings by presenters from the Colorado Emergency Medical Services Division, public and private sector providers, and members of the medical community, the TAT sequestered to evaluate the current EMS system as presented and to develop a set of recommendations for system improvements.

When reviewing this report, please note that the TAT focused on major areas for system improvement. Unlike the state's initial assessment which contained many operational recommendations, several of which were identified as a priority, this report offers fewer yet broader recommendations that the team believes to be critical for continued system improvement.

The statements made in this report are based on the input received. Pre-established standards and the combined experience of the team members were applied to the information gathered. All team members agree with the recommendations as presented.

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ACKNOWLEDGMENTS

The TAT would like to acknowledge the Colorado Department of Public Health and Environment, EMS and Prevention Division, and the Colorado Department of Transportation, Office of Transportation Safety for their support in conducting this assessment.

The TAT would like to thank all of the presenters for being candid and open regarding the status of EMS in Colorado. Each presenter was responsive to the questions posed by the TAT which aided the reviewers in their evaluation. Many of these individuals traveled considerable distance to participate.

Special recognition and thanks should be made regarding the extraordinary efforts taken by Michael Armacost, Program Director and his staff, and the briefing participants for their well prepared and forthright presentations. In addition, the Team applauds the well-organized, comprehensive briefing material sent to the team members in preparation for the reassessment.

Special thanks also to Colorado Office of Highway Traffic Safety, for providing assistance to the TAT.

INTRODUCTION

Rugged mountains that spill onto open plains symbolize the diversity and challenge Colorado faces in continuing to develop a comprehensive EMS system that serves all her people. A frontier spirit that values individual freedom has brought Colorado to where it is and will clearly influence its future.

In 1988, Colorado was the first state in the nation to request an assessment of its EMS system. The product of that process shaped what has become a widely recognized tool for evaluating and improving state EMS systems throughout the nation. In Colorado, the evaluation formed the basis of a state EMS plan that has guided improvements for nearly a decade. In 1997, Colorado becomes the second state in the nation to repeat the assessment process.

Now is a time to reflect, to celebrate past accomplishments, examine where we are, and look boldly to the future. This reassessment report represents one of the tools that Colorado EMS has chosen to guide its efforts into the next decade. The document acknowledges many of the accomplishments of Colorado EMS. One accomplishment that stands out is the high regard the EMS Division has earned, largely due to its ability to accurately gauge the sophistication and dedication of EMS providers throughout the state.

Despite the progress of the past decade, much remains to be done. Some of the barriers to progress that existed ten years ago are still present today. As the nation's health care system evolves and matures, Colorado must find its place. The answers to yesterday's questions must be reexamined in the light of tomorrow's opportunities. This report provides substrate for thought and action so that Colorado may continue on its trail of developing an EMS system to serve a diverse geography and society.

The unyielding frontier spirit of Colorado will undoubtedly carry her to new heights. A heritage of progress tempered by respect for the rights and freedoms of the individual will continue to be reflected in the structure and configuration of EMS. The assessment team is privileged to have been afforded this opportunity to share the experience that is Colorado. For this we thank you.

COLORADO EMERGENCY MEDICAL SERVICES (CEMS)

The TAT revisited the essential components of an optimal EMS system that were used in the *State of Colorado, An Assessment of Emergency Medical Services*, on December 13-15, 1988 which provided an evaluation or quality assurance report based on 1988 standards. While examining each component, the TAT identified key EMS issues, reviewed the State's progress since the original report, assessed its status, and used the 1997 Reassessment Standards as a basis for recommendations for EMS system improvement.

A. REGULATION AND POLICY

Standard

To provide a quality, effective system of emergency medical care, each EMS system must have in place comprehensive enabling legislation with provision for a lead EMS agency. This agency has the authority to plan and implement an effective EMS system, and to promulgate appropriate rules and regulations for each recognized component of the EMS system (authority for statewide coordination; standardized treatment, transport, communication and evaluation, including licensure of out-of-hospital services and establishment of medical control; designation of specialty care centers; PIER programs). There is a consistent, established funding source to adequately support the activities of the lead agency and other essential resources which are necessary to carry out the legislative mandate. The lead agency operates under a single, clear management structure for planning and policy setting, but strives to achieve consensus among EMS constituency groups in formulating public policy, procedures and protocols. The role of any local/regional EMS agencies or councils who are charged with implementing EMS policies is clearly established, as well as their relationship to the lead agency. Supportive management elements for planning and developing effective statewide EMS systems include the presence of a recognized state EMS Medical Director, a Medical Advisory Committee for review of EMS medical care issues and state EMS Advisory Committee or Board. The state EMS Advisory Committee or Board has a clear mission, specified authority and representative membership from all disciplines involved in the implementation and delivery of EMS systems.

Progress on Meeting 1988 Recommendations

Colorado has made significant accomplishments in achieving the 1988 EMS Assessment recommendations. Some of these accomplishments include the following:

- Creation of a statewide EMS plan;

- Planning for a trauma system including the establishment of statutory authority;

Establishment of a funded medical director within the State Health Department for oversight of the Prehospital Care Program and the Trauma Program;

Development of a strategy to address EMS personnel recruitment and retention issues;

Establishment of a voluntary medical director training program;

Removal of fees associated with EMS personnel certification;

Development of voluntary air medical service guidelines;

Establishment of a dedicated EMS funding program;

Identification of the status of statewide 911 access;

Implementation of a voluntary emergency medical dispatch program;

Establishment of a Public Information and Education program;

Several recommendations contained in the 1988 EMS Assessment have yet to be completed.

They include:

Establishing a comprehensive EMS legislation which provides statutory authority for the creation of a State EMS lead agency;

Creation of standardized medical control and direction;

Standardization of ambulance licensing.

Status

Colorado has an EMS system which divides regulatory and policy responsibility among multiple governmental organizations. These responsibilities include the regulation of ambulance services by counties, Emergency Medical Technicians (EMTs) and trauma systems by the State Department of Health, and EMS medical directors and EMT scope of practice issues by the Board of Medical Examiners.

The current Colorado system has established a structure which effectively regulates EMTs and their associated training programs. Major legislation has been passed which includes the creation

of a dedicated EMS funding source and the implementation of a statewide trauma system. State EMS and Trauma Advisory Councils have been statutorily established and will soon be consolidated into a single entity. Colorado must be commended for its vision in requiring EMTs at all levels to have medical direction and is a leader in the nation in establishing this important standard.

While many accomplishments have been attained, several fundamental issues have yet to be addressed. There continues to be no state EMS lead agency with statutory authority to plan and implement an effective, comprehensive EMS system. Creation of EMS regulation and policy is excessively decentralized, resulting in impediments to improvement and EMS system disparities throughout the state. Substantial differences exist, for example, in the regulation of ambulance services across the state. No statutory authority exists at any level to regulate air medical transportation and non-transporting EMS agencies. Basic questions regarding the profile of Colorado's EMS system cannot be answered and the state does not have authority to assure the provision of quality EMS to the public.

Recommendations

- ◆ **A state EMS lead agency should be statutorily established to coordinate implementation of the EMS system. That state EMS lead agency should have statutory authority to address regulation and policy; resource management; human resources and training; transportation; facilities; communications; public information, education and prevention; medical direction; trauma systems and evaluation. Local and regional involvement should continue and the authority to exceed the state standards should be maintained. Attainment of this recommendation may be achieved by the following:**

Identify and document current system inefficiencies and weaknesses and describe their impact in terms of patient care and optimal use of financial resources;

Create an EMS plan which addresses these system inefficiencies and weaknesses;

Educate a broad constituency including members of the medical, public safety, county, and legislative communities, as well as the general public regarding the need for improvements in the EMS system;

Identify leadership in the legislature supportive of EMS and Trauma system development;

Consolidate EMS activities currently assigned across state departments to the EMS lead agency for improved communication and efficiency of operations.

- ◆ **Secure adequate personnel and financial resources to perform the necessary lead agency functions. Those financial resources could include but are not limited to the use of private foundations, general funds, user fees, and an expansion of the current dedicated funding source or the identification of other dedicated funding sources.**

B. RESOURCE MANAGEMENT

Standard

Central coordination and current knowledge (identification and categorization) of system resources is essential to maintain a coordinated response and appropriate resource utilization within an effective EMS system. A comprehensive State EMS plan exists which is based on a statewide resource assessment and updated as necessary to guide EMS system activities. A central statewide data collection (or management information) system is in place that can properly monitor the utilization of EMS resources; data is available for timely determination of the exact quantity, quality, distribution and utilization of resources. The lead agency is adequately staffed to carry out central coordination activities and technical assistance. There is a program to support recruitment and retention of EMS personnel, including volunteers.

Progress on Meeting 1988 Recommendations

The creation of a dedicated funding source has enabled the upgrading of EMS vehicles, equipment and communications throughout the state. More recently the passage of trauma legislation has provided the foundation of a system to assure more accurate allocation of EMS system resources to meet the specific needs of individual patients.

Status

The Department has little ability to identify and categorize essential resources within the EMS system. Except for the area of trauma, this is largely due to the lack of either authority or a specific charge to develop this information. Anecdotal evidence of uneven resource distribution and utilization within comparable demographic areas of the state was presented. Without the very basic ability to catalog and describe the EMS resources within the state, it is impossible to describe or analyze the nature and extent of resource needs.

A comprehensive plan for the development of a coordinated EMS system for Colorado was developed and published in 1992. Since that time, impressive progress on some goals and objectives has occurred, while little movement has taken place for others. The plan has not been updated since its initial publication.

The recent passage of trauma system legislation calls for the consolidation of the existing State EMS Advisory Council and the Trauma Advisory Council. As these two groups come together as a single entity, a similar approach to joining the EMS program and the Trauma program within the Department appears warranted.

The Highway Users Transportation Fund (HUTF) provides a sustained revenue stream that allows EMS providers throughout the state to improve their vehicles, equipment, communications and other necessities. Concern was expressed that the HUTF is becoming an EMS entitlement program and that the financial resources of the fund are not being allocated to the current areas of greatest need within the EMS system. The fund is also used to support county governments in their regulation of ambulance services and pay for the EMS program within the Department. The current formula for disbursing funds does not provide the flexibility necessary to assure an adequate EMS system infrastructure.

An effort is currently underway to analyze the status of EMS personnel recruitment and retention within the state. The intended purpose of this work is to develop strategies that will enable EMS organizations to more reliably maintain a qualified workforce.

Three pilot programs have been initiated within different areas of the state to promote regional cooperation among counties by providing a staff resource. Work to date has resulted in an improved understanding of system resources within the pilot regions and is leading to a more consistent approach to ambulance service regulation. This effort represents a creative step towards building on the existing model of local control. These pilot projects should be monitored and evaluated carefully and supported as an intermediate step towards statewide regulation of ambulance services.

Most of Colorado appears to be well served by a Critical Incident Stress Management Network (CISM) that has been organized and operated as a grass roots effort. This is an active network of professionals who donate their expertise in areas of teaching as well as crisis intervention.

Recommendations

- ◆ **The State EMS Division should develop a management information system (MIS) with the capacity to identify EMS system resources at state, regional and local levels. Information about organizations, personnel, vehicles, hospitals, communications, medical direction and similar attributes should be kept current and provided to all who need access to this information;**
- ◆ The State EMS Division should develop state and regional capacity to analyze information in the MIS system and use it for EMS system planning and coordination purposes;
- ◆ The State EMS Division should establish a process to involve EMS stakeholders in updating and maintaining the Colorado EMS plan on a routine basis;

- ◆ The Department should take steps to assure the complete integration of its existing EMS and Trauma programs into a single organizational structure;
- ◆ **The Colorado legislature should remove the percentage constraints contained in the Highway Users Transportation Fund statute and establish an administrative procedure to distribute the funds to areas of greatest need.**

C. HUMAN RESOURCES AND TRAINING

Standard

EMS personnel can perform their mission only if adequately trained and available in sufficient numbers throughout the State. The State EMS lead agency has a mechanism to assess current manpower needs and establish a comprehensive plan for stable and consistent EMS training programs with effective local and regional support. At a minimum, all transporting out-of-hospital emergency medical care personnel are trained to the EMT-Basic level, and out-of-hospital training programs utilize a standardized curriculum for each level of EMS personnel (including dispatchers). EMS training programs and instructors are routinely monitored, instructors meet certain requirements, the curriculum is standardized throughout the State, and valid and reliable testing procedures are utilized. In addition, the State lead agency has standardized, consistent policies and procedures for certification (and re-certification) of personnel, including standards for basic and advanced level providers, as well as instructor certification. The lead agency ensures that EMS personnel have access to specialty courses such as ACLS, PALS, BTLS, PHTLS, ATLS, etc., and a system of critical incident stress management has been implemented.

Progress on Meeting 1988 Recommendations

The state has begun a process to identify recruitment and retention issues affecting EMS personnel through the funding of a three part study assessing personnel needs, volunteer efforts and interventions or barriers to overcoming identified retention and recruitment problems. Other accomplishments include the development of a voluntary Physician Medical Directors course, the institution of medical direction for basic, intermediate and advanced EMT's, voluntary Emergency Medical Dispatcher (EMD) training programs, and elimination of prehospital certification fees.

Activities yet to be accomplished include human resource needs assessments, on-line medical direction for prehospital personnel, preestablished and standardized policies, procedures and protocols for EMS personnel and agencies, and the institution of routine audit capability of EMS activities statewide. Finally, progress is limited in acquiring adequate state, local or regional infrastructure staffing and system automation to enable the evaluation of the total continuum of EMS care.

Status

Formal, recognized training programs are available for basic, intermediate and advanced EMTs. Voluntary training programs are also available for EMD, EMS Physician Advisors, and an

Instructor Development Program and Management Development Program have been implemented. Training programs which include both training centers and training groups are standardized and state approved. The process of recognizing and re-recognizing training programs contribute to maintaining quality and consistency within the programs. This practice is important in that currently there is no process to routinely monitor or evaluate training programs. The issue of universal access to EMS training programs remains an unmet need. The state has established a uniform curriculum, available through two types of approved training agencies; community colleges and hospitals. Individual courses are not approved by the state and generally courses are driven by demand and price. The EMT-Basic and EMT-Paramedic curricula generally follow the *National EMS Education and Practice Blueprint*. However, the same is not true for the EMT-Intermediate Curricula.

There is within the state a standardized process for certification of EMT's. The process is organized and timely in issuing certificates to individuals who meet certification standards. Courses to advance the knowledge and training of EMS personnel are also available such as ACLS, PALS, BTLIS. A well developed CISM program is in place and active throughout the state. Reciprocity is not available except for challenge testing for EMT personnel seeking to practice in Colorado. Testing of EMT personnel includes both practical and written examinations, however, the testing program has not been validated. First Responder training and credentialing occurs but is not an integrated part of the EMS system in Colorado.

Currently, in Colorado, primary ambulance services are required to staff vehicles to the level of advanced first aid. Consistency in staffing vehicles with a minimum of at least one EMT-Basic has not been realized. There is available within the state a cadre of EMS Physician Advisors providing differing levels of EMS oversight. Special recognition is made to a unique and innovative program to enhance the availability of Physician Advisors in rural areas that includes the use of emergency residency physicians at the PGY 2 or higher level. These emergency residency physicians are supervised by the state EMS Medical Director. This type of program helps to extend physician involvement in EMS to underserved rural areas.

Recommendations

- ◆ The Division should implement a protocol for monitoring and evaluating EMS training programs and instructors possibly including peer review and instructor mentoring programs.
- ◆ **Establish a process of legal recognition for Colorado credentialing of nationally registered EMT's.**
- ◆ Establish a mechanism to validate instruments used for EMT testing or use services such

as the National Registry of EMTs.

- ◆ Establish the quality and performance criteria for the development of training programs, including standards and uniform instructor qualifications in order to expand the training agency options beyond hospitals and community colleges.
- ◆ **Require at least one certified EMT-Basic on all emergency ambulances within the state.**
- ◆ **Establish the standards and criteria for first responder training and certification (both individual and training programs), within the State EMS lead agency.**
- ◆ Study and incorporate where feasible, distance learning programs that could include such activities as video conferencing, telemedicine availability, computer inter/ intranet and interactive educational modalities..

D. TRANSPORTATION

Standard

Safe, reliable ambulance transportation is a critical component of an effective EMS system. The transportation component of the State EMS plan includes provisions for uniform coverage, including a protocol for air medical dispatch and a mutual aid plan. This plan is based on a current, formal needs assessment of transportation resources, including the placement and deployment of all out-of-hospital emergency medical care transport services. There is an identified ambulance placement or response unit strategy, based on patient need and optimal response times. The lead agency has a mechanism for routine evaluation of transport services and the need for modifications, upgrades or improvements based on changes in the environment (i.e., population density). Statewide, uniform standards exist for inspection and licensure of all modes of transport (ground, air, water) as well as minimum care levels for all transport services (minimum staffing and credentialing). All out-of-hospital emergency medical care transport services are subject to routine and unannounced standardized inspections. There is a program for the training and certification of emergency vehicle operators.

Progress on Meeting 1988 Recommendations

The state has developed a mechanism to address transportation needs as it relates to the replacement and acquisition of ambulances and equipment at the local level. This has been accomplished through the passage of EMS funding legislation (1989) and the implementation of the grants program to distribute those funds to requesting agencies with the approval of the EMS Council. This has been one of the most important initiatives since the last assessment.

Additional accomplishments include the development of a uniform ambulance inspection form, although its use is variable across the state. Progress has also been made in the development of air medical guidelines, through the voluntary efforts of the air medical providers. Compliance with those guidelines is unknown but thought to be widely accepted by the air medical industry.

Issues identified in 1988, but yet to be implemented include statewide standards for the inspection and licensing of all modes of emergency medical transportation; and a statewide needs assessment that includes ambulance placement strategies and deployment guidelines.

Status

Colorado is a large geographic area covering over 104,000 square miles. Much of the land mass is isolated, rural, frontier territory complicating the provision of emergency transportation. Time

and distance are often factors in accessing emergency medical services in this state. While a statewide needs assessment has not been undertaken, some communities at the local or regional level have completed resource identification projects. The state has seen considerable improvement in vehicle and equipment acquisition through the grants program. There are extensive first response systems including Quick Response Teams (QRT's) in many areas and air medical resources are available statewide. The implementation of the trauma system promises to better match patient needs with system resources including utilization of appropriate transport services and facilities.

There are a number of critical unmet needs that impact system efficiency. These include the absence of statewide planning for emergency transportation such as; statewide standards for vehicle design, including procedures for the licensing and inspection of ambulances; adoption of standards for the training of ambulance drivers; uniform transportation coverage and mutual aid plans providing for the coordination of transportation services between neighboring jurisdictions within and outside the state; minimum staffing and credentialing of ambulance personnel and services; and deployment or point of entry plans. The missing piece is an information system that allows for the identification and assessment of transportation issues.

Recommendations

- ◆ **The State EMS Division should develop a management information system to collect information on the transport component of EMS for system management, system design and utilization and placement of resources;**
- ◆ **The State EMS Division should at a minimum, develop statewide standards for vehicle design, inspection, licensing and equipment. These standards should assure uniform ambulance licensing and inspection processes statewide, and minimum staffing level (EMT-Basic) statewide;**
- ◆ The State EMS Division should require the development, implementation and evaluation of mutual aid plans for contiguous areas;
- ◆ The State EMS Division should establish response time goals for all responding EMS teams accounting for the differing demography of the state (urban, suburban, rural, wilderness, and frontier areas);
- ◆ The State EMS Division should establish or enhance access to QRT's including the development of uniform standards;
- ◆ The State EMS Division should develop and implement a program to license or permit air

ambulance operations, including the establishment of minimum standards for personnel and equipment (fixed wing and rotocraft);

- ◆ The State EMS Division should establish and implement ambulance driver training courses.

E. FACILITIES

Standard

It is imperative that the seriously ill patient be delivered in a timely manner to the closest appropriate facility. The lead agency has a system for categorizing the functional capabilities of all individual health care facilities that receive patients from the out-of-hospital emergency medical care setting. This determination should be free of political considerations, is updated on an annual basis and encompasses both stabilization and definitive care. There is a process for verification of the categorizations (i.e., on-site review). This information is disseminated to EMS providers so that the capabilities of the facilities are known in advance and appropriate primary and secondary transport decisions can be made. The lead agency also develops and implements out-of-hospital emergency medical care triage and destination policies, as well as protocols for specialty care patients (such as severe trauma, burns, spinal cord injuries and pediatric emergencies) based on the functional assessment of facilities. Criteria are identified to guide interfacility transport of specialty care patients to the appropriate facilities. Diversion policies are developed and utilized to match system resources with patient needs; standards are clearly identified for placing a facility on bypass or diverting an ambulance to another facility. The lead agency has a method for monitoring if patients are directed to appropriate facilities.

Progress on Meeting 1988 Recommendations

The designation of trauma centers began in 1991 utilizing the American College of Surgeons' Trauma Center Verification Program. Successful verification was the prerequisite for state designation for Level I - III trauma centers. Level IV trauma centers were verified by the Colorado Trauma Institute (CTI). Currently there are 18 designated trauma centers, including 3 Level I, 6 Level II, 8 Level III and 1 Level IV. No other hospital categorizations have occurred.

Status

With the exception of trauma facilities and an established neonatal unit, no formalized process for patient referral exists. Patients in need of special expertise are referred by physician to physician based on informal linkages. There is no outcome data confirming acceptable mortality and morbidity and no ongoing monitoring to determine whether existing practices provide optimal patient care.

Recommendations

- ◆ **The State EMS Division should coordinate the categorization of hospital capabilities for all specialized emergency patients and disseminate this information to the medical and EMS communities;**
- ◆ **The State EMS Division should facilitate the establishment of appropriate field triage guidelines;**
- ◆ The State EMS Division should develop and implement policies for the diversion of patients with special emergency needs subject to system quality improvement and evaluation;
- ◆ The State EMS Division should encourage all acute care hospitals to actively participate in enhancing the quality of prehospital emergency service in their locality.

F. COMMUNICATIONS

Standard

A reliable communications system is an essential component of an overall EMS system. The lead agency is responsible for central coordination of EMS communications (or works closely with another single agency that performs this function) and the state EMS plan contains a component for comprehensive EMS communications. The public can access the EMS system with a single, universal emergency phone number, such as 9-1-1 (or preferably Enhanced 9-1-1), and the communications system provides for prioritized dispatch. There is a common statewide radio system that allows for direct communication between all providers (dispatch to ambulance communication, ambulance to ambulance, ambulance to hospital, and hospital to hospital communications) to ensure that receiving facilities are ready and able to accept patients. Minimum standards for dispatch centers are established, including protocols to ensure uniform dispatch and standards for dispatcher training and certification. There is an established mechanism for monitoring the quality of the communication system, including the age and reliability of equipment.

Progress on Meeting 1988 Recommendations:

A survey of 9-1-1 availability was performed. A voluntary system of registering Emergency Medical Dispatchers has been established.

Status

Most of state's counties have implemented Enhanced 9-1-1 access for EMS. All but one of the remaining counties are in the process of implementing Enhanced 9-1-1. This is an excellent and important step in improving EMS along with other public safety services.

Telecommunications Services is the state agency providing a statewide microwave system available to state and local agencies to serve their needs. This organization also exists to provide technical assistance and coordinate communications system development.

The Colorado EMS communications system is characterized by numerous unlinked subsystems, each with different designs and technology. The lack of a common approach to system design results in problems with the provision of on-line medical direction and coordination among responder agencies. It also increases the cost of communications and decreases reliability. Other

effects of this diverse communications landscape include patients arriving at hospitals without giving pre-notification and mass casualty incidents where responder agencies cannot communicate with one another.

Cellular telephones have become the default route of EMS communication for field to hospital linkages. Since cellular service is not complete statewide, there are numerous gaps in this system as well. In both urban and rural areas, the loading of cells during peak use times makes this system unreliable. Cell calls are commonly routed through a hospital switchboard adding to delays in reaching the appropriate receiver.

The communications needs of rural providers differ from those in urban settings. The lack of radio coverage and the need to communicate over great distances provide significant rural challenges. In urban settings the problems are more related to system design coordination. Both settings face a common challenge of assuring communications when transferring patients between facilities that utilize different communications technology.

Recently the state patrol has begun the process of consolidating its dispatch operations from eighteen into five regional centers. Many of these facilities provided dispatch services to local EMS providers. As dispatch is consolidated, there has been a reluctance on the part of some providers to move their dispatch out of the local community. In some cases providers are establishing new local dispatch operations.

In June 1995, a digital trunked radio system (DTRS) plan was completed and published. This plan addresses many of the issues identified as problems in the current EMS communications system and provides an avenue to begin corrections. Pending financial support by the legislature, phase in of the plan could begin as early as 1998.

Recommendations

- ◆ **Telecommunications Services should facilitate development of the communications section of the State EMS plan. Improvements in the EMS communications system should not be dependent on the statewide trauma system. This section should address statewide coverage and the ability for all ambulances to speak to all hospitals and provide for interagency communications. Implementation of the communications section of the State EMS plan should include:**

Steps to avoid past problems of system duplication and assure the appropriate introduction of new communication technology;

A mechanism to ensure the availability of on-line medical direction;

Avoidance of dependance on cellular communications in lieu of a functional EMS and public safety communications network.

- ◆ The State should commit additional funds as necessary to implement the communications portion of the EMS plan;
- ◆ The State should implement standards for the training and credentialing of EMDs to assure the safe and effective performance of their functions, by building on the existing foundation of a voluntary Emergency Medical Dispatcher registry.

G. PUBLIC INFORMATION AND EDUCATION

Standard

To effectively serve the public, each State must develop and implement an EMS public information, and education and relations PIER program. The PIER component of the State EMS plan ensures that consistent, structured PI&E programs are in place that enhance the public's knowledge of the EMS system, support appropriate EMS system access, demonstrate essential self-help and appropriate bystander care actions, and encourage injury prevention. The PI&E plan is based on a needs assessment of the population to be served and an identification of actual or potential problem areas (i.e., demographics and health status variable, public perceptions and knowledge of EMS, type and scope of existing PI&E programs). There is an established mechanism for the provision of appropriate and timely release of information on EMS-related events, issues and public relations (damage control). The lead agency dedicates staffing and funding for these programs, which are directed at both the general public and EMS providers. The lead agency enlists the cooperation of other public service agencies in the development and distribution of these programs, and serves as an advocate for legislation that potentially results in injury/illness prevention.

Progress on Meeting 1988 Recommendations

A public information and education position has been established in the Prehospital Care Program within the Department. Informative programs have been created which enhance the public's knowledge of EMS systems and encourage injury prevention.

Status

An impressive public information and education system has been implemented under the leadership of the Prehospital-Care Program. This exemplary program began in 1993 utilizing EMS-C funding. A staff position has been dedicated to achieve a wide variety of desired outputs and significant accomplishments have been realized since the inception of the program. These accomplishments include, but are not limited to:

The training of 86 public information officers from EMS, Fire and Law Enforcement agencies in PIER Instructor techniques;

A program entitled "Cheat the Reaper" was created which targeted prevention of teenage drinking and driving;

Resources have been developed and distributed including an EMT's Handbook for Injury Prevention, a guidebook for activating community child car seat programs entitled "Seat Safe", and a bystander care program entitled Everyone Can Help Others (ECHO);

An annual Colorado Safety & Prevention Conference is held;

A program has been developed to address EMS recruitment and retention issues;

A Child Passenger Safety Training Program has been developed for the inspection of child safety seats;

A quarterly EMS newsletter is published;

EMS week activities are coordinated;

Funding has been secured to establish two half time EMS-C Injury Prevention Specialists, who will target pediatric emergency care knowledge and injury prevention issues in rural areas;

A mobile program entitled "Life Safety House" has been established;

A program entitled "Make the Right Call", to educate children in accessing emergency assistance, was implemented;

Technical assistance is provided to numerous regional and local entities involved in injury prevention.

The importance of prevention programs has been recognized within the Department and elsewhere. A strategic decision has been made to reduce morbidity and mortality by focusing on injury prevention activities rather than relying predominantly on legislative mandates. However, this strategy has been ineffective in increasing safety belt and motorcycle helmet utilization. The Department is utilizing a needs assessment model to assist in development of its injury prevention programs.

Recommendations

- ◆ **Support for a PIER position and prevention program should continue as a priority of the EMS Division;**

- ◆ The State EMS Division should develop a process which identifies the need for new PIER prevention programs, evaluates program effectiveness and allows for the creation of interdepartmental injury prevention strategies. This process should employ an epidemiological approach to identify those issues which will have the greatest impact within Colorado and encourage the development of a shared vision between multiple state agencies;
- ◆ The EMS Division should continue to educate legislators about steps that can be taken to reduce preventable death and disability among Colorado's citizens;
- ◆ The EMS Division should continue to develop EMS personnel into effective prevention advocates.

H. MEDICAL DIRECTION

Standard

EMS is a medical care system that involves medical practice as delegated by physicians to non-physician providers who manage patient care outside the traditional confines of office or hospital. As befits this delegation of authority, the system ensures that physicians are involved in all aspects of the patient care system. The role of the State EMS Medical Director is clearly defined with legislative authority and responsibility for EMS system standards, protocols and evaluation of patient care. A comprehensive system of medical direction for **all** out-of-hospital emergency medical care providers (including BLS) is utilized to evaluate the provision of medical care as it relates to patient outcome, appropriateness of training programs and medical direction. There are standards for the training and monitoring of direct medical control physicians, and statewide, standardized treatment protocols. There is a mechanism for concurrent and retrospective review of out-of-hospital emergency medical care, including indicators for optimal system performance. Physicians are consistently involved and provide leadership at all levels of quality improvement programs (local, regional, state).

Progress on Meeting 1988 Recommendations

The Department has funded and maintained the position of State EMS Medical Director since 1990.

Since 1991 the Division has offered a one day Physician Advisor Course to EMS Physician Advisors and their coordinators. More than 50% of the Physician Advisors have attended.

The Medical Advisory Group was formed in 1995 to provide additional physician input to the EMS Division, and the Board of Medical Examiners recognized the group in 1996 as a formal liaison committee of the Board.

Status

Dr. Ben Honigman is the current State EMS Medical Director, and has served in that role for the past three years. He now also serves as the Medical Director of the State Trauma System, which enhances the influence of medical leadership at the state level. He is credited for his inclusive and collaborative approach to pursuing statewide advances in EMS and trauma care. Unfortunately, the State EMS Medical Director position is not based in statute and enjoys no legislative authority. There is some concern regarding its potential lack of permanence in the Division.

The State EMS Medical Director is assisted by the Medical Advisory Group, which was developed by Dr. Honigman. The Group now serves in an official liaison capacity to the state Board of Medical Examiners with regard to EMS-related matters. Among other things, the Group provides support and assistance for development of the statewide trauma system, advises on curriculum matters for prehospital care providers, and reviews quality improvement plans developed by the EMS Physician Advisors.

Colorado relies on more than 160 EMS Physician Advisors to provide medical direction for its prehospital care providers. All practicing providers at the level of EMT-Basic and above, as well as training centers and groups, are required to maintain a relationship with a Physician Advisor. Currently, such a relationship may be independent of any that the provider's employing agency may or may not have. However, no statewide regulation exists that requires EMS agencies to have a Physician Advisor.

To become an EMS Physician Advisor, one must apply to the Division, which is charged with making a recommendation to the Board of Medical Examiners for approval. The Board is responsible for establishing practice parameters and setting expectations for EMS Physician Advisors. It is also responsible for determining how their activities are to be monitored. However, EMS Physician Advisors may independently determine the practice parameters for their EMS personnel. Anecdotally, these parameters may occasionally far exceed the capabilities of prehospital care providers, as established by the extent of their training. Local protocols are not routinely scrutinized and there is no ongoing system of monitoring or pursuing quality improvement for EMS Physician Advisors. The extent of EMS Physician Advisor involvement in the EMS system is quite variable.

In some cases, securing the services of an EMS Physician Advisor has been difficult due to sparse resources, particularly in rural areas. Ingeniously, the Prehospital Care Program has recruited emergency medicine resident physicians to temporarily fill these roles, enabling local EMS providers to continue their service. Clear educational benefit accrues to the residents as they work under the guidance of the State EMS Medical Director.

Recommendations

- ◆ **The Department of Health and Environment should institutionalize the position of State EMS Medical Director, ensuring the permanence of the position and its source of funding. Future state statutes related to the state EMS system should delineate authorities of the State EMS Medical Director.**
- ◆ The Division and the Board of Medical Examiners should ensure that all EMS Physician Advisors are qualified to serve that role. Established requisite qualifications should be based on some combination of evidence of previous education, experience, completion of

a Physician Advisor course, and commitment to required duties.

- ◆ The Board of Medical Examiners should establish a clear relationship between EMS Physician Advisors and the State EMS Medical Director. The Physician Advisors should be responsible to, and take direction from, the State EMS Medical Director.
- ◆ **The Division and the Board of Medical Examiners should require that all EMS activities are conducted with appropriate medical direction. This should include, but not be limited to, activities of emergency medical dispatchers, EMS first response agencies, and EMS patient-transporting agencies. The Division must be enabled to stipulate the maintenance of relationships with Physician Advisors not only for prehospital care providers, but also for the agencies who employ them.**
- ◆ The Division, Medical Advisory Group, and the Board of Medical Examiners should collaborate to promulgate practice parameters for all levels of prehospital care providers. Such parameters should serve as guides for EMS Physician Advisors as they authorize specific practices to be conducted by providers working with them. Protocols or authorizations for practice outside the established parameters should require explicit approval of the Division, Medical Advisory Group, or Board of Medical Examiners, as appropriate.
- ◆ The Division should facilitate regional collaboration among its more than 160 EMS Physician Advisors. Regional uniformity in medical direction practices, including protocol development, should be actively encouraged and facilitated.
- ◆ The Division and the Medical Advisory Group should develop and continually update resources which are made available to EMS Physician Advisors. These should include, but not be limited to, a published resource guide, model protocols for local adaptation, and models or templates for local evaluation and quality improvement.
- ◆ The Division should actively explore possibilities for incentives that might be offered to EMS Physician Advisors. Turnover of Physician Advisors should be tracked and a recruitment and retention plan developed.

I. TRAUMA SYSTEMS

Standard

To provide a quality, effective system of trauma care, each State must have in place a fully functional EMS system; trauma care components must be clearly integrated with the overall EMS system. Enabling legislation should be in place for the development and implementation of the trauma care component of the EMS system. This should include trauma center designation (using ACS-COT, ACEP, APSA-COT and/or other national standards as guidelines), triage and transfer guidelines for trauma patients, data collection and trauma registry definitions and mechanisms, mandatory autopsies and quality improvement for trauma patients. Information and trends from the trauma registry should be reflected in PI&E and injury prevention programs. Rehabilitation is an essential component of any statewide trauma system and hence these services should also be considered as part of the designation process. The statewide trauma system (or trauma system plan) reflects the essential elements of the Model Trauma Care System Plan.

Progress on Meeting 1988 Recommendations

Under the direction of the Colorado Trauma Institute and utilizing the ACS-COT verification process, 18 trauma centers have been designated. A CTI trauma registry for those centers is in place providing data on trauma type with outcome, injury causation, age and gender distribution, geographic injury distribution by county, temporal demographics by day and month, alcohol involvement, discharge destination and injury severity with outcome. Trauma system enabling legislation was passed in 1995 and new leadership established in the Department to facilitate system implementation. Area Trauma Advisory Councils (ATAC) are in place.

Status

The trauma system is on the launch pad. Due in part to the early efforts of the Colorado Trauma Institute, and efforts of the Department and the Trauma Advisory Council most of the essentials for system development now exist. Funding for the system is singularly absent. Successful implementation will depend on perceived incentives within the system, including the preservation of a substantial portion of the existing patient base at facilities designated within this inclusive system. Monitoring of system performance should be facilitated by registry information at the Level I-III trauma centers. Outcome data from Level IV trauma centers and nondesignated facilities is available through the Colorado Hospital Association.

Recommendations

- ◆ **The State EMS Division should implement the statewide trauma system per the**

1995 legislative mandate;

- ◆ **The State EMS Division should provide adequate staffing and funding to support implementation of the statewide Trauma System;**
- ◆ **The State EMS Division should continue to provide leadership and a collaborative approach to bringing facilities and personnel on board as team players in the inclusive system;**
- ◆ **The State EMS Division should view total needs of the state in context of those facilities expressing interest in designation; if needed, encourage facilities in critical shortage areas to improve their trauma care capabilities;**
- ◆ The State EMS Division should establish evaluation mechanisms to demonstrate system effectiveness and cost savings to encourage continued state financial support for the system;
- ◆ The State EMS Division should monitor and provide technical assistance to the ATACs to encourage compliance with their role as defined by legislation;
- ◆ The State EMS Division should include rehabilitation in system design and further define outcome by quality of life measures;
- ◆ The State EMS Division should utilize existing expertise within the State to facilitate system components, such as; trauma center designation, quality improvement, data collection and processing;
- ◆ The State EMS Division should develop a mechanism to track system performance and outcome measures and improve morbidity and mortality.

J. EVALUATION

A comprehensive evaluation program is needed to effectively plan, implement and monitor a statewide EMS system. The EMS system is responsible for evaluating the effectiveness of services provided victims of medical or trauma related emergencies, therefore the EMS agency should be able to state definitively what impact has been made on the patients served by the system. A uniform, statewide out-of-hospital data collection system exists that captures the minimum data necessary to measure compliance with standards (i.e., a mandatory, uniform EMS run report form or a minimum set of data that is provided to the state); data are consistently and routinely provided to the lead agency by all EMS providers and the lead agency performs routine analysis of this data. Pre-established standards, criteria and outcome parameters are used to evaluate resource utilization, scope of services, effectiveness of policies and procedures, and patient outcome. A comprehensive, medically directed, statewide quality improvement program is established to assess and evaluate patient care, including a review of process (how EMS system components are functioning) and outcome. The quality improvement program should include an assessment of how the system is currently functioning according to the performance standards, identification of system improvements that are needed to exceed the standards and a mechanism to measure the impact of the improvements once implemented. Patient outcome data is collected and integrated with health system, emergency department and trauma system data; optimally there is linkage to data bases outside of EMS (such as crash reports, FARS, trauma registry, medical examiner reports and discharge data) to fully evaluate quality of care. The evaluation process is educational and quality improvement/system evaluation findings are disseminated to out-of-hospital emergency medical care providers. The lead agency ensures that all quality improvement activities have legislative confidentiality protection and are non-discoverable.

Progress on Meeting 1988 Recommendations

Despite efforts to implement data collection systems, progress in the area of evaluation has been disappointing. None of the recommendations have been effectively addressed.

Status

Colorado has abandoned attempts to institute a statewide, centralized prehospital data collection system. The current focus is on creating local interest to collect and analyze meaningful data, and share such information with the Division. Work is underway to define a minimum prehospital data set that local EMS agencies would be encouraged to use.

Some sporadic local EMS evaluation undoubtedly occurs, but it is not uniform. Local capacity and interest is variable. Additionally, there is no confidentiality conferred upon EMS evaluation results, unless the activities evaluated occur within the confines of a hospital.

The state lacks the infrastructure necessary to conduct meaningful EMS evaluation. There is no information system. The Prehospital Care Program is currently unable to reliably evaluate EMS structures, processes, or outcomes, as it does not have a statewide data base. Subsequently, it is limited in its ability to disseminate meaningful information to other stakeholders in the state, and planning efforts are undoubtedly hindered.

Recommendations

- ◆ **The State EMS Division must develop a strategy for EMS system evaluation. This must be included in future EMS planning. Evaluation is a mandatory activity to determine the effectiveness of the statewide EMS system and to validate future directions of EMS system development.**
- ◆ **Statewide EMS evaluation should include structural (capacity of the system), process (activities of the system), and outcomes (effects of the system) components. All three components are necessary to accurately describe the EMS system. Outcome evaluation should describe effects on death, disease, disability, discomfort, dissatisfaction, and destitution (or dollars).**
- ◆ The State EMS Division should finalize adoption of a minimum EMS data set which includes elements to be collected for every EMS response in the state. The data set should include the essential elements of the NHTSA Uniform Pre-Hospital Data Set.
- ◆ The State EMS Division should continue efforts that encourage local EMS systems to collect data and conduct self-evaluation. Conferences or seminars should highlight the benefits of accurate data collection and tools available for accomplishing the task. A NHTSA Emergency Medical Services Information Systems course or similar courses should be held in the state, in order to facilitate a greater understanding and appreciation of data collection and analysis by EMS personnel.
- ◆ **The Division must implement a system for statewide EMS data collection. It is not important that every EMS agency collect data by the same technique. However, using statewide criteria, the locally validated data collected must be able to be converted to a format that can be periodically and reliably transferred to the state, so that statewide evaluation is possible.**
- ◆ The Division must develop an EMS information system that is able to process the EMS data elements. The state EMS plan evaluation section should describe such an information system. The description should, at a minimum, include the sources of data, data elements to be entered, the expected output, and users of the information.

- ◆ The State EMS lead agency should direct HUTF grant money or other revenues as needed to develop local and regional data collection tools and information systems. The Division should take an active role in developing tools that enable local EMS agencies to efficiently collect data that benefits them directly.
- ◆ The state should require reliable data submission by local EMS agencies. It should develop sanctions that may be applied to local EMS agencies when data submission requirements are not met.
- ◆ The Division must provide meaningful and timely feedback to those who provide data. Furthermore, the Division and the Medical Advisory Group should lead by example, in making decisions that are based on the information generated from the data collected. Additionally, they should advocate and facilitate regional and local decision making based on reliable information generated by the EMS system.
- ◆ The state legislature should confer confidentiality upon the results of EMS evaluation, protecting them from discovery in the manner similar to hospitals and other aspects of the health care system.

K. CURRICULUM VITAE

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California Office of Traffic Safety, DOT/ NHTSA
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ORGANIZATIONS/APPOINTMENTS

San Diego County

Emergency Medical Care Committee	Drug Summit Partnership
Trauma System Medical Audit Committee	County Fire Chiefs Association
Youth Suicide and Homicide Task Force	Unified Disaster Council
Methamphetamine Task Force	Domestic Violence Fatality Rev.

State of California

- Trauma System Regulatory Review
- Emergency Medical Services Administrators of California
- State and Local Injury Control Network
- Region five Medical Disaster Management Committee

National, Department of Transportation

- EMS Agenda for the Future Implementation Guide task force
- Instructor, Development of Trauma Systems: A State and Community Guide
- Instructor, Emergency Medical Services Information Systems
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EMSI Regional EMS Council
Board of Directors
Medical Direction Committee
National Association of EMS Physicians
Chair, Standards and Practices Committee
Society of Academic Emergency Medicine
Chair, EMS Committee
American College of Emergency Physicians
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ORGANIZATIONS/APPOINTMENTS

National Association of State EMS Directors
Past President
Executive Committee, Nomination Committee, EMS Agenda For the Future Committee
New England EMS Council
Board Member
Governor's Highway Safety Policy Council
Vermont E-9-1-1 Task Force
Vermont State Firefighters Association
North Country Council for Emergency Helicopter Service
Essex Rescue, EMT Captain
Vermont HAZMAT Response Team, Coordinating Committee
EMS Agenda For The Future, Co-Chair
EMS Agenda For The Future Implementation Group, Member
HRSA EMS-C Grant Review Committee
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ORGANIZATIONS/APPOINTMENTS

American Trauma Society
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Past Chairman, Regional Committees
Consultant, Subcommittee on Education
Senior Reviewer, Trauma Center Verification Program
American Association for Surgery of Trauma
Association for Advancement of Automotive Medicine
Past President
World Association for Emergency and Disaster Medicine
National Association of EMS Physicians
Eastern Association for Surgery of Trauma
Past President
Pan American Trauma Society
Past President
Joint Review Committee on Educational Programs for EMT-Paramedics
Advisory Committee on Injury Prevention and Control (Centers for Disease Control)
Past Member
Medical College of Virginia Paramedic Program
Past Director
Columbia Trauma Society
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ORGANIZATIONS/APPOINTMENTS

National Association of State EMS Directors (1979-1996)
Past President
Past Chairman, Government Affairs Committee
National Association of EMS Physicians, Member
American Medical Association,
Commission on Emergency Medical Services (Former)
American Trauma Society
Founding Member, Past Speaker House of Delegates
ASTM Committee F.30 on Emergency Medical Services
Institute of Medicine/National Research Council
Pediatric EMS Study Committee, Member
Committee Studying Use of Heimlich Maneuver on Near Drowning Victims, Member
World Association on Disaster and Emergency Medicine
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National Registry of Emergency Medical Technicians State Representative
National Registry of Emergency Medical Technician, EMT-Intermediate and First Responder
Written Test Item Writing Committees
Health Resource Service Administration, Division of EMS/Trauma Grant Review Committee,
Past Participation as Chair
North Dakota Association of Emergency Medical Services, Board of Directors Advisor
North Dakota Advanced Life Support Society
North Dakota Emergency Medical Services Instructor coordinator Society
North Dakota Advanced Life Support Society
North Dakota Emergency Medical Services Instructor Coordinator Society
North Dakota Auto Extrication Society
North Dakota Critical Incident Stress Management Program, Director
North Dakota Health Care Reform Access Committee
Governor's 9-1-1 Communications Advisory Committee, Emergency Medical Services
Representative
North Dakota 911 Coordinator's Association
North Dakota Highway Traffic Safety Management System Committee,
Health Department Representative
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