OPERATIONAL AND TACTICAL MEDICINE

Medical Direction of Wilderness and Other Operational Emergency Medical Services Programs

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Within a healthcare system, operational emergency medical services (EMS) programs provide prehospital emergency care to patients in austere and resource-limited settings. Some of these programs are additionally considered to be wilderness EMS programs, a specialized type of operational EMS program, as they primarily function in a wilderness setting (eg, wilderness search and rescue, ski patrols, water rescue, beach patrols, and cave rescue). Other operational EMS programs include urban search and rescue, air medical support, and tactical law enforcement response. The medical director will help to ensure that the care provided follows protocols that are in accordance with local and state prehospital standards, while accounting for the unique demands and needs of the environment. The operational EMS medical director should be as qualified as possible for the specific team that is being supervised. The medical director should train and operate with the team frequently to be effective. Adequate provision for compensation, liability, and equipment needs to be addressed for an optimal relationship between the medical director and the team.

Key words: wilderness, emergency medical services, medical direction, search and rescue, operational medicine

Introduction

Operational emergency medical services (EMS) programs are specialized types of EMS that are complicated by less resources or environmental conditions and are more austere than typical urban EMS. In defining operational EMS, Bogucki¹ notes, “operational EMS comprises a body of knowledge, specially trained providers, and applied technology organized into a medical support system for personnel working in hazardous, austere, and/or tactical environments.” Providers of EMS who work in operational environments, therefore, require specialized skills distinct from those required of other EMS providers.

Perhaps the most obvious example of an operational EMS program is one that is connected to a law enforcement tactical response unit. Although it is appropriate to

think of law enforcement EMS as an operational program, there are many other types of EMS programs that should be considered as operational. Some of these programs, which function in wilderness environments, should additionally be thought of as wilderness EMS (WEMS) programs (eg, wilderness search and rescue, ski patrols, water rescue, and cave rescue). In their joint position statement on operational EMS medical direction, the National Association of EMS Physicians (NAEMSP) and the National Association of State EMS Officials (NASEMSO) identify all EMS providers operating in remote or austere conditions as being operational, specifically naming, without the exclusion of other programs that also operate in austere environments, “ski patrols, wilderness search and rescue teams, fast or open water rescue teams, urban search and rescue teams, tactical EMS supporting law enforcement operations, fire-ground operations, and wild land fire crews.”² Most WEMS programs, if acting as a formal component of a geographic region’s emergency response system, fall within the scope of operational EMS. In addition to being

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austere, many of these environments are further complicated by the inability to safely get either a ground or air ambulance to the patient, requiring providers who work in these environments to be able to care for a patient with only the equipment that can be carried without the assistance of a ground or air ambulance.

In consideration of the complex nature of wilderness operational environments, the specialized skills needed to manage patients in these environments, and the demands on the providers and agencies that function within these environments, it is essential that these agencies and providers function with medical oversight and direction. The medical director will ensure that the EMS providers are appropriately trained for the specific operational activity, and that the care provided follows a system of protocols that accounts for the demands and needs of the unique environment. In addition, the medical director will ensure that there is a program for continuous quality improvement which is essential for administering safe healthcare to the public. Finally, to assist with system integration and ensure that the care provided is consistent with local and state standards, the medical director for the program should be a physician with knowledge of the overall EMS system and how the operational EMS team functions within it.

Integration of Wilderness Emergency Medical Services Programs With the General Healthcare System

Although WEMS programs are unique, it is important that these programs are integrated with the local EMS and general healthcare systems. Integration of WEMS providers and programs with the general EMS system supports compliance with state and local regulations. It also helps to ensure that the care provided meets national standards given the nonstandard environment. Although many wilderness programs require guides and trip leaders to have some level of emergency care training, such as Wilderness First Responder (WFR), it is ultimately the person specifically assigned as an emergency responder who will provide healthcare as one of his/her duties. Regardless of training level, emergency responders need to be integrated into the EMS system and have an identified medical director.

National consensus has long supported the concept that out-of-hospital healthcare should be integrated with the larger healthcare system. The first document to support this concept was the 1966 white paper *Accidental Death and Disability: The Neglected Disease of Modern Society*.³ This landmark paper proposes methodologies for the management of the traumatized patient as a seamless process from initial identification of the patient to

discharge from the hospital. Perhaps the most eloquent explanation for the importance of integration is identified in the *EMS Agenda for the Future*,^{4,5(p2)} which states that “patients are assured that their care is considered part of a complete health care program.” In wilderness and other operational settings, regardless of how remote or hostile the environment, the patient’s journey through the healthcare system begins with the first episode of emergency care. The care provided in the wilderness may be adapted to meet the constraints of an unusual environment, but must still follow national standards and state guidelines. One role for a medical director of a wilderness or operational EMS organization is to ensure an appropriate balance between adapting to the demands of a challenging environment and providing evidence-based medical care that is compliant with accepted standards.

Scope of Practice

In 2007, the National Highway Traffic Safety Administration (NHTSA) published the *National EMS Scope of Practice Model*⁶ as a consensus-based document to improve consistency in the development of scopes of practice of EMS providers. This document provides a framework for the out-of-hospital scope of practice of EMS providers that function in all settings, including wilderness and operational incidents. The EMS scope of practice is based on education, certification, licensure, and credentialing, which determine the level of care that a rescuer may provide. The EMS personnel practice under a medical director, who should supervise all prehospital care including in the operational and wilderness arena.

A complete discussion of the foundation to scope of practice can be found in the NHTSA document.⁶ A few things do warrant mention as these activities pertain to wilderness and operational EMS. The difference between certification and licensure is particularly important for EMS as most states certify but do not license EMS providers, reflecting the fact that EMS providers usually operate under another provider’s license. The requirement for a nonlicensed EMS provider to function under a medical director is especially important in wilderness and operational EMS, in which direct online medical control may be difficult.

The scope of practice for a specific type of operational environment is determined at multiple levels including state, local, and agency (including the medical director) authorities. The *National EMS Scope of Practice Model*^{6(p45)} suggests that “state regulations must be clear as to the extent to which the State’s EMS scope of practice applies to EMS personnel functioning in . . . non-traditional roles and settings,” suggesting that there is a role for operational specific scopes of practice within an

EMS system to address the needs of specific environments. The *National EMS Scope of Practice Model* currently defines four levels of EMS provider certification: Emergency Medical Responder (EMR), Emergency Medical Technician (EMT), Advanced Emergency Medical Technician (AEMT), and Paramedic.⁶

If the individual is a component of an organized response in the opinion of the authors, the need for medical directorship holds true for providers trained at the level of WFR and those working for search and rescue (SAR) groups or ski patrols. The authors realize that this goal may be difficult to achieve, especially for smaller agencies, but we believe this will enhance the quality of medical care at all levels and environments.

TRAINING

Wilderness EMS programs with protocols designed for their specific environment face a number of additional challenges in implementation. Having personnel with adequate training is critical and may have to be obtained through an external program if the agency does not have the requisite expertise. It is important to verify that training certifications will be recognized by all appropriate authorities.

The National Ski Patrol's "Outdoor Emergency Care" program, 5th edition, meets and exceeds all the national requirements for EMR, including specialized attention to alpine and winter environments.⁷ This is just one appropriate training program available and others may be appropriate to use. The National Park Service, in conjunction with University of California San Francisco-Fresno's Department of Emergency Medicine, maintains a "Parkmedic" certification that trains park rangers to a level roughly between that of an AEMT and Paramedic in the traditional licensure levels, but with additional wilderness training.⁸ These training programs have stood the test of time and, if available and affordable, are excellent training opportunities for wilderness providers. In addition, the aforementioned WFR and WEMT courses are also appropriate training for the appropriate level wilderness responder.

OPERATIONAL-SPECIFIC PROTOCOLS AND SCOPE OF PRACTICE

There are many considerations regarding the use of wilderness-specific protocols often referred to as "expanded scope of practice." Most important, state regulatory and legal practice limitations must be followed. Wilderness and operational-specific protocols involve medications or procedures that would not normally be available to a traditional EMS provider at that care level. The agency

and its medical director may allow providers at one level to provide a medication or procedure usually restricted to a higher level provider in a specific situation when they are the only providers available. One example would be to permit an EMR to immobilize a patient on a backboard and transport out of the environment, care that is usually restricted to an EMT-B or higher.

More often, operational-specific protocols involve the insertion of a skill or medication that is not typically used in the traditional EMS milieu. Procedures in this category include relocation of some joint dislocations, insertion of a urinary catheter for a patient with a suspected spinal injury, and advanced wound management. Medications in this category might include oral antibiotics and medications to treat pain, nausea, anaphylaxis, and other symptoms that are inhibiting safe extrication out of the environment.

Although the development and implementation of a wilderness-specific, or expanded scope of practice, program may be critical to the success of the WEMS team, it is equally critical that such policies be carefully considered and have the support of all appropriate regulatory agencies, the system itself, and all elements of medical direction. Ultimately, the only reason to implement operational-specific protocols or expanded scopes of practice is a demonstrated need as evidenced by improvement of patient comfort that facilitates extrication out of the environment or prevention of permanent disability or death that would otherwise not have been prevented without the use of the protocol.

Medical Director Requirements

The minimal requirements for a WEMS medical director should be current licensure to practice in the primary state of practice, board certification in a primary specialty (with emergency medicine giving the most specific postgraduate training pertaining to WEMS), and adequate training and expertise in general EMS medical direction.⁹⁻¹¹ With the recent designation of EMS as a recognized subspecialty of Emergency Medicine,⁴ in the future, board certification in EMS will be a desired qualification for an operational EMS medical director. However, despite the benefit, quite often the only available physician who has interest in working with a wilderness program is a specialist in another discipline besides emergency medicine. An operational EMS medical director should have specific training in EMS medical direction, which may consist of the National Association of EMS Physicians Medical Direction Overview Course or the newly developed Medical Directors Certification Course on wilderness medical direction co-

sponsored by NAEMSP and the Wilderness Medical Society.

An EMS medical director should also have a working knowledge of the National Incident Management System (NIMS).¹¹ The medical director should be familiar with the local, regional, state, and federal responses to all incident types and how each operational EMS team and its medical director fit within the NIMS structure.¹¹ The operational EMS medical director should be familiar with local and regional prehospital systems of triage. Many systems are available (Simple Triage and Rapid Treatment [START]; Move, Assess, Sort, Send [MASS]; Sort, Assess, Lifesaving, Treatment/Transport/Triage [SALT]), but few, if any, have been tested in a rigorous fashion, especially in a remote location.¹²⁻¹⁴

The program medical director will also likely be responsible for team medical support during missions. This may include advice to assure adequate nutrition and hydration for team members and strategies to mitigate weather extremes. Responsibilities will also include managing on-duty injuries, which include proper evaluation and treatment including rehabilitation and appropriate reporting to supervisor and insurance carrier. A formal return to duty and medical certification may be accomplished by an occupational health clinic because this is a complex medical, legal, and ethical process that EMS medical directors may wish to avoid.

Specific Teams and Roles

The duties of an operational EMS medical director are potentially very broad and depend on the type of specialized team for which the medical director bears responsibility. All of these teams will need to address integration of all levels of providers into the general EMS system, the potential need for operational-specific protocols, and the appropriate method to implement operational-specific training and protocols. This section will review briefly the potential roles and responsibilities of the medical director for specific teams.

WILDERNESS SEARCH AND RESCUE

Wilderness SAR teams function in remote conditions that are inaccessible to traditional EMS response.¹⁵⁻¹⁷ In fact, team members often have to carry personal and rescue supplies for a multiday mission into the wilderness. Most wilderness SAR teams consist mostly of volunteers. Regardless of the agency that is the origin of the SAR team (ie, public health, law enforcement, fire department, etc), if the members of the team are providing direct patient care to the public or force protection to other members of the team, these providers should be

functioning under the supervision of a medical director, if at all possible. An ideal relationship would involve the medical director being a working member of the team, going on as many missions as possible, and providing oversight of the medical training for the team.

URBAN SEARCH AND RESCUE

Urban SAR teams can be nationally sponsored Federal Emergency Management Agency (FEMA) teams, state-sponsored programs, or organized by a single fire service.¹⁸ Urban SAR teams are used to search for and extract people trapped within collapsed structures or scattered throughout the environment. Scenarios might include earthquakes, landslides, hurricanes, tornadoes, and explosions. These teams may function in conditions that are inaccessible for varying lengths of times depending on the severity of the incident. The team's medical personnel's primary responsibility is for the well-being of rescue personnel and then for entrapped and rescued patients. Because of these responsibilities, the teams should be advanced life support-capable, if possible, and self-sufficient for at least 72 hours of operation.

SKI PATROLS

Ski area operations are unique in that they are often remote, affected by cold weather, and challenged by vertical or near vertical conditions. Medical direction is a necessity to ensure that ski patrollers are adequately trained to manage patients in this complex environment, the care follows an acceptable standard, and there is a quality improvement process in place to continuously improve the care delivered to the skiing public.

All patrollers, regardless of paid or volunteer status and of whether the patroller is affiliated with the National Ski Patrol, should be considered to be working in the continuum of EMS care. Regulation of ski patrol personnel will vary by region, but their activity should follow state and local guidelines and regulations whenever feasible.¹⁹

WATER RESCUE

The environmental conditions of all types of water rescue create hazards that are quite different from typical urban EMS. It would be helpful for the medical director to be trained in water rescue, but this may not be possible for many teams. The medical director should have a thorough knowledge of water-related injuries to both rescuers and patients. Frequent issues that come up are: field management of hypothermia: appropriate use of personal flotation devices for both rescuers and the pa-

tient; when to fix (or not) a patient to a backboard; when to discontinue rescue operations and transition to recovery efforts; and when to refer patients to hyperbaric chambers for decompression injuries.²⁰

FLIGHT OPERATIONS

As a result of remote locations, WEMS programs are often supported by air medical operations. Although most air medical transports are equipped with resources found in a typical urban ambulance, the physiology of flight and the inability to land at will dictates a need for specialized medical direction and an understanding of the wilderness environment.²¹ Helicopter flight programs are particularly helpful in remote locations, potentially providing a higher level of care and decreasing transport times to receiving hospitals. A flight program's medical director needs to be familiar with the additional risks and costs associated with air medical care and transport of patients.²¹⁻²⁴ The medical director, in conjunction with local EMS agencies and receiving hospitals, is usually responsible for establishing protocols for appropriate utilization of air medical services and the determination of and training for air medical scopes of practice.²⁵

FIRE-GROUND OPERATIONS AND REHABILITATION

Fire-ground operations, including wildland fire, require the medical director to have thorough understanding of regulations and methods for fire rehabilitation as outlined by standards with the National Fire Protection Agency.^{26,27} On the fire-ground, the most common injuries are musculoskeletal, the most common cause of death remains cardiac related, and there may be toxic exposures, emphasizing the need for medical surveillance of firefighters.²⁷⁻³¹ In addition, wildland fire camps often expose workers to acute respiratory illnesses, including common respiratory viruses, necessitating the medical director to have an understanding of common procedures for infection control within group camps.

TACTICAL EMERGENCY MEDICAL SERVICES

Providing medical care in the tactical environment requires knowledge of the effects of this hostile situation on the victim and the tactical team including the medical director, allowing a safe extrication. There are several types of tactical teams and possible incidents that the operational EMS medical director may have to deal with. In some law enforcement systems, EMS personnel are inserted into the law enforcement organizational structure on tactical EMS (TEMS) teams that support SWAT

or other specialized tactical teams. In other law enforcement systems, the law enforcement personnel are inserted into the EMS organizational structure, serving as first responders for EMS under a medical director's supervision.³² Medical directors need a thorough knowledge of law enforcement agency (LEA) procedures for various ballistic, explosive, chemical, and civil disorder threats and the role they will play in a particular incident.³³ The tactical EMS medical director should train as much as possible with LEA officers to further understanding of requirements and to team build. The LEA team members will have similar requirements for medical surveillance, occupational health evaluations, evaluation of injuries, and fitness for duty issues as firefighters.³³ The Counter Narcotics and Terrorism Operational Medical Support course has been the standard for TEMS training.^{34,35}

ANIMAL CARE

Wilderness EMS medical directors may have to take care of injuries associated with using SAR animals. Wilderness, urban, tactical, and avalanche SAR may use horses and dogs. Veterinary help may not be readily available, and the medical director and medics may need to temporarily care for animals used with the teams.^{36,37} In addition, the medical director may have to care for team members who may become injured by animals involved with the operational event. Therefore, medical directors who work with animals should be familiar with appropriate care for animals and animal-related injuries. The American Red Cross and FEMA both sponsor courses in field first aid for animals.

Responsibilities of the Program

A good working relationship between the medical director and the program requires that expectations are discussed in advance and performance by both parties is measured and evaluated. The operational agency and the EMS medical director should execute a contract or memorandum of understanding to clarify roles, responsibilities, compensation, and insurance issues to prevent confusion and loss of team effectiveness.

In a US nationwide sample, 75% of EMS medical directors, including those from operational programs, are paid.³⁸ A portion of the operational medical director's professional time will be devoted to specific EMS duties, foregoing other professional activities and compensation. Therefore, the medical director should be compensated at an appropriate rate, given the resources of the agency.

Wilderness EMS medical directors should be able to safely operate in the field to enable the organization to

deliver the highest quality of care. This allows the medical director to provide real-time evaluation of the care delivered and provides an ongoing opportunity to understand the unusual environment of the specific program. There are some retrospective data on improvement in EMS patient outcomes with direct physician care and supervision,³⁹⁻⁴¹ although these studies did not specifically focus on operational situations. The basic requirements for an operational EMS physician includes a uniform, badge or ID card, pager or other means of notification, radio or cell phone for ongoing communications, and other gear appropriate for field work.

Wilderness EMS organizations must also ensure that the medical director has adequate liability insurance. Because a physician is exposed to potential liability during medical director activities, the organization should ensure that these risks are adequately covered. Medical director's liability insurance should cover administrative duties, civil complaints, and medical malpractice for duties performed or advice given as a medical director. A medical director's liability coverage may be purchased as a personal policy, or the cost of the policy may be covered directly by the program. The medical director's liability may be mitigated by Good Samaritan laws, federal or state statutes but one should still be covered by liability insurance.

Conclusions

Although published evidence to support the specific roles of the wilderness and operational EMS medical director is lacking, the need for supervision is often mandated by regulation. Furthermore, the NAEMSP and NASEMSO and the consensus of experts in the field of operational EMS believe that operational WEMS teams should optimize the involvement of a medical director.² Wilderness EMS providers and programs that have a formal role in emergency response should be integrated into the local and state EMS system, regardless of the level of training of the providers and the number of patients seen in a given calendar year. This integration will serve the patient population by ensuring that standards are met and patients receive safe, quality healthcare. A primary role for a WEMS medical director is to ensure the best possible medical training, preparing the team to manage traumatic and medical illness for the public and team members.

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