

Center for Emergency Medicine of Western Pennsylvania

Appalachian Search and Rescue Conference

**WILDERNESS EMERGENCY MEDICINE
CURRICULUM DEVELOPMENT PROJECT**

PROSPECTUS

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PROSPECTUS

First (Draft) Edition

Edited by

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With help from members of the Appalachian Search and Rescue Conference and staff of the Center for Emergency Medicine of Western Pennsylvania. Appendix lists other consultants and prospective consultants.

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Preface

This Prospectus is a compendium of information about wilderness emergency medicine with three main goals. First, it is a draft curriculum of wilderness emergency medicine courses; we are publishing it to solicit constructive criticism and thus refine plans for our first class. Second, it is an informal survey of wilderness emergency medicine, providing background information on Wilderness EMT training. (This portion will expand as reviewers send in new information). Finally, it includes a free-flowing discussion of wilderness emergency medicine and Wilderness EMT training (often with controversial observations or opinions) to stimulate the debate needed to develop and refine the ASRC/CEM wilderness medicine courses.

If, in places, this first draft reads like a personal essay, I apologize. While it draws on the experience and knowledge of many people, at this early stage it still mostly reflects my personal knowledge and ignorance. A prime goal for this project is to help move wilderness emergency medicine from the personal and anecdotal to the professional, but one must start somewhere; and, on many topics, all I can offer is personal experience, opinion, or anecdote. Where opinions are primarily my own, I have written in the first person, so that any blame may fall squarely where it belongs. In upcoming drafts, I will do my best to credit other's ideas and opinions as clearly.

Wilderness medicine is a field largely inhabited by “amateurs.” I do not mean this in a derogatory sense; amateurs have a passionate interest in their chosen subject, and will devote more time and effort to it than someone arbitrarily assigned to the same job. Along with this massive investment of emotional and intellectual energy, amateurs often have a passionate interest in explaining their opinions to others. I hope the Prospectus will tap this reservoir of energy. I also hope that “amateur” readers will be enlightened, amused, or enraged by certain sections, and will write me to correct misconceptions, to provide more up-to-date information, or to express a contrary opinion. In this way, we amateurs can work together to make future publications of this Project more professional, and further the aims of wilderness medicine: to reduce suffering and illness in the wilderness.

Keith Conover, M.D.
Pittsburgh, Pennsylvania
June, 1987

The Sponsoring Organizations

The Center for Emergency Medicine The Center for Emergency Medicine of Western Pennsylvania (CEM), founded in 1978 and incorporated in 1983, is a consortium of 11 Pittsburgh-area hospitals and the University Health Center of Pittsburgh, the largest single medical campus in the U.S. Through its large residency program (the University of Pittsburgh Affiliated Residency in Emergency Medicine) the Center trains emergency physicians, and it also conducts a highly-respected paramedic training program. The Center provides medical command for the city of Pittsburgh, and provides emergency ground and aeromedical transportation services (STAT: Special Treatment And Transport). The Center for Emergency Medicine is well-known for its research in emergency medicine and prehospital care (the use of lighted stylets for intubation is a recent CEM innovation). The Center publishes many papers in the Annals of Emergency Medicine and other medical journals. It is the center for Pennsylvania's Basic Trauma Life Support training, and it is the headquarters of the National Association of Emergency Medical Services (EMS) Physicians.

The Appalachian Search and Rescue Conference The Appalachian Search and Rescue Conference, Inc. (ASRC), comprised of local Groups in Virginia, Maryland, and Pennsylvania, is a large, nationally-renowned wilderness search and rescue organization. The ASRC conducts mountain rescue operations, manages large and small wilderness searches, provides training and advice for fellow search and rescue organizations, and teaches outdoor safety classes. For many years, sophisticated medical care for wilderness and backcountry patients has been integral to ASRC operations, and that philosophy continues with the ASRC co-sponsoring this wilderness emergency medicine project.

Many ASRC members work as paid or volunteer EMT's (Emergency Medical Technicians), paramedics, emergency nurses, or emergency physicians. The ASRC membership even includes some of the country's first EMT's, paramedics, and emergency physicians. ASRC Groups have long been active with local Emergency Medical Service (EMS) councils, participating in disaster planning and disaster drills, communications networking, and EMS systems planning. Collaboration between emergency medicine experts and wilderness rescue experts is an ASRC specialty, which has led to wilderness-oriented basic EMT classes and seminars on adapting standard prehospital training and techniques to the wilderness, culminating in this Wilderness Emergency Medicine Curriculum Development Project.

Acknowledgments

This Prospectus is the work of many people. Members of the Appalachian Search and Rescue Conference and the staff of the Center for Emergency Medicine of Western Pennsylvania have of course played pivotal roles in the project. The staff of the Center for Emergency Medicine (especially Dr. Ronald Stewart) and the Board of Directors of the Appalachian Search and Rescue Conference (especially Chairman Albert Baker) provided the enthusiastic support needed to get the project off the ground. Bob Lasek, M.D., Dave Lindell, and Walt Stoy, all affiliated with the Center for Emergency Medicine and members of the ASRC's Allegheny Mountain Rescue Group, helped with all the initial planning. The faculty of the Department of Internal Medicine at Allegheny General Hospital were invaluable in reviewing medical concepts for the course. Bob Koester, Chairman of the ASRC's Medical Committee, developed text materials which will become part of our Wilderness Emergency Medicine Textbook, and has been an enthusiastic supporter.

Stan Bush was for many years the Chairman of the Emergency Medicine Committee of the National Association for Search and Rescue, and was one of the first to support the idea of a national Wilderness Emergency Medical Technician course curriculum. This Project draws heavily on work that Stan and I did in the late 1970's, with help from others on the NASAR Emergency Medicine Committee. Dr. Warren Bowman, current Chairman of NASAR's Emergency Medicine Committee and national medical advisor for the National Ski Patrol System, coordinated development of the new National Ski Patrol -- American Red Cross Winter Emergency Care Course (WECC). Along with older National Ski Patrol training courses, the WECC course was a model for our Wilderness Emergency Medicine Curriculum Development Project. We owe a debt to Dr. Paul Auerbach and his colleagues in the Wilderness Medical Society, because they have made wilderness medicine respectable in the eyes of the medical community (see the December 19th issue of the Journal of the American Medical Association¹). Research sponsored and encouraged by the Wilderness Medical Society will put Wilderness EMT courses on a more sound scientific and medical foundation.

Many people, from all parts of the country, have offered to review this Prospectus and help with the curriculum; as work continues, the list of acknowledgments will grow. Appendix lists those who have offered to help or whose names have been suggested as possible consultants.

This Prospectus, and all the publications of the Wilderness Emergency Medicine Curriculum Development Project, owe a debt to those who have contributed articles and textbooks to the wilderness medicine literature. These teach physicians and the outdoor public, but they also provide the scientific basis for all wilderness emergency medicine classes. The names of Paul Auerbach, Cameron Bangs, Fred Darvill, William Forgey, Edward Geehr, Murray Hamlet, John Hayward, Evan Lloyd, Allen Steinman, and James Wilkerson stand out as major contributors to this literature.

Finally, I must acknowledge the help of my wife, Betty P. Thomas. Her unfailingly judicious review and commentary, her mountain rescue and EMT background, and her constant encouragement made this Prospectus and Project possible.

Pittsburgh as a Wilderness EMT Training Center

Pittsburgh might strike one as an unlikely place for a Wilderness EMT training center. However, Pittsburgh lies at the western edge of the central Appalachian Mountains, the country's most heavily-used backcountry recreation area. Within a half-day's drive of Pittsburgh are three large National Forests and a National Park, both designated and undesignated Park Service and Forest Service wilderness areas, and many other popular backcountry areas. The region is criss-crossed by thousands of miles of backpacking trails (including the Appalachian Trail), and contains popular whitewater streams, famous climbing areas like Seneca Rocks, and some of the world's longest and most interesting caves. With such an outdoor recreation area near New York, Philadelphia, Baltimore, and Washington, backcountry emergencies are common and becoming more so. With both local needs and outstanding search and rescue and wilderness medicine resources, Pittsburgh is an ideal site for Wilderness EMT training.

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I. INTRODUCTION

A. The Wilderness Emergency Medicine Curriculum Development Project

The ASRC/CEM Wilderness Emergency Medicine Curriculum Development Project is a joint project of the Center for Emergency Medicine of Western Pennsylvania (CEM) and the Appalachian Search and Rescue Conference (ASRC), although many individual and organizational consultants are participants (see Appendix D). The Project consists of four parts. The first is this Prospectus you hold. It is a vehicle for distributing information about the ASRC/CEM Project, but it is also a way for us to gather information about Wilderness EMT training across the country. The information we gather will not be solely for our own use; we will publish it and do our best to make it available to any interested person. We expect the Prospectus to go through several revisions, and eventually we will publish it as a Course Guide for Wilderness EMT, Wilderness Paramedic, and Wilderness Command Physician training.

The second part of our Project is a Wilderness EMT pilot class, tentatively planned for August 1987. This first "pilot" class will train EMT's involved with wilderness search and rescue (the second offering will include classes for paramedics and doctors). Although those who attend will receive outstanding instruction, we will conduct the first class primarily to obtain student and instructor feedback. For teaching the pilot class, as with developing the Prospectus, we will recruit as many experts as we can. We will also ask educational experts to help us organize the class to make the instruction as interesting and effective as possible. The class will be well-documented (including video tapes). Based on instructor and student reactions, we will make modifications (possibly major ones) before offering the class on a regular basis.

The third part of the Project is to distill the pilot class materials into a comprehensive written curriculum, consisting of Instructor's Lesson Plans for each class (basic Wilderness EMT, Wilderness Paramedic, and Wilderness Command Physician) and a single comprehensive Wilderness Emergency Medicine Textbook. While still in draft form, each manual will receive extensive review by experts in the field. As with the Course Guide, these will be available to any interested agency or organization. We aim for the lesson plans and textbook to be comprehensive yet highly adaptable.

The final part of the Project will be to establish, in cooperation with local emergency medical services (EMS) and search and rescue (SAR) agencies, a regional Wilderness Emergency Medical Services System, with region-wide training, certification, communications systems, and support services. This WEMS system will complement existing EMS and SAR systems, providing a coordinated, statewide (or multi-state) plan for dealing with wilderness medical problems in a coordinated and professional manner. It will use the most modern emergency medical knowledge and technology available, while recognizing the constraints of the wilderness environment on personnel and equipment.

This Wilderness EMS system will provide a sophisticated medical component for wilderness SAR organizations and EMS agencies with wilderness responsibilities. It will not in any way supersede or replace existing EMS or SAR organizations, but will provide specialized support services to those organizations. We will teach Wilderness EMT's the fundamentals of wilderness search and rescue, but will also emphasize the need for more specialized training for search management and technical rescue. We will depend on existing regional and national search and rescue organizations (Mountain Rescue Association, Civil Air Patrol, Appalachian Search and Rescue Conference, and state Search and Rescue Councils) to provide SAR training, and will not attempt to duplicate their training.

We hope that a regional Wilderness Emergency Medical Services system here will inspire others to establish similar systems in their own regions. Our wilderness emergency medicine curriculum, with its wide support base, might even serve as a model for a nationwide curriculum.

B. The Prospectus

This Prospectus is a collection of information, ideas, and opinions about wilderness emergency medicine, and a proposal for a standard curriculum of training courses in wilderness emergency medicine. It is not as detailed as the Course Guide, Instructor's Lesson Plans, and Wilderness Emergency Medicine Textbook will be, but it provides enough of an outline to make the general plan clear. It also includes short mini-essays on controversial wilderness emergency medicine topics. Any organization planning of a Wilderness EMT curriculum must consider these issues, and the mini-essays are deliberately written to stimulate discussion. Readers' comments on these issues will mold the final form and content of the Project's courses and training materials.

C. The Pilot Basic Wilderness EMT Class

The ASRC/CEM plan for wilderness emergency medicine training will focus on three levels of training: Wilderness EMT, Wilderness Paramedic, and Wilderness Command Physician. Our first course offering (planned for August 1987) will be a single basic Wilderness EMT class, and the second offering will include Wilderness Paramedic and Wilderness Command Physician classes as well. For those familiar with the terms EMT, paramedic, and command physician, the general type and extent of training should be immediately evident. Levels of Training and Terminology, page , explains the choice of levels (and names) in more detail.

Since high-quality EMT and paramedic training is readily available in the mid-Appalachian area, our local Wilderness EMT and Wilderness Paramedic training will build on that base; applicants for our courses thus must have EMT or paramedic training. We suspect that some regions will prefer to integrate wilderness training into existing EMT and paramedic courses, or to train wilderness EMT's and paramedics "from scratch," (that is, without the strictly ambulance-oriented portion of "standard" EMT or paramedic courses). Guidelines for these variants will be an integral part of our written curriculum.

Some wilderness emergency medicine physicians believe that wilderness paramedics should use advanced skills, even some rarely used by other paramedics (e.g. placement of Foley catheters to monitor urine output during long rescues). For wilderness paramedics to perform invasive techniques, particularly ones unique to Wilderness EMS, we believe that wilderness rescue agencies should first set up comprehensive, paramedic-staffed, physician-supervised, wilderness advanced life support systems. (We suspect that many local physicians and EMS agencies will feel the same.) In the mid-Appalachian region, the closest to such a system that we know is the National Park Service's Parkmedic program, and it deals as much with "rural" as with "wilderness" EMS². We would very much like to hear about Wilderness EMS systems in other areas, and their approaches to invasive procedures.

We would like to offer Wilderness Paramedic and Wilderness Command Physician classes at the same time as the basic Wilderness EMT class. However, we want to concentrate our initial efforts on the basic Wilderness EMT curriculum, and we wish to do further work in establishing a regional Wilderness EMS system before

training paramedics and physicians, so we will not offer Wilderness Paramedic or Wilderness Command Physician classes until our second Wilderness EMT course offering (probably late 1987 or early 1988). Physicians and paramedics who wish to attend our first Wilderness EMT class are welcome to apply; we will be sure to use their talents to help with the class. We will set aside some positions for members of search and rescue teams which plan to join a comprehensive regional wilderness EMS system with specialized wilderness ALS capabilities. To qualify for this status, a team must:

- (1) Show that members are trained and certified to the Level I Ground Search and Rescue standards (see Appendix), a parallel outdoor search and rescue certification. (We cite the Virginia SAR standards, rather than Pennsylvania standards, because the Appalachian Search and Rescue Conference is active in a multi-state region including Virginia as well as Pennsylvania, and we envision a potential multi-state wilderness EMS system including both Pennsylvania and Virginia; besides, Pennsylvania has no SAR standards.
- (2) Be willing to become part of a regional wilderness EMS system.
- (3) Have a physician medical director willing to
 - a. attend a future ASRC/CEM Wilderness Command Physician class,
 - b. help supervise and command Wilderness EMT's throughout the region, and
 - c. coordinate continuing education and recertification programs for the team.

D. The Course Guide, Instructor's Lesson Plans, and Wilderness Emergency Medicine Textbook

After completing and reviewing the pilot class, we will publish three manuals. The Course Guide, similar to this Prospectus, will outline the Project, its publications, how to set up Wilderness EMT, Paramedic, and Command Physician training courses, and how to establish regional Wilderness EMS systems. It will describe how to adapt our materials to other regions' needs.

The Instructor's Lesson Plans will provide annotated class outlines for Wilderness EMT, Wilderness Paramedic, and Wilderness Command Physician courses. Experts in the field will review the lesson plans for content, and our editors will review them for coherence, appropriate level of detail, and style of presentation.

The Wilderness Emergency Medicine Textbook will be a single text for EMT, Paramedic, and Physician courses. Each topic will include basic material for EMT's, more advanced material for paramedics, and detailed information for physicians; the more detailed information will be set in smaller type faces, to allow students to read only the information they need, or to delve deeper as interest and time allow. Where possible, the text will borrow from existing texts. (We will encourage students to acquire and read these texts.) With the help of our consultants, we will review each chapter for accuracy, sort the material into the appropriate levels (EMT, paramedic, physician), and edit the entire manual for clarity and ease of reading. The textbook will be extensively referenced, but will remain a learning tool rather than a reference work.

Our tentative schedule calls for preliminary drafts of these three manuals to circulate within the ASRC and CEM in May, with formal drafts distributed for consultants to review in July. We will combine consultants' feedback with student and instructor reactions to the pilot class to produce first editions in fall 1987 or spring 1988.

E. A Regional Wilderness EMS System

The Appalachian Search and Rescue Conference and Center for Emergency Medicine will work toward establishing a regional Wilderness EMS System including the western Pennsylvania region. This system may include all Pennsylvania, or perhaps even extend across several states, as does the Appalachian Search and Rescue Conference. The Wilderness EMS system will include in-hospital clinical training, written and practical testing and certification at all levels, continuing education programs, physician medical direction and on-line control, and a sophisticated communications network to extend on-line medical control as far as possible. Quality control and accountability are imperative for such a system, if it is to be accepted by the medical community. This Wilderness EMS System will be tightly integrated with existing EMS systems and wilderness search and rescue systems. This is an ambitious undertaking, and may take years to accomplish.

II. ISSUES IN WILDERNESS EMS

A. Standard of Care

The purpose of this project is to provide high quality training for EMT's, paramedics, and doctors who will be providing prehospital care for patients in wilderness search and rescue settings. Our ultimate goal is to improve the care of backcountry patients, and we would like to see wilderness patients get the same quality of care as a patient on the streets of Pittsburgh. Equipment limitations and the wilderness environment may limit our ability to do this, but we will come as close as we can. Just because wilderness rescues are rare in a given jurisdiction is no reason for them to result in confusion, disability, or death.

B. The Scope of "Wilderness" and "Medicine" in Wilderness EMS

1. Wilderness First Aid, Wilderness Medicine, and the Wilderness EMT

"Wilderness Medicine" includes a wide spectrum of medical, paramedical, and non-medical topics. These include preventive measures for foreign travelers, definitive care of minor injuries, care of environmental exposure in the wilderness, improvised evacuation of patients, and the physiological study of altitude effects.

The ASRC--CEM Wilderness Emergency Medicine Curriculum Development Project deals only with a particular subset of these topics, defined by the training needed by medical and paramedical personnel working with a wilderness search and rescue team. This includes management of patients over extended periods, treatment of exposure, trauma, shock, and infections, and the use of drugs, IV's, and other invasive procedures.

We reserve the title "Wilderness EMT" for specially-trained members of a wilderness-oriented, well organized, physician-controlled system that provides emergency medical care to patients in backcountry situations. Other courses, some using the name Wilderness EMT, offer training in general wilderness medicine for EMT's who will use their training in recreational outdoor activities. We support the teaching of basic EMT-level first aid and medical care (and beyond) to outdoor trip leaders, and may develop such courses locally, but we do not plan to apply the term "Wilderness EMT" to this training.

If we strictly interpret the term "Wilderness Emergency Medical Services," it should apply only to care rendered in a designated wilderness area: a large roadless area, usually with rugged terrain, where rescuers must go in on foot, carrying rescue and medical gear on their backs. However, similar problems (time, access, environment, and the like) may occur in many other types of areas. (The most trivial example is an injured backpacker in a wild backcountry area the government has not designated as wilderness.) Most Wilderness EMT enthusiasts believe in broadening the scope of the "Wilderness" in the WEMT title; but to what extent? This topic often engenders heated discussion.

Many environments might fall within the scope of the Wilderness EMT. Some areas that are not officially "wilderness" have similar search and rescue problems: many recreational users and difficult, often uniquely challenging, access. Some such environments already have specialized training curricula. We must decide which environments are crucial (mountain rescue?), which are less important but belong in the Wilderness EMT course (cave rescue?), which environments we should exclude, since adequate training is already available (dive rescue?), and which environments deserve a separate curriculum (mine rescue?). This Section, and the Appendix on wilderness EMS regulation proposals (Appendix C), may help solidify the reader's opinion on this issue, though I suspect that it will be a subject for lengthy debate.

2. Mountain Rescue

I believe that the central theme of the Project should be mountain rescue. By "mountain rescue," I don't mean just spectacular alpine cliff rescue, but also the less-spectacular but difficult rescues in the rolling mountains and foothills of the Appalachians and similar areas. I've worked as a Ranger in California's Yosemite National Park, and been on many Appalachian cave and mountain rescues. Although the east does not have the vertical heights or altitude of the west, the weather and brush here can be much worse than anything in the Sierras. I remember in particular one rescue in Shenandoah National Park that involved 11 hours of difficult vertical rescue, at night, in fog and freezing rain. I believe that most western rescuers do not appreciate how difficult eastern mountain rescues can be.

But vertical night rescues in freezing rain aren't necessary for search and rescue to be "mountain rescue." If a semi-technical evacuation, up out of a deep ravine in a coastal area, required rescuers to carry all medical and rescue equipment to the patient on their backs, and if the evacuation to a vehicle access point (jeep trail or helicopter landing zone) required several hours even for skilled rescuers, I would call it mountain rescue. Thus, to me, mountain rescue refers to using technical or semitechnical evacuation techniques (ropes) for a several-hour evacuation, whether in the mountains or not.

3. Cave Rescue

In many parts of the country, exploring wild caves is a popular and somewhat hazardous outdoor recreation. Cave rescue has some unique access problems, for example: while they are often seen as a panacea for mountain rescue, helicopter evacuations are seldom useful underground. In cave-bearing areas of the U.S., recreational caving results in frequent searches and rescues. Although cave rescues are under-reported, some one to two hundred cave rescue operations probably happen yearly in the U.S. (extrapolated from 20 years of reports in the National Speleological Society's American Caving Accidents³ series.) Cave rescues are long, technically difficult, and offer some unique medical considerations. As Medical Advisor to the most active region of the National Cave Rescue Commission, I know of no training programs which can provide cave rescue personnel with specialized wilderness-oriented emergency medicine training. Therefore I think cave rescue should be part of our Wilderness Emergency Medical Technician courses. (In areas with no caves, there is no need for this training; our course materials should make it easy to omit cave-specific material. However, since most parts of the country have caves, most WEMT classes should include the cave environment.)

4. Diving Medicine

Most recreational diving accidents come to a quick resolution: the victim survives and comes promptly to a shore facility or boat, or dies. In either case, those present at the scene will need to use their first aid and diving training to deal with the circumstances as best they can, and this argues for dive-oriented first aid training for all sport divers. The inability of human beings to breathe water, and the rapidity with which a sport diver may reach the surface, means that "dive rescue teams" rarely need to brave the undersea environment to bring medical care to a live victim. Most "Dive Rescue" or "SCUBA Rescue" teams are in reality body recovery teams for the local rescue squad.

The National Association of Diver Medical Technicians sponsors a Diver Medical Technician⁴ course. Although it is primarily for medics on undersea drilling rigs where underwater work is a daily activity, it also applies somewhat to sport diving. I am not a diver, so I cannot judge the diving aspects of the course, but when the Undersea Medical Society asked me to review the medical portion of Diver Medical Technician manual, I it to be comprehensive and well-thought-out. Given that this training is available, does our

Wilderness EMT program need to consider the diving environment, or should we just refer those interested in diving emergency medicine to the Diver Medical Technician course?

5. Mine Rescue

Although deep mine rescue is similar to cave rescue in that both types of rescue take place underground, they differ in many ways: the environment is quite different; the rescue personnel come from different backgrounds (most mine rescue personnel are professionals employed by a mining agency or corporation, whereas almost all cave rescue personnel are recreational cavers who serve as members of volunteer teams); and political and sociological features put the two types of rescue worlds apart. Nonetheless, resources from mine rescue are occasionally used in cave rescue, as when the Special Medical Rescue Team, which consists of volunteer paramedics and doctors trained in mine rescue, help out the National Cave Rescue Commission (NCRC) with medically complicated rescues. Sometimes, an NCRC Coordinator will ask for federal help to tunnel down to a patient trapped in a cave.

In a sense, mine rescue is structure (“building”) rescue, rather than wilderness rescue; some of the problems are similar in outline to cave rescue, but the details are vastly different. Therefore, I think that mine rescue should not be part of the standard Wilderness EMT course, but that someone should offer a separate course in emergency medicine for mine rescue.

6. Expedition Medicine

For many years, climber-physicians have taught courses for climbers heading to the Himalayas, the Hindu Kush, or other far-away mountain ranges. Even “trekkers” with less lofty aims heading to the high mountain valleys of Nepal or Peru have sought medical training. In such an environment, medically-untrained trekkers or climbers often must cope with their own medical problems for extended periods up to months, also providing whatever medical care they can to the locals (who often have had no previous medical care whatsoever). Climbers and even trekkers in such places must also prepare themselves to deal with the special problems of the high mountain environment: water disinfection, infectious diarrhea, trauma, infections, and high altitude pulmonary and cerebral edema.

James Wilkerson's classic *Medicine for Mountaineering*⁵, now in its third edition, has been a standard textbook for “mountaineering medicine” classes, such as those offered by The Mountaineers in Seattle, the Appalachian Mountain Club in Boston, or the Mountaineering Section of the Potomac Appalachian Trail Club in Washington, D.C. These classes traditionally have concentrated on providing a good general “family practice” background for the climbers, with a smattering of wilderness-oriented first aid. Since there is generally few problems associated with climbers administering prescription medications to each other in places like the Himalayas, classes generally include the use of some oral and injectable medications, though the pharmacology instruction is much simpler than in any paramedic class.

Some people journey far from civilization in ships, sailboats, kayaks, or canoes. Some of this travel comes properly under the heading of expedition medicine. The Public Health Service's text *The Ship's Medicine Chest and Medical Aid at Sea*⁶ is an easily-read guide to medical care for the merchant marine, and deserves wider use by those planning sailing or canoeing expeditions.

The only recent information about expedition medicine and first aid in the “mainstream” medical literature is a series of overview articles in *Postgraduate Medicine* in 1985.^{7,8,9}

7. River Rescue

Whitewater raft and canoe guides often have to deal with wilderness rescues and medical problems. Many want to go beyond first aid training, and some river guides take EMT classes for more training.

Should river guides be candidates for Wilderness EMT training? Or should we simply offer them better and more appropriate first aid training, without the Wilderness EMT's requirements of continuing education, physician supervision, and recertification? (This discussion might apply equally well to climbing guides, backpacking guides, and so forth.) Of course, one may argue that we should permit river guides to receive Wilderness EMT certification without the need for being a part of an organized Wilderness EMS system, and without the need for physician control and advice.

I will argue that the question may be easily resolved: guides whose employers become part of a regional Wilderness EMS system may become Wilderness EMT's. We should offer other guides the best wilderness first aid training we can provide. This is not because I want to restrict Wilderness EMT training. I think, though, that this is the crux of the definition of a Wilderness EMT: the WEMT is a member of an organized, physician-supervised wilderness EMS system.

8. Which Wildernesses, and Which Medicine, for the Wilderness EMT?

What wilderness-type environments, and which wilderness medical topics, should be part of this program? A summary of my current opinions are as follows. We should feature medical aspects of mountain rescue, where mountain rescue means "wilderness rescue in rugged terrain far from the road" rather than just cliff or high-altitude rescue. We should include primary care for minor injuries and illnesses that the Wilderness EMT might need to deal with in team members on a two or three day mission away from a physician's care, but where the team may evacuate members with major injuries or illnesses promptly (see the section below on wilderness primary care.) Expedition medicine (e.g. management of illnesses over a several-week period) should be given only a short discussion, although we should direct interested students to appropriate texts and training courses. We should include medical aspects cave rescue, while making it easy for course directors to remove the cave rescue sections if appropriate. We should mention diving medicine and medical aspects of river rescue briefly, but our class should not attempt to train students specifically to deal with diving or river rescue problems. We should discuss including mine rescue with mine rescue volunteers such as the Special Medical Rescue Team. Perhaps someone could establish a separate mine rescue course, since mine rescue has a larger paying support base, both federal and corporate, than the rest of wilderness rescue. Or, perhaps, mine rescue personnel could take the standard ASRC/CEM Wilderness EMT training, then branch off into modules in mine rescue applications taught and certified by some other organization. The criterion for acceptance into WEMT training should be participation in a physician-supervised Wilderness EMS system.

C. The ASRC -- CEM Project: Levels of Training and Terminology

Our wilderness emergency medicine curriculum will provide several levels of training. The levels that we have tentatively chosen for our program are: Wilderness EMT, Wilderness Paramedic, and Wilderness Command Physician. These labels are chosen for convenience: the terms EMT (Emergency Medical Technician), Paramedic, and Command Physician are well-known, and we want our training levels to closely parallel the existing "street" EMS training levels, showing that Wilderness EMT's, too, are part of an integrated system delivering high-quality prehospital care.

Terms used in the past to describe advanced wilderness medical training for non-physicians include "Wilderness EMT," "EMT-Wilderness," and "Wilderness Medical Technician." I favor using the term "Wilderness EMT" to describe the basic level of wilderness emergency medicine beyond first aid, but before training in invasive skills. "Wilderness EMT-Basic" would be more systematic, but the "-Basic" is probably unnecessary. To parallel the current terminology of the National registry of EMT's, the higher levels could become "Wilderness EMT-Intermediate" and "Wilderness EMT-Paramedic." We commonly shorten "EMT-Paramedic" to simply "paramedic," and thus could shorten "Wilderness EMT-Paramedic" to "Wilderness Paramedic." In its generic sense, "Wilderness EMT" can thus describe someone with any of the levels of Wilderness EMT training, from Wilderness EMT (-Basic) to Wilderness EMT-Paramedic.

When the DOT established the Advanced Emergency Medical Technician curriculum, they changed the name of this highest level of EMT training from EMT-Advanced to EMT-Paramedic, bowing to the popularity of the title paramedic (partly due to popularization of the term by a television show). This left us with inconsistent terminology: the basic level of EMT training is "EMT-Ambulance," because DOT had to justify its EMS program as relating primarily to highway traffic safety, whether the EMT works on an ambulance or not; the advanced level of training is "EMT-Paramedic" because the term paramedic was popular. If it were not so ingrained, I would suggest that we change the misleading name "EMT-Ambulance" to "EMT-Basic;" then we could have a Wilderness EMT-Basic, Diver EMT-Basic, and Ambulance EMT-Basic, and similarly for the advanced EMT training levels.

The term wilderness in the WEMT title neatly sums up in a word the essence of our work environments, even if not all are truly wildernesses. Using any other word (e.g. "Backcountry EMT") becomes indistinct, unwieldy, or degrading.

A difficulty with using this terminology is that the term "Emergency Medical Technician" may be used, I believe, only by those who complete a course meeting all the official U.S. Department of Transportation EMT course requirements. Thus, regions that wish to train Wilderness EMT's using courses that leave out ambulance-specific material might not be able to legally use the term "Wilderness EMT" for their graduates.

1. Wilderness First Aid and Beyond

All wilderness first aid enthusiasts agree that wilderness first aid training should differ from the non-wilderness first aid training that is now available. However, when these same people get down to discussing "wilderness first aid" in detail, they discover that they have very different ideas about the ideal wilderness first aid course. This makes sense, if one considers the widely different situations that might call for "wilderness first aid": from afternoon day-hikes, to expeditions to the Hindu Kush; from blisters on the heel, to open femur fractures; and from Sunday afternoon day-hikers, to medics with Mountain Rescue Association teams. The idea that a single first aid curriculum can meet all these needs seems absurd. If we recognize that wilderness first aid covers a wide spectrum of needs, an idea that recurs throughout the prospectus, we will avoid many arguments; and, if we recognize that chopping wilderness first aid into smaller, more manageable bits, rather than talking about it as a monolithic entity, we will focus our efforts much better.

Let's first consider the occasional day-hiker (or climber, caver, hunter, or paddler). Weighed against the content of the American Red Cross Standard First Aid and Personal Safety class, this person needs to know more about environmental dangers such as hypothermia and heat exhaustion, more about improvised splinting and evacuation, and more about accessing the local wilderness search and rescue/emergency medical services system. A wilderness-oriented instructor may easily add this content to a Standard First Aid class. Almost twenty years ago, the Seattle Mountaineers and the Seattle area Red Cross developed a Mountaineering Oriented Standard First Aid Course. This course uses the classic booklet, *Mountaineering First Aid*, originally written by Dick Mitchell¹⁰. A similar wilderness-oriented (rather than just mountaineering-oriented) first aid course would fill the day-hiker's needs very well. National guidelines for such a course, endorsed by organizations such as the Wilderness Medical Society, would encourage its acceptance.

The weekend wilderness backpacker needs more training than the day-hiker: how to deal with common medical problems until the backpacker can reach a doctor or hospital (a day or so), and preparation for dealing with major trauma and illness in the backcountry. Most backpackers carry a variety of over-the-counter (and occasionally prescription) drugs, and their wilderness first aid training must deal with the appropriate use of these drugs for minor problems. Teaching backpackers to use prescription medications, or to use non-prescription medications in non-approved ways, has legal implications that cause most doctors and first aid instructors to shy away. However, training lay backpackers to appropriately use some prescription and over-the-counter drugs makes sense, because the advice "see your doctor if the problem persists" is less than helpful a day's hike from the roadhead, especially when a common medication may be very helpful. A class that combines a wilderness-oriented version of the Red Cross Advanced First Aid and Emergency Care course with instruction on using simple medications for minor problems would be ideal for the "serious" outdoors devotee. (Although I have discussed only backpackers, the course should apply to all outdoor enthusiasts; for instance, a section on altitude illness for climbers, and a near-drowning section for whitewater paddlers.)

The Wilderness Medical Society is working toward a national backcountry first aid curriculum:

Backcountry First Aid can be defined as first aid rendered under conditions where immediate, definitive medical care is unavailable because of distance, adverse travel conditions, or difficulties in communications. The term "backcountry first aid," therefore, can be applied to first aid rendered at high and low altitudes, from arctic ice and subarctic tundra to forests, deserts, seashores, the tropics, and even under the seas. Small boat sailors, inhabitants of isolated villages, and victims of disasters where medical facilities and communications have been destroyed may all require "backcountry first aid." Backcountry first aid differs from the usual type of first aid and EMT training in three major ways:

(a) The need to learn new procedures in order to handle injuries and illnesses in which a delay of more than a few hours or days will likely cause adverse effects which outweigh the dangers of teaching such new procedures to lay persons. Standard urban protocols for these illnesses and injuries are not adequate for the backcountry setting.

(b) The need to deal with entirely new illnesses and injuries not seen in the urban setting.

(c) The need to learn basic care of an injured or ill person so that ordinary day-to-day requirements of the body will be met until definitive care is secured. These requirements include temperature control (warmth or coolness), shelter, water, food, cleanliness, psychological support, and the management of excretory functions. . .

. . . The WMS, with its membership which already includes a large number of the country's experts on various aspects of backcountry first aid, can and should become the national authority in this area. . .

. . . The WMS . . . does not have the manpower or funds to set up a national program for backcountry first aid training, including certification and recertification of instructors and

students. It can, however, be in a position to assist, advise, and perhaps certify other organizations which teach and certify students and instructors¹¹. . . .

Although some argue that a wilderness-oriented first aid course should be more of a “First Responder” course, parallel to the Department of Transportation's First Responder course¹², rather than the Red Cross First Aid courses¹³, others point out that Red Cross courses stress longer-term care, and primary care of minor illnesses and injuries, more than the First Responder course. If one accepts that, then the Red Cross courses would seem more easily adapted to the wilderness. The new National Ski Patrol System Winter Emergency Care Course is an excellent example of the adaptation of the American Red Cross Advanced First Aid and Emergency Care course for an outdoor setting, although it is suited more to rescuers than to recreational users of the outdoors.

Next, I would like to go beyond wilderness first aid to more advanced but related medical topics.

Compared with backpackers, members of an expedition to a remote corner of the globe will need more background in general medicine, such as extended treatment of common and serious conditions, the use of antibiotics, and general supportive care. This expedition medicine training should include some wilderness first aid, but the primary goal must be to prepare members to deal with their own medical problems for weeks, focusing on problems common in the region.

We have been considering variants of wilderness first aid by extending the duration and remoteness of the wilderness experience, but now let's extend wilderness first aid in another direction. Assume that a day-hiker breaks a leg, and one of his companions hikes out to call for help. A park ranger hikes up to the patient, and the local wilderness search and rescue team responds to evacuate the patient, who is by now hypothermic. What sort of wilderness first aid/medical training should the park ranger have? Rangers are wilderness first responders, and since they will see major injuries much more often than the occasional day-hiker, they should have training in the care of major problems (more than standard or advanced wilderness first aid), and does not need as much training in the use of over-the-counter and prescription medications for common minor problems.

The wilderness search and rescue team that evacuates the victim needs wilderness first aid/medical training similar to that of the park ranger, and if possible, even more extensive. The members of the search and rescue team might have wilderness EMT training (after all, that's the purpose of this Project), but in many areas, search and rescue teams cannot operate at the EMT level. The American Red Cross Advanced First Aid and Emergency Care training has been a mainstay for many search and rescue teams. Though many teams have an EMT or two, only a few teams operate as an organized EMS agency, and in some areas, only members of “legitimate” EMS agencies may become EMT's. While we would like to extend Wilderness EMT training to as many search and rescue teams as possible, we must acknowledge that in many areas, search and rescue teams will not be able to participate in Wilderness EMT training, and that adequate wilderness first responder training for those SAR teams that need it.

We have now identified several different types of needs for wilderness first aid/medical training:

1. outdoors enthusiasts: standard and advanced wilderness first aid
2. expedition members: expedition medicine
3. rangers and rescue team members: wilderness first responder, wilderness EMT, and above

This subdivision of wilderness first aid/medicine is arbitrary, and other breakdowns may be just as valid, but it helps explain the limitations of the ASRC--CEM Curriculum Development Project: although we may wish to expand our scope at some point, we are now addressing only the third of these three categories, and only at the EMT level and up.

We are thus admitting the need for wilderness first aid training, expedition medicine training, and wilderness first responder training, but offering no plans for training courses in these areas. Those looking for such training may, however, find some guidance in other sections of this Prospectus. We are also not addressing the need for wilderness first responder training; in our area, the National Ski Patrol Winter Emergency Care Course has the potential for providing this training.

Before leaving the topic of wilderness first aid, I must mention the use of EMT training to substitute for proper wilderness advanced first aid training. When I first took an EMT class, I was not a member of an EMS agency (though I later joined a rescue squad and served as a "street" EMT and paramedic for years); I took the class because I wanted something better than advanced first aid training, thinking ahead to when I might be faced with an emergency on a wilderness backpacking or climbing trip. I suspect that many backpackers, cavers, and climbers will want to attend our Wilderness EMT class (in preference to a regular EMT class) for similar reasons, especially since many EMT classes will only admit members of EMS agencies. However, we have much the same attitude as those EMT classes: we only want to admit those who will serve as Wilderness EMT's in the local Wilderness EMS system. We also believe that participation in a wilderness EMS system an essential part of the definition of the Wilderness EMT. However, we recognize the need for proper advanced wilderness first training for outdoor enthusiasts, although that is not part of this Project, and we do not believe the graduates of such courses should call themselves "Wilderness EMT's." Perhaps we will be able to start such a course in Pittsburgh once the Wilderness EMT curriculum is established; we will emulate established courses, such as Wilderness Medical Associates' course in New Hampshire.

2. Wilderness EMT (Basic)

A level of wilderness emergency medicine training equivalent to that of a basic Emergency Medical Technician is attractive. As with a "street" EMT, a basic Wilderness EMT would be able to competently manage most emergencies in the wilderness as far as may be done without invasive procedures. (Invasive procedure would require more training, certification, and close supervision by physicians.) Since the basic EMT course focuses on ambulance equipment which is seldom available or appropriate for wilderness EMS, we must supplement (or replace) many basic EMT-ambulance techniques and equipment with ones suitable for the wilderness. Training centers could offer Wilderness EMT modules that build on paramedic, EMT, First Responder, or even Advanced First Aid training. However we approach this, Wilderness EMT's will need to treat patients over a longer time period than their street-EMT counterparts, and thus will also need more extensive training in the pathophysiology of illness and injury.

3. Wilderness EMT-Intermediate

A person trained to competently deliver emergency medical care in the wilderness would be much more useful to the patient with a few invasive skills. Prehospital intravenous therapy is of little benefit for the urban multiple-trauma victims (rather than taking time to start an IV, it is better to move the patient immediately to a medical facility for definitive surgery), but wilderness trauma patients are more likely to benefit from IV therapy in the field. Starting IV's seldom delays a wilderness evacuation (the IV's are put in while the WEMT's prepare the patient for the evacuation), and patients with the massive multi-system urban-type trauma will probably die long before the Wilderness EMT's can reach the scene. Wilderness EMT's could use some other simple invasive procedures for long-term patient management. For instance, monitoring urinary output via a Foley catheter might make the Wilderness Command Physician's job easier. Therefore, a module containing a few such invasive skills would be a useful addition to the basic Wilderness EMT training. We might even wish to include a few invasive skills in all Wilderness EMT courses, and skip the basic level entirely. However, since the EMT-Intermediate is not a recognized EMT training level in Pennsylvania, we have elected to bypass the intermediate level of training until the other courses are well-established.

4. Wilderness EMT-Paramedic

Skill decay is a problem for full-time paramedics, so a volunteer rescue team Wilderness Paramedic will find it even worse. SAR team members who work or volunteer as "street" paramedics would not have this problem, but most "street" paramedics cannot take off from their jobs at a moment's notice, so they would be unavailable for many SAR missions. If team members who are not paid or volunteer "street" paramedics wish to become Wilderness Paramedics, then training them, certifying them, and providing them with adequate continuing education and experience will require a major investment of time and effort. Teams that would like some advanced life support capability without the need for members to be "street" paramedics might do best to work for establishment of a Wilderness EMT-Intermediate classification.

Some states have prehospital R.N. certification, separate but similar to EMT-Paramedic certification, for R.N.'s who serve in the field. Since we must care for wilderness patients for extended periods, the critical care training of these R.N.'s will be quite valuable. We will accept certified Prehospital R.N.'s for the Wilderness Paramedic class, substituting the prehospital R.N. certification for the EMT-Paramedic certification requirement; once certification was established, they would meet the same standards and receive the same certification as Wilderness Paramedics.

Although any given SAR team might have only a few members who could qualify for Wilderness Paramedic (or Wilderness EMT-Intermediate) status, the team needs only a few Wilderness Paramedics to assure that one is available for each patient. Since each SAR team would need only a few Wilderness Paramedics, and an advanced life support program with only a few paramedics will find it difficult to arrange adequate continuing education, we find the idea of regional multi-team Wilderness EMS Systems attractive.

5. Wilderness Command Physician

Providing medical command to a wilderness medic, especially one who is on a 36-hour evacuation in freezing rain on the side of a mountain, involves problems encountered by few command physicians in their routine practice. A Wilderness Command Physician should have a solid understanding of general emergency medicine, and particular expertise in wilderness medical problems (hypothermia, environmental poisonings, and the like). The command physician should have an understanding of the wilderness environment and the problems encountered by the Wilderness EMT's; this is true for any physician giving command to paramedics in the field, but is particularly important in wilderness EMS. Wilderness Command Physicians, even experienced outdoors enthusiasts, should participate in wilderness rescues or rescue simulations, or at least observe one at close range, to appreciate the difficulty of wilderness rescue and the severity of the environment. For these reasons, I believe that specialized training for Wilderness Command Physicians is a necessity.

D. What Problems Do Wilderness Patients Have?

For many people without wilderness rescue experience, medical training for wilderness rescue brings to mind courses such as the American Heart Association's Basic and Advanced Cardiac Life Support courses, the American College of Surgeons Basic and Advanced Trauma Life Support courses, and the National Association of EMT's Prehospital Trauma Life Support course. These courses focus primarily on stabilizing critically ill patients for a few minutes, then transporting to a sophisticated hospital resuscitation unit. In wilderness situations, it is unlikely that such severely ill patients will survive even until their companions can reach a telephone to call for help, much less until Wilderness EMT's can arrive.

We can find very little literature about the injuries and illnesses treated by search and rescue team EMT's. Articles on the epidemiology of wilderness medicine are beginning to appear in *Wilderness Medicine*¹⁴, and we also have *Accidents in North American Mountaineering*¹⁵, *American Caving Accidents*, and statistics gathered by the Appalachian Search and Rescue Conference and the National Association for Search and Rescue which provide some very rough estimates, but much is unknown. For instance, in several recent cave rescues, victims trapped in tight passages, but who were warm and otherwise doing well, suddenly died; autopsy reports were nonspecific (information from Eastern Region, National Cave Rescue Commission). Also, anecdotal evidence suggests that epileptics are quite prone to becoming lost while hiking, even though there is no evidence to suggest a seizure as the direct cause of the person becoming lost (information from Appalachian Search and Rescue Conference records). Do these represent new syndromes that we must investigate, or are they merely coincidences?

To answer this type of question, the Wilderness Medical Society is planning a research project to investigate the spectrum of injuries and illnesses in wilderness patients. We hope that this will allow future Wilderness EMT training to be more rational and scientific and less anecdotal.

The Wilderness Medical Society fosters the study of the etiology, pathophysiology, and treatment of environmental and wilderness emergencies, and although it has made great progress in defining the field, the scientific study of wilderness medicine is just beginning. However, even what little we do know about wilderness emergencies is not often enough applied to wilderness patients, and we therefore believe that this Project is warranted. Though we must wait for answers to many questions about wilderness medicine, we think that Wilderness EMT training will have a significant impact on wilderness patients; even though little solid evidence about prehospital care was available when EMT training was first introduced, it significantly improved prehospital care, even if just to the extent of preventing patients from asphyxiating on their tongues. Perhaps formal Wilderness EMT

programs will help publicize the need for upgrading the wilderness and environmental emergency content of first aid, EMT, and emergency physician training.

E. Clinical Training

A Wilderness EMT-Paramedic cannot learn all needed clinical skills in a single one-week training curriculum, no matter how intensive or well-taught. Clinical training (e.g. rotations in various hospital units) should be a part of any training program leading to certification, especially if the certification will include skills beyond those expected of “street” paramedics. Since continuing education for the wilderness paramedic must include clinical training and lectures, it may make sense for clinical training to be set up within the wilderness paramedic's own local wilderness EMS system, rather than as part of an intensive regional course. We plan to set up such clinical training here in Pittsburgh, but it will take some time to establish.

F. Wilderness EMT's and Wilderness “Primary Care”

Wilderness EMT's might provide incidental medical care for team members' minor injuries and illnesses: in wilderness rescue, sending a team member back to Base Camp for medical care might be disastrous; a team member or two must accompany the victim, and the depletion of the team may delay an evacuation for hours, perhaps even resulting in the patient's death. Since mountain rescue often stresses team members to the limit, injuries and illnesses that might be minor at home loom much larger in the wilderness, which is another argument for Wilderness EMT's to provide “primary care” for the team.

While Wilderness EMT's need not be Physician's Assistants capable of providing all routine primary care services, one may argue that they should be able to care for minor injuries and medical problems common in the wilderness.

On the other hand, providing care for minor problems comes closer to the practice of medicine than routine “paramedic-type” emergency care. Some may argue that this is similar to the duties expected of a Physician's Assistant or Nurse Practitioner, and thus beyond what we may reasonably expect of a part-time Wilderness EMT.

G. Advanced Life Support, EMS Areas, and “Turf”

Wilderness search and rescue teams find it difficult to obtain the official sanction to provide Advanced Life Support (ALS) capabilities. By common definition, ALS involves the use by paramedics of techniques previously restricted to licensed physicians (or nurses under their direct supervision), such as starting intravenous infusions, administering intravenous drugs, and inserting endotracheal tubes. In recent years, states have enacted legislation allowing non-physicians to perform certain invasive procedures and give specified medications, if done in an organized and professional manner, under the control and supervision of a qualified physician. Achieving “ALS status,” in most jurisdictions, requires setting up a comprehensive system of training, establishing physician direction and command, conducting regular critical review, and establishing the necessary relations with local and state EMS regulatory agencies.

At the beginning, many physicians objected to paramedics administering such medical care; although this resistance to ALS has moderated remarkably, we must still prepare for physician resistance to this new type of paramedic. If physician organizations such as the Wilderness Medical Society, the American College of Surgeons, the National Association of Emergency Physicians, or the American College of Emergency Physicians were to endorse the idea of the Wilderness EMT, we would have a much easier time

countering physician resistance. However, to acquire medical acceptance, Wilderness Paramedics will need to meet the same standards as “street” paramedics, as far of training, competence, and medical control. When we consider that Wilderness Paramedics may often be out of radio contact with their command physicians for a long time, and thus must exercise even more independent discretion than other paramedics, we must take extra care to show the medical community that Wilderness Paramedics are competent, will show mature judgement, and will exercise due restraint in exercising their Advanced Life Support privileges. A regional or national Wilderness EMT curriculum, such as this one, may help persuade the medical community that the Wilderness Paramedic is an appropriate addition to the paramedical field.

Although it is difficult for SAR teams to obtain permission to provide ALS in their own local jurisdiction, the problem is even worse here in the mid-Appalachian area. In many states, each local jurisdiction regulates its own prehospital care. Therefore, the techniques that paramedics may use change as one moves from place to place. For instance, in one county, paramedics may place endotracheal tubes, while in another, they may only use esophageal obturators. In parts of the West, where counties are large and each county has its own EMS agency and SAR team, this may not be a problem, but here in the East, counties are much smaller, and wilderness SAR and wilderness EMS agencies therefore need to operate in many counties (for instance, the Appalachian Search and Rescue Conference operates in several states).

Since a wilderness medical emergency will occur only rarely in a given county, the EMS agencies in that county will rarely have the special training, experience, or equipment to deliver state-of-the-art wilderness emergency care. A Wilderness Paramedic called into one of these areas might be bound by the local protocols, even though local (or even statewide) protocols seldom reflect the needs of the wilderness patient. In some areas, law or EMS regulations may prohibit the search and rescue team from operating outside the protocols of the local EMS system, as inadequate as they may be for wilderness problems. In some jurisdictions, a Wilderness Command Physician at the scene may establish a physician-patient relationship, and thus place the entire rescue outside the bounds of most EMS regulations. However, if search and rescue team Wilderness EMT's wish to use advanced skills, using medical command from their own Wilderness Command Physician several hundred miles away, I doubt that we may invoke such a physician-patient relationship to go beyond local protocols. Most wilderness medicine physicians will agree, I think, that a Wilderness Paramedic who works in many EMS jurisdictions should probably follow not by the local “street” protocols, but by state or regional wilderness protocols, and should have medical control from a physician who has special training in wilderness emergency medicine. Thus, setting up a state-wide Wilderness EMS system would make it easier for Wilderness EMS agencies to achieve ALS status, and would provide protocols that could be applicable to Wilderness EMT's across the state, regardless of local EMS idiosyncrasies. This might be considered a way to bypass the local medical community and local EMS system, but it is a way of working with the state's wilderness medical and wilderness EMS community, and we must invite the local EMS agencies and doctors to join in this effort.

State-wide Wilderness EMS protocols will, however, encounter a major problem: turf. Local EMS agencies have a mandate to provide emergency services within their jurisdiction, and “foreign” EMS agencies may come into the area only under special circumstances. Although this has some administrative justification, it also has an emotional component: the “turf” problem. Most EMS agencies, volunteer or paid, feel that they are serving a need, and react violently to anyone who interferes with their serving that need (e.g. a “foreign” EMS agency stealing their business). An EMS agency often considers all medical emergencies within its jurisdiction part of its own “turf,” and are suspicious of anyone trying to take over part of “its” job. In an emotional field such as emergency medicine, this reaction is understandable. For sustaining the emotional commitment needed by volunteers (and even by paid paramedics), it may be to some degree appropriate. Thus, a search and rescue team Wilderness Paramedic may find “turf” a problem in dealing with the local EMS agency.

In view of these problems, the Appalachian Search and Rescue Conference and the Virginia Division of Emergency Medical Services have established a trial program whereby ASRC Medics may use their own medical command for certain Advanced Life Support procedures (IV's, intravenous medications) in wilderness situations anywhere in Virginia, using wilderness protocols established by the ASRC's Medical Director. While this removes legal and administrative barriers to the ASRC's Wilderness Advanced Life Support, and may serve as a model for others, the "turf" problem remains. However, as turf is an emotional rather than legal or administrative problem, we can only handle it with appropriate interpersonal relations at the scene, and cooperation between Wilderness EMT's and local EMS personnel.

H. SAR Team Members or Rescue Squad EMT's?

Some people believe that we should reserve Wilderness EMT certification for those who will use their training in wilderness search and rescue operations; in other words, don't train Wilderness EMT's in advanced diagnostic and therapeutic skills unless they will use them regularly. Thus, climbers who want first aid and medical training, but who will not employ their medical training except on expeditions and climbing trips, would not qualify for Wilderness EMT. (As stated elsewhere, climbers should receive sophisticated first aid and mountaineering medicine training; but they need not become full Wilderness EMT's.)

One may also argue that Wilderness EMT training and certification should not be given to EMT's or paramedics who merely want to add another "merit badge" to their list of certifications. A paramedic who likes to hike and climb, but whose only involvement with EMS is that he works on a rescue squad in downtown Manhattan, can offer no credible need for Wilderness EMT training other than personal interest.

Should we permit only members of bona fide search and rescue teams to take part in Wilderness EMT training, and offer special wilderness emergency medicine seminars (but no Wilderness EMT certification) for city EMT's who are outdoor enthusiasts?

On the other hand, some rural rescue squad Emergency Medical Technicians may regularly participate in wilderness rescue operations, even though the other EMT's aren't interested in wilderness rescue (local search and rescue teams or park rangers might take care of the SAR part of rescues). Shouldn't these EMT's be eligible to become full-fledged Wilderness EMT's?

If we certify isolated rescue squad members as Wilderness EMT's, how do they receive medical command for the skills that differ from their standard local protocols? How do these WEMT's receive proper supervision and how do they recertify? One answer to these problems is to set up a regional Wilderness EMS System with unified medical command, case review, continuing education, and recertification. Thus Wilderness EMT's from the Ski Patrol, Civil Air Patrol, Rescue Squad, Mountain Rescue Team, Cave Rescue Team, and Park Service could all join in a regional Wilderness EMS system that would be difficult for any one of these organizations to support by itself.

I. Outdoor Competence

The ability to lead 5.12 rock climbs should not be a prerequisite for Wilderness EMT training, but on the other hand, a Wilderness EMT confined to a wheel chair, or one who has never been outside of New York City, will be of little use on a wilderness rescue. Since Wilderness EMT's must be able to cope with the physical and intellectual rigors of the wilderness environment, we should perhaps establish standards of physical ability and wilderness competence. (There is a precedent: ambulance EMT-A's must be able to lift and move patients.) Some argue that we need no standards, since only those who enjoy the outdoors will want to become Wilderness EMT's, but the question of Wilderness EMT outdoor competence greatly concerns many search and rescue organizations and outdoor organizations. I will use cave rescue and caving to discuss outdoor competence further, although the arguments apply equally to vertical rescue and climbing, white water rescue and paddling and wilderness search and backpacking.

"Cavers" are those who regularly explore wild caves for fun or scientific purposes. (A note on terminology: to "cavers," a "spelunker" is a preadolescent child with a flashlight and a ball of string.) The cave environment is unique, and over the years cavers have developed sophisticated ways to navigate this environment in a safe and efficient manner. (Cavers developed many of the techniques used in technical rescue, such as PMI and Blue Water ropes, rappel racks, and Gibbs ascenders.) Those who are new to caving, even if they have extensive wilderness backpacking and climbing experience, often have difficulty adapting to the environment. U.S. cave rescue teams are made up almost entirely of cavers, and they know that taking non-cavers on a cave rescue puts the non-cavers at risk, and may prevent the cavers' carrying out their own tasks. Therefore, an unwritten cave rescue rule is "non-cavers don't go underground."

In an effort to smooth the interaction between cavers and noncavers on a rescue, the Eastern Region of the National Cave Rescue Commission offers weekend "Orientation to Cave Rescue" classes. In these classes, cavers receive an orientation to rescue and emergency medicine, and rescue squad members receive an introduction to caving and cave rescue; both groups merge for a joint exercise the second day. Thanks to this program, there are many more "cave-conscious" EMT's in the region (and more caver-EMT's). However, most cavers still feel that, deep in a cave, a non-caver is more of a nuisance than an asset, no matter how competent at emergency medicine aboveground. Many aboveground search and rescue groups also subscribe to the idea that competence in dealing the wilderness environment is crucial, and that it is easier to train an outdoors enthusiast in wilderness medicine than to train an EMT in survival and wilderness travel.

Is it better to teach EMT's outdoor skills and search and rescue skills, or to train backpackers and climbers in search and rescue skills and have them take an EMT class? When the Appalachian Search and Rescue Conference was first recruiting members, we decided to take the latter course: to teach EMT courses to outdoors enthusiasts. It's true that 81 hours of training doesn't make one an expert EMT; additional experience and continuing education are necessary. However, although it takes more than an 81 hour basic EMT class to become a competent EMT, it takes much more than 81 hours experience to become an expert caver (or climber, or backpacker, or . . .). Although the ASRC's reasoning may have been appropriate in its time (15 years ago), emergency medicine has advanced since then. Now that EMT-Paramedic training is widely available, appropriate medical training may take much more than the 81 hours of the old basic EMT course. Perhaps we should not train cavers/backpackers/climbers as paramedics, but train paramedics in outdoor skills. There is one distinct advantage to this approach: for those who are so inclined, outdoor skill continuing education is easily accomplished on vacations and days off, and EMT-P's who don't enjoy spending their free time in the great outdoors are probably uninterested in becoming Wilderness EMT's. With the advances in prehospital care over the past twenty years, one may make a strong case that wilderness EMT's who have no previous prehospital care experience will not measure up to today's standard of prehospital care. If one adopts this viewpoint, it would be best to train EMT's and

paramedics in outdoor skills.

I suspect that many members of the wilderness medicine and search and rescue communities will argue strongly for one viewpoint or the other. Some will argue for both views: wilderness EMT's must be expert in the outdoors and expert at prehospital care.

J. Search and Rescue Competence

The intent of the search and rescue portion of the Wilderness EMT and Paramedic courses is not to reproduce existing basic search and rescue skills training, but to discuss the medical aspects of search and rescue topics. (The Wilderness Command Physician course includes enough basic search and rescue skills for the doctors to participate safely and meaningfully in the mock missions.) We must insure that Wilderness EMT's have not only the medical training they need, but also the necessary outdoor and search and rescue training, equipment, and experience. As discussed in the previous sections, the Wilderness EMT need not have the outdoor abilities of Reinhold Messner nor the cliff rescue experience of the Yosemite National Park rescue team, but each WEMT must have some minimum capability in these areas. Regional standards for outdoor and search and rescue competence already exist, such as the membership standards of the Appalachian Search and Rescue Conference¹⁶, and the Virginia Search and Rescue Training and Certification Program¹⁷. (The membership standards of the ASRC meet the stringent requirements of the Mountain Rescue Association, but less exacting standards, such as Virginia's, are probably more appropriate for Wilderness EMT's.) The National Association for Search and Rescue has considered establishing national standards similar to Virginia's¹⁸. With such excellent standards available, so it makes sense to adopt one of them as our own. We do not need to duplicate or compete with these search and rescue certification systems (it would also be costly and difficult).

[COMMENT1] Some subspecies of wilderness rescue have evolved their own training and standards in parallel to the "routine" wilderness SAR standards described above. Cave rescue and whitewater rescue are good examples. Should an EMT who works with a cave rescue team, but who does not routinely do above-ground search and rescue, need to meet the above-ground GSAR Level I standards to become a wilderness EMT? There are several arguments that favor caver-EMT's meeting the GSAR standards to become a Wilderness EMT. First, cave rescue almost always involves some element of above-ground rescue as well (few cave entrances are right next to the road, and many are in rugged and wild terrain). Second, just as one may argue that Wilderness EMT's need to have all the training of their urban counterparts, one may argue that caver Wilderness EMT's should share a common background with other Wilderness EMT's. Third, very little of the GSAR Level I material that is irrelevant to cave rescue. Similar arguments may be made for whitewater rescue. Therefore, I suggest the following as an acceptable compromise. For now, caver and whitewater EMT's must meet the same GSAR standards as all other Wilderness EMT's. When cave rescue or whitewater rescue standards, equivalent to the Virginia GSAR standards, are recognized by an authority such as the Virginia Department of Emergency Services, we will accept it in lieu of the GSAR Level I certification.

For search and rescue teams that require members to meet the Level I GSAR standards, we could merely depend on the search and rescue team to handle testing. But what about prospective Wilderness EMT's who are not part of such a search and rescue team? Until statewide or nationwide search and rescue training and certification is available, regional search and rescue training and testing organizations (such as Search and Rescue Training Associates, which developed and conducts the Virginia search and rescue training program) could train and test prospective non-SAR-team Wilderness EMT's for us.

For your reference, Appendices and list the pertinent sections of the ASRC and Virginia training and certification standards.

K. Command Physician Selection

The ideal command physician for Wilderness EMT's is a residency-trained, board certified, full-time Emergency Department physician who is also an MRA-certified member of a wilderness search and rescue team and who has completed our Wilderness Command Physician class. Since such physicians will be exceedingly rare, we should make some compromises. For instance, an understanding of the field problems of Wilderness EMT's is necessary, but the ability to serve in the field is not. Therefore, we would be happy to have a wilderness command physician with an outdoor background (winter backpacking would be ideal) who has been through a realistic rescue orientation such as in our Wilderness Command Physician course. (If cave rescue or whitewater rescue were to be part of the Wilderness EMS System the command physician will supervise, physicians should participate in cave rescue or whitewater simulations as part of their training.) The command physician must have a broad base of knowledge about the prehospital aspects of emergency medicine, and have experience giving medical command to paramedics, but employment as a full-time ER physician might not be a requirement. Many physicians have had experience "moonlighting" in emergency departments, and perhaps a minimum number of hours of ER experience would be acceptable in lieu of full-time ER staff status. If we accept this, perhaps we should require that each wilderness command physician have completed the standard American College of Emergency Physicians Base Station course.

Wilderness rescue operations take many hours, sometimes lasting a day or more. Thus, a wilderness rescue might easily run through several shifts of emergency department physicians. Command of Wilderness Paramedics will thus be much different from most prehospital medical command situations, and we might even argue that, unlike most emergency medicine, wilderness rescue entails an extended physician--patient relation through the Wilderness Paramedic. For continuity of care, we would prefer a single physician providing command for the entire rescue. Since the condition of the patient will be known well before arrival in the emergency department, the Wilderness Command Physician will have ample opportunity to discuss the case with the primary physician and specialists who will care for the patient once admitted (these other physicians may very well be at another institution.) This allows the Wilderness Command Physician to obtain the specialist's help in the prehospital management of the patient, and also provides an opportunity for the Wilderness Command Physician to educate the other physicians in the unique considerations of wilderness illness and injury. Therefore, the Wilderness Command Physician should be well-educated about the in-hospital management and pre-hospital management of wilderness problems. (This might promote cooperation between institutions and subspecialists, as well.)

Since present communications technology will permit us to connect the Wilderness Paramedic to the Wilderness Command Physician in different ways, the physician could take command from a home telephone, from a radio in the emergency department, or from a telephone in the office. Thus, during a long evacuation, a command physician at one emergency department could pass command of the wilderness rescue to a physician at another emergency department across town, then to an internist or surgeon at the office, then to a physician at home. Or, if continuity of care were thought to be important enough, the same Wilderness Command Physician could follow the case through, even if not on duty in the emergency department the entire time.

L. Add to Existing EMT Courses or Start from Scratch?

Some of today's Wilderness EMT courses start from "ground zero," and others build on existing prehospital training (e.g. First Responder, EMT, EMT-Intermediate, Paramedic). With the widespread availability of First Responder, EMT, and Paramedic training in the mid-Appalachian region, we feel separate modules are best for the first ASRC/CEM classes. Once we have a core curriculum, guidelines could allow agencies to incorporate it into an EMT course, producing a single comprehensive EMT and Wilderness EMT course.

A parallel question is whether combined EMT-A/EMT-W courses must include ambulance-specific material. If the course graduates were to become EMT's working strictly in the wilderness setting, there is little intrinsic justification for including details about manifold-suction devices and use of the ambulance cot. However, some wilderness search and rescue team members (including the ASRC's Bob Koester, a non-ambulance EMT) believe that the ambulance specific material is minimal and should be included in all Wilderness EMT courses. One reason is to maintain uniformity among EMT's, so that a "street" EMT knows that the Wilderness EMT has had the same basic training. Another reason is that ambulance-specific training is part of the definition of the basic EMT, and if we want to use the term EMT, we have to include that training. (My long-held opinion is that the initial EMT course be called "basic EMT" and the ambulance-specific material should have been put in a separate module, called basic EMT-Ambulance, with other modules for the basic EMT-Wilderness, basic EMT-Diver, and so forth. I think that the definition of a basic EMT should rest on medical training rather than a specific type of automotive vehicle. However, it's not worth the effort to change established standards and terms.)

M. Local Courses or a National Standard Course?

The needs for wilderness emergency medicine training differ depending on the terrain, flora and fauna, weather, and patient population in the service area. However, a large core of information and skills should be of universal application. Are the regional differences enough to warrant a completely different program for each area: "Desert EMT," "Alpine EMT," "Swamp EMT," and so on? Or should we use a national standard curriculum, with optional sections on limestone caves for the central Appalachians, aquatic dangers for the Pacific wild beaches, desert problems for the southern California and Southwest areas, and so forth? I favor the latter approach, that is, having a single national curriculum with local options.

N. Building on Existing Training

This Project aims to secure a large base of EXPERT consultants in emergency medicine and search and rescue. This is not so much to produce a set of quality wilderness emergency medicine training programs, although that is important, but so that the curriculum will serve as an information resource for others interested in developing Wilderness EMT programs. We aim to document, and where appropriate and permitted, incorporate materials from other Wilderness EMT and similar courses, such as Wilderness Medical Associates' course in New Hampshire¹⁹, or the new National Ski Patrol System -- American Red Cross Winter Emergency Care Course (which is the new standard for all NSPS first aid training, starting in September of 1986). We will acknowledge all quoted or adapted material, and will make our Project materials available to all interested people.

O. Communications

1. Standing Orders vs. Online Medical Command

The accepted standard of care for prehospital care in complicated cases (as are most wilderness patients) is for on-scene or on-line command physician direction. However, in some wilderness rescues (e.g. in cave and mine rescue situations, where VHF/UHF radios will not function) the Wilderness EMT must function without on-line medical command. Although improving technology extends the reach of the command physician, we should establish broad standing orders for Wilderness EMT's, so they may manage their patients when medical command and advice are unavailable for extended periods.

2. Communications Relays and Legal Medical Command

It is my understanding that a physician must be in direct voice contact with an EMT to legally provide orders for invasive procedures or drugs, i.e. an EMT may not accept an order from a third person who is relaying the message. Since radio relays are often used in wilderness search and rescue operations (portable repeaters being both scarce and heavy to carry up a mountain, so often a member with a handheld radio stands atop a mountain, relaying messages back and forth), this would seem to preclude online medical control. However, in the hospital, doctors often give orders to nurses by written orders on the chart, even though verbal orders must be taken directly by a nurse. The critical point is that the nurse or paramedic must receive the physician's order by a method that permits no "garbling" of the order that might lead to errors. (The classic childhood game of passing a whispered message "verbatim" from one child through several intermediaries to another, and comparing the original with the usually unrecognizable end message, illustrates the point.) If we use a method of radio communication as reliable and as well documented as written orders, would that allow legitimate relaying of a doctor's orders? For example, the command physician would enter the order on a standard "medical order form." In the physician's presence, the Base Camp radio operator would transmit this to the Wilderness EMT's in the field, through a relay if necessary, and the Wilderness EMT's would read back the order word-for-word for confirmation. The Wilderness EMT's would record orders in their own log, word-for-word, and would sign off on both their own logs and on the Base Camp log at the completion of the mission. (I'm sure this would result in fewer errors than when hospital ward secretaries try to interpret an illegible doctor's scrawl.)

3. Is Telemetry Necessary for Wilderness EMS?

EKG telemetry is not much used in wilderness EMS, because the telemetry equipment is heavy, bulky, and delicate, and because there is rarely the required direct line-of-sight between transmitting and receiving antennas, and if multiple communications links relay the signal, signal degradation is severe. There is also a common impression that cardiac complications are rare in wilderness EMS, although the Appalachian Mountain Club does encounter a fair number of cardiac problems in the Hut System in the White Mountains of New Hampshire (personal communication, 1986).

Local or distant monitoring vital signs other than the EKG may be more useful for wilderness EMS. Looking to the future, we could use machines to monitor, record, and transmit blood pressure, pulse, temperature, and urine output. In some extended rescues (especially cave rescues), rescuers may get to the patient's side in a few hours, even though the evacuation may take a day or more. Rescuers could carry blood samples out of the cave to a waiting helicopter, and thus the Wilderness Command Physician could have laboratory tests available well before the patient arrives in the Emergency Department. We could even transfuse the patient with several units of crossmatched blood while still in the cave.

4. "Patch Boxes," Satellites, and Medical Command.

For several years, the ASRC has been working toward direct voice communications between the command physician and the Wilderness EMT in all rescue situations. These plans include the use of "patch boxes" that allow direct connection of VHF, 2-meter, UHF, and HF radios, also the field telephones used for cave and mine rescue. Another project is using patch boxes and a communications satellite to provide direct, high-quality voice communication over hundreds of miles. Although Wilderness Paramedics may have broad standing orders, but the advice and command of a Wilderness Command Physician, especially with the help of medical and surgical specialists, may prove invaluable. The receiving hospital may be better able to care for a patient when the patient's physicians were involved with the patient's prehospital care, especially when the rescue lasts for hours or days.

5. Pilot Project: Communications

The ASRC/CEM Wilderness Emergency Medicine Curriculum Development Project will focus on developing the Wilderness EMT, paramedic, and command physician courses described above. However, as part of a regional wilderness EMS system, we are also considering a pilot wilderness EMS communications system. We could obtain funding and technical help from private foundations and industry to set up an ideal area-wide wilderness EMS communications and command system, so that wilderness paramedics would have reliable communications with trained Wilderness Command Physicians. The Appalachian Search and Rescue Conference and the Center for Emergency Medicine would take a leading role in this project, but it would be a regional system, networking Wilderness Command Physicians with Wilderness Paramedics from many different teams.

P. [COMMENT2]Equipment

The goals of equipment used in wilderness EMS are the same as for the equipment used on an ambulance: the delivery of quality prehospital care. However, much of the equipment used on an ambulance (which many jurisdictions require for certification of an EMS vehicle) is inappropriate for a wilderness setting; for instance, a standard ambulance cot is not well-suited for cliff or cave rescue. However, the underlying reasons for ambulance equipment requirements may, after consideration, give clues about the equipment we should use for wilderness EMS.

I like to make an analogy between an ambulance and a wilderness rescue team. The feet of the litter team are its "tires," and damaged feet or slippery shoes on a rescue team may be just as hazardous as bald tires on an ambulance. Night-time rescuers trying to carry and care for a patient using hand-held flashlights are probably worse off than EMT's in an ambulance with no headlights and no interior lighting. The analogy can, of course, be carried to extremes, but is a useful starting place for examining the equipment needs of a wilderness rescue team. Just as ambulances must have a full complement of required equipment, I think that the state EMS agencies should require every wilderness EMS agency to have the minimum equipment and personnel to build a wilderness "ambulance." (However, I also believe that search and rescue teams that wish to concentrate on search and rescue, leaving the medical care of their victims to other Wilderness EMS organizations, should not be regulated by state EMS agencies.)

Appendix provides a set of possible modifications to the Virginia Emergency Medical Services regulations, which would then provide appropriately parallel requirements for both ambulance agencies and wilderness search and rescue teams.

III. WILDERNESS EMS: THE STATE OF THE ART

A. The Literature

Current wilderness first aid and emergency medicine training relies on standard texts. The Seattle Mountaineers' Mountaineering First Aid, originally edited by Dick Mitchell, is now in a third, expanded edition edited by a team of Mountaineers members. It has been a standard text across the country for the last fifteen years, and its usefulness as an alternative or supplement to the American Red Cross standard first aid training materials is undeniable. For twenty years, Wilkerson's *Medicine for Mountaineering*, also published by the Seattle Mountaineers, has been the "medical Bible" for climbers on expeditions to remote corners of the world, and with its third edition it continues to be up-to-date. Several new wilderness first aid and medicine books have appeared in recent years, ranging from outstanding to terrible (I will not comment on those in the latter category). Fred Darvill's *Mountaineering Medicine-- A Wilderness Medical Guide*²⁰, a first-aid-kit sized booklet, has sold about 150,000 copies over the past 20 years, and is widely accepted. Many backpackers and wilderness canoeists use *Forgey's Wilderness Medicine*²¹ as a wilderness first aid and medicine text, and some physicians prefer it for teaching first aid and wilderness medicine to outdoor club members. Breyfogle's *Common Sense Medical Guide and Outdoor Reference*²² is a required text for members of two of the Appalachian Search and Rescue Conference's Groups. Auerbach's recently-published *Medicine for the Outdoors*²³ provides an outstanding addition to the literature.

Several monographs focus on medical problems specific to the wilderness. A short book by Wilkerson, Bangs, and Hayward²⁴ and another by Forgey²⁵ provide information to outdoors enthusiasts, doctors, and EMT's about the medical problems associated with cold. Burton and Edholm²⁶, LeBlanc²⁷, Maclean and Emslie-Smith²⁸, Pozos and Wittmers²⁹, and most recently Lloyd³⁰ have provided textbooks on cold and hypothermia directed at physicians and researchers, but which will serve admirably for the Wilderness EMT wishing to acquire a deeper understanding of accidental hypothermia. Peter Hackett's succinct monograph on mountain sickness³¹ summarizes present knowledge of this topic, although it should be supplemented with recent research on the role of steroids³² and acetazolamide³³ until a new edition appears. The new edition of the *Manual of U.S. Cave Rescue Techniques*, due out in June, contains an expanded section on the medical aspects of cave rescue³⁴.

With the publication of Auerbach and Geehr's *Management of Wilderness and Environmental Emergencies*³⁵, the field saw its first definitive compendium textbook. Aimed at physicians and researchers, this 600+ page book provides wilderness medicine with its first rigorous medical reference work.

Although these references provide a reasonable starting point for the doctor wishing to study a topic, or for a backpacker trying to improve his understanding of wilderness first aid, none aims toward the EMT or paramedic. Therefore, the Wilderness Emergency Medicine Curriculum Development Project will include developing a Wilderness Emergency Medicine Textbook that will be suitable for the courses we offer.

B. Existing Wilderness EMT Training

We hear of many programs which might be called "Wilderness EMT" courses, though only a few use that title. Some focus on wilderness medical problems, some teach search management to EMT's, and some provide training in cliff and cave rescue. A few courses integrate some or all these topics.

The courses range from a brief orientation to comprehensive courses including the basic EMT-A curriculum. One four-hour self-study course, aimed at EMT's and paramedics, covers the most basic facets of wilderness SAR (search in particular), and is offered by an independent training organization (contact: Walter G. Green, Virginia Air Search Institute, 105 Lindsay Landing, Grafton, VA 13692)³⁶. Mountain Medicine, Inc., of Worcester, Massachusetts, offers a popular 4-day Mountain Medicine Symposium each year. Held in New Hampshire's White Mountains, at the Appalachian Mountain Club's Pinkham Notch Camp, these mountain medicine symposia offer training in wilderness medicine for EMT's and physicians, and include some leading experts on the faculty (contact: Mountain Medicine Education, Inc., P.O. Box 211, Worcester, MA 01613). The National Ski Patrol System and the American Red Cross jointly offer a Winter Emergency Care Course that is roughly similar to the Red Cross Advanced First Aid Course but oriented to the type of first aid problems encountered by alpine and nordic ski patrollers. Wilderness Medical Associates, in Littleton, New Hampshire, offers a comprehensive course including the basic EMT-A lessons and wilderness-specific adaptations' students completing the course may sit for the EMT-A exam.

We have only sketchy and anecdotal information about many other Wilderness EMT courses (and will gladly accept more information about the courses mentioned above), but hope to expand this information in the next draft of the Prospectus. We will try to note how much of each course's content is medicine, search, rescue, or outdoor skills; describe the level of the course (first aid, EMT, paramedic, physician); and tell where to write for information. For Wilderness EMT courses and related training not described above, a short but incomplete list follows.

New Hampshire's state mountain rescue module for EMT's.

Yosemite Mountain Medicine seminars (sponsored by an independent foundation and the American Alpine Club).

National Association of Diver Medical Technicians' Diver Medical Technician course (see page for more information).

Wilderness Medical Associates' WEMT course in New Hampshire. (Wilderness Medical Associates, 107 Cottage St., Littleton, NH 03561)

Wilderness EMT Seminars offered through Northeastern University (contact David M. Rayne, Program Director, EMT-Paramedic Program, Northeastern University, 370 Common St., Dedham, MA 02026).

The National Park Service Parkmedic course.

The National Ski Patrol -- American Red Cross Winter Emergency Care Course.

A basic Wilderness EMT course planned by the Massachusetts Office of Emergency Medical Services (contact Michael Callahan, Department of Geographic Medicine,

Tufts/New England Medical Center, Box 41, 750 Washington St., Boston, MA 02111).

Eastern Region, National Cave Rescue Commission's 2-day Orientation to Cave Rescue classes, offered every few months. It deals primarily with caving and cave search and rescue for EMT's and paramedics; an alternative track trains cavers in basic wilderness first aid and cave search and rescue. Both tracks join for an underground rescue the second day. A Student Textbook will be available in mid-1987. (contact: John C. Hemple, NCRC Eastern Region Coordinator, Rt. 1 Box 371, Dilliner, PA 15327.)

IV. PLANS: WILDERNESS EMT COURSE

This draft of the Wilderness EMT class schedule includes roughly 64 hours of classroom discussion, indoor practice, and field exercises. The schedule starts with a survey of the medical and physiologic implications of wilderness environments, followed by an overview and review of wilderness search and rescue and emergency medical services emphasizing the Wilderness EMT's role and relationship to other components of the SAR and EMS systems; the class then considers the packaging and transportation of the wilderness patient from a medical standpoint. The second day starts with an overview of general medical and pharmacologic principles, then continues with a study of environmental emergencies emphasizing those most common in the wilderness. Discussions of general medicine in the wilderness and wilderness trauma variation fill the third day. The fourth day deals extended patient monitoring and management with medical and physiologic aspects of short-term wilderness survival, covers medical command communications, and orients WEMT's to the advanced techniques performed by Wilderness Paramedics. Each day includes appropriate practical and field exercises. The last two days are set aside for tests: a written test, a practical test with stations where students show skill proficiency, and a large-scale simulated search and rescue operation where students must display competence in realistic field situations, including night operations.

Most students taking part in the first class will carry certification from a search and rescue organization meeting the Virginia Ground Search and Rescue Level I standards (or equivalent). We will permit non-GSAR-certified students to participate in the pilot class, provided they have adequate wilderness search and rescue training and personal equipment. For future classes, we will guide non-GSAR-certified prospective students to appropriate sources of training and certification (search and rescue groups or the Ground Search and Rescue College). Thus, prerequisites for the Wilderness EMT course will be basic EMT certification and Level I Ground Search and Rescue certification. The curriculum stresses adaptation of traditional EMT knowledge and skills to the wilderness environment, and focuses on medical and surgical emergencies particular common in the wilderness setting. A small but significant part of the curriculum concerns the definitive care of minor medical and surgical problems in team members when remote from a physician's care. We will assume basic EMT and search and rescue training, so the course will focus on the special medical considerations of wilderness search and rescue. After completing this course, the Wilderness EMT will integrate search and rescue and emergency medical training along with wilderness-specific medical training to provide a competent wilderness search and rescue medical capability.

On the next page is an outline of the tentative Wilderness EMT class schedule.

Monday

The Wilderness Environment: Mountains, Cliffs, Forests, Snow and Ice, Caves, and Whitewater Streams	2 hours
Introduction to Wilderness Search and Rescue and Wilderness Emergency Medicine: Organization, Problems, Resources, and Legal Aspects	2 hours
Transportation of Wilderness Patients: Medical Aspects of Immobilization, Carries, Litters, Packaging and Patient Protection, and Nontechnical and Semitechnical Evacuations	2 hours
Patient Handling Exercises (Immobilization and Packaging)	3 hours

Tuesday

Principles of General Medicine: Taking a History, Physical Diagnosis, Monitoring, Infectious Agents, Asepsis and Infections, Psychological Aspects, and Convalescence and Recuperation	2 hours
General Pharmacology for the Wilderness EMT	1 hour
Environmental Emergencies: Cold, Heat, Weather Hazards, Altitude Illness, Near-Drowning, Poisoning, and Allergy	3 hours
Patient Assessment Exercises	3 hours

Wednesday

Wilderness Medical Problems: Eye, Ear, Nose, and Throat Problems, Respiratory Problems, Cardiovascular Problems, Gastrointestinal Problems, and Genitourinary Problems	2 hours
Wilderness Trauma I: Pain, Shock, Fluid Balance, and the Response to Trauma	2 hours
Wilderness Trauma II: Injuries to Skin and Nails, Musculoskeletal System, Chest and Viscera, and Central Nervous System	2 hours
Patient Care and Rescue Problems	3 hours

Thursday (Note: the practical session will extend until late evening)

Extended Management of the Wilderness Patient	1 hour
Communications	1 hour
Medical Aspects of Short-term Survival and Wilderness Travel	2 hours
Improvisation in Treatment and Evacuation	1 hour
Orientation to Advanced Medical Skills	1 hour
Patient Care and Rescue Problems (including night operations)	8 hours

Friday (Note: the practical session will extend until late evening)

Critique of Thursday's Problems and General Review	2 hours
Written and Practical Testing	8 hours

Saturday

Full Wilderness Search and Rescue Simulation: WEMT Performance Evaluation	10-12 hours
Critique, Graduation, and Barbecue	2 hours

V. PLANS: WILDERNESS PARAMEDIC COURSE

The curriculum for our Wilderness Paramedic class will include all the material in the Wilderness EMT course; we may require Wilderness Paramedic students to first take the complete Wilderness EMT course, offering the Wilderness Paramedic class as a separate module, or we may offer a single combined Wilderness EMT/Paramedic class. Our current plans are to offer the Wilderness Paramedic class for the first time when we give our second Wilderness EMT class. This will probably be in late 1987.

The Wilderness Paramedic class plans include roughly two days more of classroom training in wilderness advanced life support, and clinical training in advanced skills. We will publish guidelines for this curriculum when we develop them.

VI. PLANS: WILDERNESS COMMAND PHYSICIAN COURSE

Here is a broad outline of the tentative Wilderness Command Physician class schedule. Note that a required part of the curriculum is participation in (or at least observation of) simulated rescues.

The Wilderness Command Physician course includes two days of lecture and discussion, an evening in the field, and a final day entirely in the field. The first day includes a review of the wilderness environment and its medical implications, an overview of wilderness search and rescue and wilderness emergency medical services, and a practice session where Wilderness EMT's must manage wilderness medical problems in a realistic setting. Some physicians will provide medical command to the Wilderness EMT's from the Base Camp, and others may go into the field to observe the Wilderness EMT's in action. (We will give physicians who wish to become field certified some practice problems of their own.) The second day covers the management of wilderness medical problems, with emphasis on the knowledge and skills taught to wilderness EMT's and Paramedics. A final day is devoted to a comprehensive wilderness search and rescue simulation, requiring the services of Wilderness Command Physicians, Wilderness EMT's, Wilderness Paramedics, and other wilderness search and rescue professionals.

Our current plans are to offer the Wilderness Command Physician class to be offered for the first time with our second Wilderness EMT class. This will probably be in late 1987.

I. Thursday

The Wilderness Environment: Mountains, Cliffs, Forests, Snow and Ice, Caves, and Whitewater Streams	2 hours
Introduction to Wilderness Search and Rescue and Wilderness Emergency Medicine: Organization, Problems, Resources, and Legal Aspects	2 hours
Transportation of Wilderness Patients: Medical Aspects of Carries, Litters, Packaging and Patient Protection, and Nontechnical and Semitechnical Evacuations	1 hour
Medical Aspects of Short-term Survival and Wilderness Travel	1 hour
Patient Care and Rescue Problems, including Night Operations (Physicians will observe the Wilderness EMT practice session)	8 hours

Friday (Note: the practical session will extend until late evening)

Communications	1 hour
Environmental Emergencies: Cold, Heat, Weather Hazards, Altitude Illness, Near-Drowning, Poisoning and Envenomation, and Allergy and Anaphylaxis	2 hours
Wilderness Medical Problems and General Medical Care, as Taught to Wilderness EMT's	1 hour
Wilderness Trauma I: Pain, Shock, Fluid Balance, and the Response to Trauma	1 hour
Wilderness Trauma II: Injuries to Skin and Nails, Musculoskeletal System, Chest and Viscera, and Central Nervous System	1 hour
Extended Management of the Wilderness Patient	1 hour
Written Test	2 hours

Saturday

Full Wilderness Search and Rescue Simulation and Evaluation	10-12 hours
Critique, Graduation, and Barbecue	2 hours

VII. CERTIFICATION

Although the ASRC and the Center for Emergency Medicine are considering certification for Wilderness EMT's, Wilderness Paramedics, and Wilderness Command Physicians, completion of the pilot Wilderness EMT class is not by itself basis for any claim of certification by either the ASRC or the Center. Instead, we will test students on the class content and issue letters of completion to those who attend the entire class and pass the written and practical tests. If we establish basic Wilderness EMT certification, this letter of completion would fulfill part of the requirements for certification.

The other requirements will most likely be

1. state or National Registry EMT certification, and
2. Virginia Level I Ground Search and Rescue certification or equivalent (see also the discussion of cave rescue and whitewater rescue standards on page).

Certification entails testing of knowledge, skills, and competence in many areas: outdoor survival and travel, wilderness search and rescue, general emergency medicine, and the specifics of wilderness emergency medicine. Each Wilderness EMT must be able to operate safely in the wilderness environment (short-term survival), to find the patient and find the way back out again (land navigation), and to traverse whatever obstacles lie along the route to the patient (wilderness travel). Although not expected to lead a mountain search and rescue team, the Wilderness EMT must be able to integrate smoothly with other members of wilderness search and rescue teams. The Wilderness EMT should be familiar with modern lost person and downed aircraft search theory, tactics, and resources, since many wilderness rescues occur as the result of a search. For personal use during wilderness travel, and for semitechnical evacuations, the Wilderness EMT should understand ropes and knots, ascending (Prusiking), rappelling, and belaying. The Wilderness EMT doesn't need to be a technical rescue team leader, but nonetheless should be able to lead a team on straightforward nontechnical and semitechnical evacuations. There are a few special wilderness search and rescue skills the Wilderness EMT must master: wilderness communications, helicopter operations, and light aircraft crash rescue.

Besides the anatomy, physiology, and general emergency medical knowledge and skills expected of every EMT, the Wilderness EMT must understand the wilderness environment and the human body; heat, cold, and other environmental hazards, and the diseases they produce; field-portable emergency medical equipment; patient protection, handling, and packaging; long-term management; wilderness medical self-care; legal aspects of wilderness emergency medicine; how to help Wilderness Paramedics with IV and drug therapy advanced procedures such as central line placement and urinary catheter placement.

This is an impressive spread of topics to test. The ASRC and CEM could offer the medical portion of the test here in the mid-Appalachian region, but what about nation-wide testing and certification?

Could we persuade a national organization to do the testing? Perhaps we could induce the National Registry of EMT's to offer written and practical tests at Wilderness EMT, Wilderness EMT-Intermediate, and Wilderness EMT-Paramedic levels. The National Registry has a well-oiled mechanism for testing EMT's and Paramedics, but is it set up to evaluate and revise tests for Wilderness EMT's? They would need a committee with expertise in wilderness emergency medicine to oversee the testing. But what about testing the outdoor and search and rescue portions of the Wilderness EMT curriculum? This is far afield from normal National Registry activities, and supervising a practical test with land navigation and prusiking stations would be difficult for most EMT-instructors and EMT test proctors. The National Association for Search and Rescue and Wilderness Medical Society are also possible national Wilderness EMT testing organizations, but neither can make a commitment now.

Is there any way to simplify the testing? We could “delegate” part of it; for instance, we could accept EMT certification as guaranteeing competence in basic prehospital care (though some would argue that this has its dangers). But which EMT certification do we accept? EMT certification from any state, or only that of the National Registry of EMT's? When we talk about EMT-Intermediate or EMT-Paramedic certification, the problem becomes worse, as some states (e.g. Pennsylvania) do not even recognize EMT-Intermediate certification, and states vary in the training required for paramedic certification.

If, for the sake of discussion, we accept National Registry EMT or paramedic certification to denote competence in routine prehospital care, and if the National Registry or Wilderness Medical Society agrees to offer written and practical tests on medical portion of Wilderness EMT knowledge and skills (or if each region has its own designated agency for such testing), what will we do about the outdoor and search and rescue topics? The only national wilderness search and rescue standards are those of the Mountain Rescue Association and of the nordic division of the National Ski Patrol. Could we simply require each Wilderness EMT to be MRA-certified? I think that the level of training and expertise for MRA certification is too much to require of every Wilderness EMT, and I think most others will agree. Could we require every Wilderness EMT to be a certified nordic patroller? The standards are less extensive than for MRA certification, but their scope is rather narrow, and does not include several topics that are on our Wilderness EMT list. (Members of the San Diego Mountain Rescue Team might find it a little strange: applying for nordic ski patroller certification to do desert rescue in Baja California?) The National Association for Search and Rescue has a committee working on a set of national standards for search and rescue competence, but the work is going slowly, and there is talk within NASAR of getting out of the standards business entirely. Perhaps the Wilderness Medical Society could address outdoor and search and rescue skills in a national Wilderness EMT certification program, but I suspect they would rather stick with the medical portion.

The foregoing discussion should adequately explain why we are not eager to establish a date for local certification testing, or even to agree that we will undertake certification testing. If the Appalachian Search and Rescue Conference and the Center for Emergency Medicine of Western Pennsylvania decide to establish regional testing and certification (either western Pennsylvania, or all of Pennsylvania, Maryland, and Virginia) until a national system emerges, a reasonable approach will be to require EMT or EMT-Paramedic certification from the National Registry or from one of the states in which our program will operate. We could also require that prospective Wilderness EMT's have and maintain Virginia Level I Ground Search and Rescue certification, or some certification deemed equivalent by the Board of Directors of the Appalachian Search and Rescue Conference (e.g. ASRC Certification, Pennsylvania Level I certification if a Pennsylvania sets such a standard, or equivalent standards for cave rescue or whitewater rescue). Since drafts of the National Association for Search and Rescue's national standards have been similar to those of Virginia and the ASRC, and there have been moves to adopt Virginia's standards in other states, conversion to a national standard should not be at all difficult. The Center for Emergency Medicine could then offer written and practical testing on the wilderness-specific emergency medicine topics in the Wilderness EMT curriculum. Perhaps we could include a few written questions and a practical station or two on basic emergency medicine and basic wilderness search and rescue to serve as a safeguard.

VIII. TOWARD THE FUTURE

The long-term goal of this project is immense: establishing a national wilderness emergency medical system with standard training and certification for Wilderness EMT's of several levels, training Wilderness Command Physicians, and providing the regional and national communications networks for medical control. The short-term goal is less all-encompassing: teaching a basic Wilderness EMT class in August 1987 in Pittsburgh, followed by a combined Wilderness EMT, Wilderness Paramedic, and Wilderness Command Physician class. These courses in wilderness emergency medicine will be distinguished by the caliber of the medical and search and rescue consultants and faculty. They will serve as a forum for discussion between outdoor, search and rescue, and emergency medicine experts; they will be models for other Wilderness EMT courses; and they will form the basis, I hope, for a mid-Appalachian regional wilderness EMS system that will itself be a model for the rest of the country. If all goes well, hospital emergency departments, state and federal agencies, and many different search and rescue teams will participate in a system that will bring the last twenty years' advances in prehospital care to the wilderness patient.

APPENDIX A: ASRC TRAINING GUIDE EXCERPT

Excerpts from Appalachian Search and Rescue Conference Training Guide (Third Edition, 1980)

III. BASIC MEMBERSHIP

A. General

1. To become a Basic Member, a Trainee must:
 - a. Complete all procedures to become a Trainee Member (see Section II);
 - b. Complete 32 hours of ASRC or Group field training as a Trainee, including 8 hours on search and 8 hours on Basic-level mountain rescue;
 - c. Meet the technical standards of this Section, as determined by the Training Officer;
 - d. Possess the personal equipment necessary to perform search tasks as a Field Team Leader in all seasons, as established and published by the Training Officer;
 - e. Receive a favorable subjective evaluation by the Training Officer, regarding the Trainee's overall competence to perform the tasks expected of a Basic Member;
 - f. Be proposed for Basic Membership, by the Training Officer, at a business meeting of the Trainee's Group; and
 - g. In accordance with the procedures of the ASRC Bylaws, receive a favorable vote of the Group's Certified Members.
2. The Training Officer must establish with reasonable certainty that every Basic Member can, upon demand, perform any of the skills included in the Basic standards. Certification testing will assess all vital skills (e.g. belaying), and an appropriate selection of other required skills and knowledge; the details of certification testing is left to the Training Officer. The selective nature of any certification test, although necessary, requires the Training Officer to incorporate his subjective impressions and knowledge of the applicant into the grading of certification tests.
3. Basic Members must complete annual continuing education requirements, maintain skills proficiency, and pass an annual review as explained in Section I.

B. Basic Level Technical Standards: Survival and Wilderness Travel

The candidate must be able to perform the tasks listed in the following items:

1. Convincingly explain the important psychological aspects of survival, including:
 - a. the priorities of short-term survival: the will to live, air, shelter, water, and food;
 - b. reactions to fear, pain, discomfort, and danger, and their effects on the mind and body;
 - c. the usefulness and dangers of panic, and the use of the STOP mnemonic for preventing panic;
 - d. evaluating and acknowledging the limits of oneself and others;
 - e. the way artificial goals may interfere with rational judgment; and
 - f. the concept of one's pack and equipment as a life support system.
2. Briefly describe the following physiological concepts pertinent to survival:
 - a. homeostasis;

- b. energy level and exhaustion;
 - c. fatigue;
 - d. daily caloric (food) and water needs of the human body;
 - e. the relative energy content and availability of fat, protein, starch, and sugar, including the effects of different levels of exertion and seasonal differences; and
 - f. conditioning for search and rescue, including conditioning for strength, flexibility, and endurance.
3. Explain the “energy budget” concept of body temperature homeostasis, including the following key points:
- a. the routes of heat loss, and their relative importance:
 - i. temperature (conduction and radiation),
 - ii. windchill (convection), and
 - iii. wetchill (conduction and evaporation);
 - b. the use of energy stores to produce heat, and the metabolic costs of shivering;
 - c. vasodilation, sweating, and behavior as means of increasing heat loss, and the long-term consequences of them;
 - d. vasoconstriction and behavior as means of conserving heat;
 - e. the effects of tobacco and alcohol on normal heat homeostasis; and
 - f. the particular danger of “hypothermia weather,” that is, temperatures near freezing with wind and rain.
4. Explain the major points of wilderness clothing selection, including:
- a. listing the “3 W’s” of clothing priority for wet cold climates, and explaining their importance. They are:
 - i. wind protection,
 - ii. waterproof clothing, and
 - iii. wool (or other warm-when-wet) clothing;
 - b. the advantages, disadvantages, and appropriate uses of waterproof shell garments, and the water penetration resistance of urethane-coated nylon, “60/40 cloth,” “65/35cloth,” and Gore-tex;
 - c. cold-weather dressing concepts, including the layer principle, ventilation, “dressing cold,” and the dangers associated with overheating in the winter; and
 - d. description of clothing materials, including cotton, down, wool, and synthetic fibers, in terms of dry warmth, wet warmth, wind protection, absorption and retention of water, and wicking of water.
5. Distinguish equipment suitable for wilderness search and rescue, including boots, packs, sleeping bags and pads, and stoves.
6. List the basic characteristics (voltage, life, weight, cost, temperature characteristics, and dangers) of carbon-zinc, alkaline, lithium, and nickel-cadmium cells.

7. Briefly describe pertinent local weather patterns, including the signs of arriving cyclonic winter storms, cold fronts, warm fronts, and local storms.
8. Travel cross-country competently in a middle appalachian wilderness area during summer, spring, or fall, including:
 - a. large stream crossings;
 - b. fourth class rock climbing; and
 - c. proper pace and rest stop use, and use of the rest step.
9. Bivouac overnight with normal mission pack gear in summer, spring, or fall, and carry out mission tasks for a full day following.
10. Build a functional emergency overnight shelter from local materials, and build a fire using mission pack gear.
11. Describe the means of transmission, preventive measures, and appropriate measures in suspected or possible exposure, if any, for the following diseases:
 - a. Rocky Mountain Spotted Fever;
 - b. Tetanus;
 - c. Rabies;
 - d. enteritis and diarrhea (viral, bacterial, or protozoal); and
 - e. chiggers, ticks, and mites.
12. Briefly describe the causes, prevention, diagnosis, and wilderness treatment for the following:
 - a. muscle cramps;
 - b. friction blisters;
 - c. tendinitis;
 - d. localized infection, including ingrown nails and abscesses;
 - e. contact dermatitis (e.g. poison ivy);
 - f. poisonous bites and stings: pit viper bites, spider bites, and bee stings;
 - g. allergic and anaphylactic reactions;
 - h. animal and human bites;
 - i. fever;
 - j. snowblindness;
 - k. hypothermia (acute, subacute, and chronic); and
 - l. heat cramps, heat exhaustion, heatstroke, and dehydration.
13. Briefly describe how one should treat the following medical problems in a wilderness setting:
 - a. subungual hematomas (blood under a fingernail after a crush injury);
 - b. nosebleed;
 - c. ear infection;
 - d. conjunctivitis, a foreign body in the eye, and eye abrasions;
 - e. burns and frostbite;
 - f. minor and major soft tissue injuries;
 - g. sprains, strains, and dislocations;

- h. closed fractures, including improvised splinting;
- i. open fractures;
- j. shock;
- k. gastroenteritis, diarrhea, and vomiting; and
- l. attached ticks and embedded chiggers.

14. Present important factors involved in the decision to:
- a. administer oral fluid and electrolyte replacement; and
 - b. to wait for an evacuation team versus beginning an evacuation with improvised methods.
15. Properly use the following improvised evacuation methods:
- a. 2-person linked-arms “chair” carry;
 - b. 2-person packstrap-and-pole carry;
 - c. both split coil and sling “piggyback” carries; and
 - d. improvised stretchers: rope stretcher, rope and pole stretcher, parka and pole stretcher, and blanket and pole stretcher.

C. Basic Level Technical Standards: Land Navigation

The candidate must be able to perform the tasks listed in the following items:

1. Given a standard 7.5 minute U.S. Geological Survey (USGS) topographic quadrangle map, correctly identify the following:
 - a. grades of highways, roads, trails, and bridges;
 - b. power and other landmark lines;
 - c. buildings, schools, churches, and cemeteries;
 - d. storage tanks, wells, mines, caves, picnic areas, and campsites;
 - e. benchmarks (control stations) and spot elevations;
 - f. boundaries and fence lines;
 - g. contour lines, depressions, cuts, and fills;
 - h. perennial and intermittent streams, falls, springs, and marshes;
 - i. valleys, ridges, peaks, sags (saddles, cols); and
 - j. elevations and general land contours.
2. Given a photocopy 7.5 minute series topographic map section with an ASRC grid overprint, the original 7.5 minute quadrangle map, and a Uniform Map System (UMS) gridded aeronautical chart of the area, identify points via:
 - a. latitude and longitude;
 - b. the ASRC grid system;
 - c. the Uniform Map System; and
 - d. an azimuth and distance off a VOR (an aeronautical radio-navigation beacon).
3. Point out the North Star.
4. Explain briefly and completely the use of the sun’s shadow to determine direction.

5. Briefly explain and give examples of the use of the following land navigation concepts:
 - a. catching features;
 - b. “collecting” features;
 - c. attack points;
 - d. aiming off; and
 - e. coarse and fine orienteering.

6. Given only a 7.5 minute topographic quadrangle or an orienteering map with an attack point and a target plotted on it, and a standard orienteering compass, reliably and accurately:
 - a. calculate the true bearing from the attack point to the target;
 - b. calculate and set on the compass the magnetic bearing to the target; and
 - c. follow the bearing accurately, including triangulating and boxing around obstacles.

7. Correctly locate a position on a topographic map, given:
 - a. the bearings to two landmarks indicated on the map (resection); or
 - b. the bearing to one landmark indicated on the map, and the information that the position is on a specified linear feature (modified resection).

8. Given bearings from two locations to a target, correctly locate it on a topographic map (triangulation).

9. Consistently complete basic-level point-to-point orienteering courses.

D. Basic Level Technical Standards: Search

The candidate must be able to perform the tasks listed in the following items:

1. Briefly explain the following search concepts:
 - a. passive and active search methods;
 - b. clue finders and subject finders;
 - c. containment;
 - d. binary search and cutting for sign;
 - e. the hasty search; and
 - f. the “bastard search.”

2. Define and outline the five phases of lost person search operations as set forth in the ASRC Search and Rescue Operations Plan (SAROP).

3. Identify the positions and their corresponding duties:
 - a. on a Field Team;
 - b. on a Quick Response Team; and
 - c. on the ASRC Mission Staff.

4. Outline the standard procedures for:

- a. hasty search tasks;
 - b. scratch search tasks;
 - c. survey search tasks;
 - d. perimeter search tasks;
 - e. sweep search tasks;
 - f. saturation search tasks;
 - g. patrol search tasks;
 - h. camp-in search tasks;
 - i. marking of clues and boundaries;
 - j. reporting and managing clues (both downed aircraft and lost person searches);
 - k. reporting and managing finds (both downed aircraft and lost person searches);
 - l. man-tracking tasks;
 - m. tracking dog tasks;
 - n. air-scenting dog tasks;
 - o. interrogation search tasks;
 - p. visual search tasks;
 - q. Emergency Locator Transmitter search tasks; and
 - r. locale search tasks.
5. With the use of gear normally carried in the candidate's mission pack, recall the standard:
- a. ground-to-air panel signals;
 - b. air-to-ground aircraft signals;
 - c. helicopter landing zone preparation and marking; and
 - d. rules for approaching helicopters.
6. Lead a Field Team competently on:
- a. scratch, survey, perimeter cut, sweep, and saturation search tasks; and
 - b. interrogation and visual search tasks.
7. Reliably use VHF-FM mobile and handheld radios to communicate mission information, including:
- a. adjustment of channel, volume, squelch, and PL (CTCSS) controls;
 - b. using the ASRC radio SOP, including proper station identification and observance of FCC regulations, proper use of prowords, and use of the ICAO (ITU) phonetic alphabet; and
 - c. describing various techniques for improving marginal communications encountered while using VHF-FM handheld radios.
8. Outline the delegation of authority and responsibility for search and rescue in Virginia, West Virginia, and Maryland.
9. Briefly explain how the following legal concepts apply to search and rescue operations:
- a. Good Samaritan laws;
 - b. civil suits and criminal actions;
 - c. standards of care;

- d. the right to emergency assistance and duties to provide emergency assistance;
- e. abandonment;
- f. implied consent;
- g. entry, during missions, upon private property posted "No Trespassing;"
- h. crime scene protection;
- i. declaration of death and confirmation of death; and
- j. confidentiality.

E. Basic Level Technical Standards: Mountain Rescue

The candidate must be able to perform the tasks listed in the following items:

1. Correctly tie, contour, and back up the following knots:
 - a. bowline;
 - b. water knot (overhand bend, ring bend);
 - c. figure eight loop;
 - d. Prusik knot;
 - e. Headden knot;
 - f. square knot;
 - g. barrel knot and barrel bend (double fisherman's knot, grapevine knot);
 - h. clove hitch; and
 - i. the ASRC seat harness.
2. Demonstrate the following rope handling techniques:
 - a. coiling and uncoiling a mountaineer's coil;
 - b. stacking and inspecting the rope;
 - c. rigging to an anchor using:
 - i. a bowline,
 - ii. a tree wrap and tie-off, and
 - iii. loop webbing slings; and
 - d. casting, padding, and rigging static lines.
3. Belay competently, including:
 - a. proper anchorage, tie-in, stance, and aim; and
 - b. correct calls, up rope, slack, and fall-catching.
4. Demonstrate competence in braking litters with tree wrap belays and with figure eight descenders.
5. Correctly coach and supervise an untrained litter team in a non-technical evacuation, including toenailing, laddering, and rotation of litter bearers.
6. Serve competently in all positions on a semi-technical evacuation team, including:
 - a. serving as rope team member with tree wrap brakes and with figure eight descender brakes;
 - b. rigging and directing a brute-force hauling system; and
 - c. serving as rope team member with a brute-force hauling system; and

- d. serving as litter captain.
- 7. Properly load and tie a patient into a Stokes litter, and rig it for semi-technical evacuations.
- 8. Rappel properly with:
 - a. the arm rappel (French arm rappel, back rappel);
 - b. the dulfersitz (“hotseat”) body rappel;
 - c. a figure eight descender (single and double wrap);
 - d. a carabiner wrap; and
 - e. a long rappel rack.
- 9. Demonstrate the knowledge of, and ability to care properly for, ropes and technical rescue equipment.

F. Basic Level Technical Standard: Emergency Medicine

The Basic Member must meet each of the following requirements:

- 1. Certification
 - a. Possess a current certificate as an Emergency Medical Care—First Responder by an agency adhering to the Department of Transportation 40-hour course or better; or
 - b. Possess a current American National Red Cross Advanced First Aid and Emergency Care card; or
 - c. Demonstrate to the satisfaction of the Training Officer equivalent training and ability.
- 2. Vital Signs
 - a. Possess an American National Red Cross card for Vital Signs: Blood Pressure; or
 - b. Demonstrate proficiency at taking palpated and auscultated blood pressures.
- 3. Demonstrate the ability to properly use oropharyngeal airways, oxygen delivery systems, and pocket masks for respiratory resuscitation.
- 4. Possess a valid American National Red Cross or American Heart Association 2-rescuer Basic Cardiac Life Support (Cardio-Pulmonary Resuscitation) card.

Note that EMT certification fulfills items 1, 2, and 3, but does not in itself satisfy item 4.

APPENDIX B: VIRGINIA SEARCH AND RESCUE STANDARDS

Excerpts from Commonwealth of Virginia Search and Rescue Training and Certification Program (Part 1: Ground Search and Rescue)

Search and Rescue Training Associate's Ground Search and Rescue College Training System originated as an effort of members of the Virginia Wing of the Civil Air Patrol, with help from members of the Appalachian Search and Rescue Conference, Inc. The program evolved to become the Ground Search and Rescue College, an independent search and rescue training system, and now forms the official ground search and rescue certification standards of the Department of Emergency Services of the Commonwealth of Virginia. The standards listed here are the basis for the standard state testing for ground search and rescue team members. These standards, and those of the Appalachian Search and Rescue Conference, Inc., along with other material, were used by the National Association for Search and Rescue to form the basis of the "Fundamentals of Search and Rescue" course. Many search and rescue experts, including members of the Appalachian Search and Rescue Conference, favor the adoption of the Virginia standards, or similar standards, nationwide.

CERTIFICATION STANDARDS

LEVEL I

GROUND SEARCH AND RESCUE TEAM MEMBER

- I. Qualifications
 - A. Attend at least one complete Level I training course.
 - 1. Individuals who can demonstrate equivalent training or experience, as set forth under section IV D.5 of the "Search and Rescue Training and Certification Program", may be entitled to waive Part A.
 - B. Pass the GSAR Level I written test with a score of at least 80%.
 - C. Pass the GSAR Level I practical test within the limits defined for each station.
- II. Equipment Requirements
 - A. Possess proper equipment as outlined in the "Level I Minimum Personal Equipment" list.
- III. Knowledge and performance expectations
 - A. SAR Operations
 - 1. Describe areas of responsibility for search and rescue as defined by the National SAR Plan.
 - 2. Describe areas of responsibility at the state level.
 - 3. List several resources that might be utilized during a SAR event.
 - 4. List several factors that may result in an aircraft being listed as missing.
 - 5. Describe the basic principles of the ICS system and define the major staff positions.
 - B. Legal Aspects of SAR Operations
 - 1. Outline the provisions of the Good Samaritan law.
 - 2. Define the terms "implied consent," "expressed consent," "informed consent," and "abandonment."
 - 3. Describe the four (4) facts necessary to prove negligence.
 - 4. Describe several methods of reducing liability exposure.
 - 5. Describe the circumstances when entry upon private property may be justified.
 - a. Define the problems involved with this action and possible solutions.

C. Personal Equipment

1. Explain these principles of clothing selection.
 - a. Choice of clothing material.
 - b. Wetproof/windproof.
 - c. Layering.
 - d. Loft.
2. Describe several ways to prevent excessive body heat loss.
3. Explain the selection principles for these items.
 - a. Boots.
 - b. Sleeping bag.
 - c. Ground protection and insulation.
 - d. Backpack/daypack.
 - e. Tent.
 - f. Personal safety items.
 - g. Fire starting aids.
 - h. Items for signalling and navigation.
 - i. Light sources and batteries.
 - j. Emergency shelters.

D. Wilderness Survival

1. Define short term v. long term survival.
2. Describe several problems commonly encountered on SAR missions that may lead to a survival situation.
3. Describe the psychological factors that may affect survival ability.
4. Explain the "energy reserve" concept.
5. Describe the body's physiologic response to both cold and heat stress.
6. Define the following temperature related diseases and their recognition, treatment, and prevention.
 - a. Hypothermia.
 - b. Frostbite.
 - c. Trench foot (immersion foot).
 - d. Heat stroke.
 - e. Heat exhaustion.
 - f. Dehydration.
7. Be able to develop an "action plan" based on the STOP rule for a given wilderness emergency scenario.
8. Demonstrate the ability to bivouac in any type weather conditions, without significantly affecting functional ability.
9. Define average daily food and water requirements.

E. Land Navigation and Orienteering

1. Identify and define the following terms or concepts.
 - a. Latitude and longitude.
 - b. Degrees, minutes and seconds.
 - c. True north and magnetic north.
 - d. Declination.
2. Demonstrate the ability to read and interpret topographic map border information, colors and symbols.
3. Describe the various parts of the compass and demonstrate the ability to use it to plot a course on a map, including northing and declination correction.
4. Define the following plotting methods or grid systems and demonstrate the ability to use them to determine the coordinates for a given point.
 - a. Latitude - Longitude.
 - b. UMS.
 - c. UTM.
 - d. ASRC.
 - e. LORAN, using a topo map.

5. Demonstrate the ability to perform the following navigational functions.
 - a. Obtain and follow a simple compass bearing.
 - b. Determine a reciprocal.
 - c. Move around obstacles.
 - d. Find a position by triangulation and by resection.
 - e. Measure distance by pacing.
 - f. Determine position by terrain feature identification.
 6. Describe the significance and use of these orienteering concepts.
 - a. Catching features.
 - b. Collecting features.
 - c. Attack points.
 - d. Aiming off.
- F. Search Skills
1. Identify the most basic tenet of search and rescue, the one that should govern all SAR activity.
 2. Identify the primary goal of all SAR activity.
 3. Identify and define (4) key points of search theory.
 4. Describe the standard techniques for these search tactics.
 - a. Attraction.
 - b. Containment.
 - c. Survey search.
 - d. Hasty search (Scratch search).
 - e. Sweep search (Open grid search).
 - f. Line search (Closed grid search).
 - g. Route search.
 5. Describe standard procedures for working with search dogs, tracking/trailing dogs and mantrackers.
 6. Define the (4) core elements of tactical operations.
 7. Briefly describe the (5) phases of a SAR event.
- G. Incident Site Procedures and Disciplines
1. Describe several hazards commonly associated with an aircraft crash site.
 - a. List additional hazards that may be present if the crash involves a military aircraft.
 2. Define the proper approach to an aircraft crash site.
 3. Explain the importance of the accurate documentation of events at an incident site.
 4. Describe the proper methods to use to adequately secure an incident site.
 5. Explain the importance of clue preservation at both an aircraft crash site and a possible crime scene.
- H. Ropes and Technical Hardware
1. Describe the several types of rope commonly used in wilderness rescue work, their construction, use and care.
 2. Describe the use and care of the carabiner, the Figure 8 and the brake bar rack.
 3. Demonstrate the ability to correctly tie these knots.
 - a. Figure 8 loop.
 - b. Figure 8 bend (follow through).
 - c. Square knot.
 - d. Water knot (overhand bend).
 - e. Prusik.
 - f. Double fisherman or barrel bend.
 4. Demonstrate these rope handling techniques.
 - a. Uncoiling and stacking.
 - b. Inspection.
 - c. Throwing.
- I. Litter Techniques

1. Demonstrate these litter techniques.
 - a. Patient loading.
 - b. Lift, lower and carry.
 - c. Rotation.
 - d. Laddering, including toe nailing.
 - e. Calls.

J. Belaying

1. Demonstrate proper belay techniques including:
 - a. Anchorage.
 - b. Belayer tie-in.
 - c. Stance.
 - d. Aim.
 - e. Uphill and downhill travel.
 - f. Calls.
 - g. Tree wrap and mechanical brakes.

K. Field Team Organization

1. Define "field team."
2. Describe at least (5) types of search teams.
3. Describe at least (4) types of rescue teams.
4. Define the functions of these field team positions.
 - a. Field Team Leader.
 - b. Medical Officer.
 - c. Rescue Specialist.
 - d. Radio Operator.

L. Helicopter Operations

1. Describe the hazards to ground personnel working around a helicopter.
2. Describe standard protocols for helicopter operations.
3. Explain proper procedures for hoist operations.
4. Describe the considerations for selecting and preparing an LZ.

M. Field Communications

1. Describe the use and dangers of these signalling devices.
 - a. Aerial flares.
 - b. Smoke.
 - c. Signal mirrors.
 - d. Fires.
 - e. Panels and paulins.
 - f. Hand and body signals.
2. Define the special problems associated with the field use of portable radios and list some of their possible solutions.
3. Briefly describe good basic radio protocols including courtesy, security, brevity, and the use of the phonetic alphabet and 10 codes.

**Excerpt from Appendix B:
Minimum Personal Equipment,
Level I**

1. Windshell jacket with hood.
2. Waterproof jacket or parka with hood. A Gore-Tex or similar jacket can serve for both items 1 and 2.
3. Rain chaps or rain pants. Add gaiters for winter.
4. Heavy wool shirts or sweaters as required.
5. Wool pants.
6. Long underwear of wool, silk, polypro or other suitable synthetic material. Cotton thermal underwear is not acceptable.
7. Wool stocking cap or balaclava. A scarf is recommended if a stocking cap is used.
8. Heavy wool socks with lighter weight liner socks.
9. Leather gloves with wool liners. Mittens are required for extremely cold weather.
10. Heavy weight backpacking or mountaineering boots with a suitable lug sole recommended. Combat boots are acceptable.
11. Backpack large enough for day pack use.
12. One quart minimum canteen or water bottle.
13. Pocket knife.
14. Whistle.
15. Orienteering type compass.
16. Flashlight or headlamp with alkaline batteries, spare batteries and spare bulb. Headlamp preferred.
17. Waterproof matches or disposable lighter.
18. Personal first aid kit.
19. Storm shelter: Tube tent, space blanket, lightweight tarp.
20. At least (1) 30 gallon leaf bag.

Notes:

A sleeping bag and an Ensolite or similar sleeping pad will be needed for overnight stays away from home.

Always carry at least a one day supply of quick energy food.

Appendix C: Suggested Equipment for a Wilderness Search and Rescue Team

The following equipment should be considered the minimum required to do a wilderness rescue involving one patient in terrain up to and including semi-technical. Rescues of greater technical difficulty should be left up to a specialized mountain rescue team.

This list also assumes that the individual team members are each carrying adequate personal gear as defined in the Minimum Personal Equipment Lists.

Specialty equipment needed to adapt a team to a particular environment or to allow the team to perform specialized SAR tasks will not be addressed. Examples include snow mobiles, cross country ski equipment, equipment for mounted patrols, etc. Coastal areas and swamplands can also present unique SAR problems requiring vehicles and equipment adapted to that type environment. However, basic requirements still remain the same. Each team will need to decide how sophisticated they wish to be and determine additional needs accordingly.

- I. Vehicle
 - A. Transportation of team members from their homes to the mission base is usually accomplished by private vehicle. A roster of members' mission-available vehicles listed by type and capability (station wagon, 4 WD, etc.) is suggested.
 - B. A dedicated, multipurpose team vehicle is highly desirable. It should be large enough to carry six or more personnel with their gear and should be outfitted to operate as a mobile operations and communications base. 4 WD ex-military field ambulances are ideal for this application and can sometimes be obtained by volunteer groups at no cost through government excess property programs. Restoring and outfitting the vehicle can be an interesting and challenging team project.
 - C. Suggested vehicle equipment
 1. Dual battery system. Interior lights and radios should be on a separate circuit from the starting system.
 2. Adequate lighting for off-roading. Side lights and spot lights recommended.
 3. Emergency lights and siren, if permitted by state and local regulations.
 4. Support equipment including jack (2 hydraulic jacks recommended), jumper cables, tire chains, tow chains or tow straps, tool kit, spare parts kit, fire extinguisher, flares, axe, portable spot light, first aid kit.
- II. Mission Kit
 - A. Complete set of forms as required by local protocols.
 - B. Miscellaneous kit including stapler and staples, pens, pencils, transparency markers, rubber bands, paper clips, carbon paper, file folders, etc.
 - C. State and county road maps, area topo maps, aeronautical charts.
 - D. Map overlay kit.
 - E. Portable map boards.
- III. Search Pack
 - A. Surveyor's tape and rolls of heavy duty string.
 - B. Instant camera and spare film.
 - C. Appropriate warning signs for scene control.

- D. Signal panel set.
 - E. Smoke.
 - F. Aerial flare kit.
 - G. Signal mirror.
 - H. Binoculars.
- IV. Communications and Electronic Equipment
- A. Vehicle mobile radio, ideally multiple frequency.
 - B. Compatible portables.
 - C. Scanner.
 - D. ELT-DF equipment if missing aircraft search is anticipated.
- V. Medical Pack
- A. Back-packable trauma kit. The contents should be determined by the team medic and governed by local medical protocols. Multiple patient treatment capability desirable.
 - B. Back-up vehicle medical kit.
 - C. Portable oxygen system with warmer and humidifier.
 - D. Triage tags.
 - E. Patient assessment and report forms.
- VI. Evacuation Kit
- A. Stokes litter with yoke, tie-ins and sling system. A back-up D-ring litter is desirable.
 - B. Patient packaging.
 - 1. Center zip sleeping bag
 - 2. (2) wool blankets
 - 3. Rain cover for the Stokes
 - 4. Ensolite pad
 - 5. Short backboard
 - 6. Patient helmet with face shield
 - C. (1) 300 ft. nylon rope, 1/2" climbing grade, static.
 - 1. (1) or more 150 ft. sections and (1) or more 50 ft. sections of the same grade rope are recommended.
 - 2. Rope and webbing sling assortment.
 - D. Technical hardware
 - 1. (10) locking-D carabiners
 - 2. (1) brake bar rack
 - 3. (4) rescue pulleys
 - 4. (2) figure 8's
- VII. Extrication Kit
- A. This is a field portable kit. A come-along with chains as part of the vehicle equipment may be desirable.
 - 1. (1) 24" pry bar.
 - 2. (1) leaf spring cutting tool.
 - 3. (1) fiberglass mallet.
 - 4. (1) screwdriver set.
 - 5. (1) pair soft-metal shears.
 - 6. (1) pair Vise-Grip (TM) type pliers.
 - 7. (1) hacksaw.

APPENDIX C: VIRGINIA EMS REGULATIONS: PROPOSED CHANGES

CHANGES TO THE VIRGINIA EMERGENCY MEDICAL SERVICES REGULATIONS REGARDING WILDERNESS EMERGENCY MEDICAL SERVICES

A DRAFT PROPOSAL

by members of the Appalachian Search and Rescue Conference, Inc.

Edited by Keith Conover, M.D.

A. INTRODUCTION

The Appalachian Search and Rescue Conference (ASRC) provides search management and technical rescue capabilities, but also offers sophisticated emergency medical care to patients in wild and mountainous areas and at backcountry aircraft crash sites. Though the ASRC does not use an ambulance, it treats and transports patients in Virginia, and therefore meets the definition of a Virginia EMS agency. The Virginia Division of Emergency Medical Services (EMS) does not generally require search and rescue teams to become licensed, as it does for ambulance-based EMS agencies. Licensed EMS agencies may access resources unavailable to non-EMS agencies, so the ASRC requested (and was granted) an EMS agency license.

The Virginia EMS Regulations deal almost exclusively with ambulances, so the Division of EMS cannot apply many of the requirements to agencies that provide backcountry EMS. To help the EMS Regulations better deal with specialized wilderness EMS agencies, we have put together this proposal. The proposal defines Wilderness EMS and Wilderness EMS agencies, and specifies the personnel and equipment required to provide Basic or Advanced Life Support and transportation for wilderness patients. We call this a Basic or Advanced Wilderness Life Support Unit. It has equipment and capabilities similar to an BLS or ALS EMS vehicle, as adapted for a backcountry setting, but without the vehicle.

This draft reflects the efforts of many ASRC members, but it is not yet a formal proposal; we are publishing it solely to stimulate discussion about the issues.

B. EMS AGENCY STATUS FOR SEARCH AND RESCUE TEAMS

Some search and rescue organizations provide only first aid services. Others, such as the ASRC, employ EMT's and provide care similar to an EMT-staffed Basic Life Support (Class B) or Advanced Life Support (Class C) ambulance. (There are some differences due to the wilderness environment, but the level of training, level of care, and types of therapy are the same.)

Therefore, the ASRC and similar organizations meet the Regulations' definition of an EMS agency:

2.01.09 Emergency medical services (EMS) - The services utilized in responding to the perceived individual needs for immediate medical care in order to prevent loss of life or aggravation of physiological or psychological illness or injury including any or all of the services which could be described as basic life support, advanced life support, specialized life support, patient transportation, and rescue.

(A revision several years ago deleted search from the definition of EMS.)

2.01.10 Emergency medical services agency (EMS agency) - Any person, as defined herein, engaged in the business, service, or regular activity, whether or not for profit, of transporting persons who are sick, injured, wounded, or otherwise incapacitated or helpless or of rendering immediate aid to such persons³⁷.

We are not sure why the Division of EMS removed search from the definition of Emergency Medical Services, but it is reasonable to surmise it was so that they need not regulate and license search-only teams.

Many search teams also rescue and evacuate their victims, and since rescue is by definition EMS (see above) we may call them EMS agencies. However, the Division of EMS has not, to our knowledge, regulated or licensed rescue agencies that provide first aid but no sophisticated (i.e. BLS or ALS) prehospital care. For emergency care beyond the first aid level, these rescue teams depend on established EMS agencies. These first-aid level search and rescue organizations may meet the “letter” of the EMS agency definition, but we doubt meet the intent of the definition. We believe that the EMS Regulations need not control these organizations.

Search and rescue organizations such as the ASRC, which require EMT's and BLS-type equipment (or better) for patient care, meet both the letter and, we believe, the intent of the definition of an EMS agency. The ASRC sees search and rescue as necessary and important functions, but proper backcountry emergency care at the scene and during evacuation has always been our prime concern. The ASRC logo, adopted at its inception, features a blue star-of-life, as an emblem showing its commitment to quality prehospital care.

This proposal might seem to place an unnecessary administrative burden on the Virginia Division of EMS. The precedent of this proposal might cause many new and unusual types of prehospital care provider to petition the Division for even more changes, resulting in a profusion of both regulations and “special” EMS Agencies. However, we suspect that few organizations will be willing to apply for special EMS Agency status, unless through the Wilderness EMS or through previously established regulations.

Each EMS agency must provide one (or more) of the recognized types of EMS service, as specified in section 3.02.01: “Each EMS agency shall provide one or more of the following services: a. Basic Life Support; b. Advanced Life Support; c. Specialized Life Support; d. Patient Transportation.” The Regulations define Basic and Advanced Life Support as follows:

2.01.01 Advanced Life Support - A sophisticated level of pre-hospital and inter-hospital emergency care which includes basic life support functions including Cardiopulmonary Resuscitation (CPR) plus cardiac monitoring, cardiac defibrillation, telemetered electrocardiography, administration of antiarrhythmic agents, intravenous therapy, administration of specific medications, drugs, and solutions, adjunctive ventilation devices, trauma care, and other authorized techniques and procedures.

2.01.05 Basic Life Support - A level of pre-hospital and inter-hospital emergency care which includes the recognition of other [other than Advanced Life Support; see above] life threatening conditions which may result in respiratory and cardiac arrest, and the application of life support functions including cardiopulmonary resuscitation (CPR), use of adjunctive techniques and procedures. (sic)

These definitions depict the care rendered in the field by the ASRC, but the present Regulations deal mostly with prehospital EMS as practiced from an ambulance. Since the ASRC does not use any vehicles to provide its emergency medical services, few of the regulations apply. Forty-eight of the EMS Regulations' ninety-six pages deal solely with vehicle requirements, and vehicle-related equipment and personnel specifications do not apply to wilderness EMS.

A careful reading of the regulations reveals that a team with no EMS vehicles could be licensed as a Basic Life Support EMS Agency and need meet no requirements except to have an EMT or two. While we would not expect the Division of EMS to issue a license to a group with only this qualification, it points up the deficiencies of the Regulations in dealing with Wilderness EMS agencies. An wilderness EMS agency (one without vehicles) applying for Advanced Life Support licensure would need to have a physician medical director. This Medical Director who would make all decisions about EMT training and equipment selection, but again the team would have to meet no specific standards for equipment or number of personnel. (This is the ASRC's current status.) Therefore the present Basic nor Advanced Life Support classifications are inadequate for wilderness EMS agencies.

Some have suggested that the Division of EMS license the ASRC, not as a Basic or Advanced Life Support agency, but under the category of "Specialized Life Support," which is the classification for agencies using mobile neonatal intensive care units (Class "D" EMS Vehicles):

2.01.27 Specialized Life Support - A sophisticated and specialized level of pre-hospital and inter-hospital emergency care which includes basic and advanced life support functions for a specified type of patient including any or all of the services which could be described as neonatal life support.

Again, this would require no specific personnel or equipment for an organization without EMS vehicles. Another reason not to put wilderness EMS agencies under this classification is that Specialized Life Support specializes by type of patient, while wilderness EMS specializes by environment.

For these reasons, the ASRC is proposing a new classification of EMS agency, defined by the characteristics of wilderness rescue: environmental hazards are there for patient and EMT's alike; EMT's must carry equipment and supplies long distances to the patient; and EMT's must care for the patient for a long time before the patient reaches the regular prehospital care system.

The ASRC believes that high-quality emergency medical care should be available to citizens of the Commonwealth, whether in a city, along a rural road, or far back in the hills. Therefore, we would like more rigorous requirements for Wilderness EMS agencies, and we have drafted this proposal to provide these. This proposal extends the Regulations' mandate for quality prehospital care into backcountry settings; we want to make prehospital care available to the hunter who falls into a ravine, the child who is lost in the forest for five days, and the people on an aircraft that crash-lands in the Blue Ridge Mountains. We want to do our part to provide a system of quality prehospital care encompassing not only the cities and highways of Virginia, but its caves, forests, and mountains, as well.

The proposed changes begin on the following page.

C. PROPOSED NEW DEFINITIONS

1. Add to Section 2.00 (Definitions) the following:

- 2.01.28 Evacuation - the transportation of patients from a backcountry site, over wild or mountainous terrain, through cave passages, or past other obstacles, without automotive vehicles, marine craft, or aircraft, to a point routine EMS vehicles may access.
- 2.01.29 Wilderness Emergency Medical Services - providing emergency medical care to a patient far from regular vehicle access, that is, where individual EMS team members must carry equipment and supplies over a significant distance of wild or mountainous terrain, and continuing to provide such care during evacuation to a routine vehicle access site.
- 2.01.30 Wilderness Emergency Medical Services Agency - any person, agency, or organization which provides Wilderness Emergency Medical Services as a regular activity or which professes to provide Wilderness Emergency Medical Services.
- 2.01.31 Basic Wilderness Life Support - providing Basic Life Support care to a patient far from regular vehicle access, that is, where individual EMS team members must carry equipment and supplies over a significant distance of wild or mountainous terrain, and continuing to provide such care during evacuation to a routine vehicle access site.
- 2.01.32 Advanced Wilderness Life Support - providing Advanced Life Support care to a patient far from regular vehicle access, that is, where individual EMS team members must carry equipment and supplies over a significant distance of wild or mountainous terrain, and continuing to provide such care during evacuation to a routine vehicle access site.

Add the following to the list of EMS types (Section 3.02.01):

- e. Basic Wilderness Life Support
- f. Advanced Wilderness Life Support

D. PROPOSED ADDENDUM**10.00 WILDERNESS EMERGENCY MEDICAL SERVICES****10.01 General Policies****10.01.01 Purpose of Regulations**

These regulations mandate that the standard of patient care in wilderness prehospital care be the same as for routine ambulance-based prehospital emergency care, insofar as is possible with present technology and resources.

10.01.02 Licensure of Wilderness EMS Agencies

No person shall establish, or operate and maintain, any service or organization as a Wilderness EMS Agency, or profess to provide services defined as Wilderness EMS, without a valid license or in violation of the terms of a valid license.

10.01.03 Wilderness EMS by Basic and Advanced Life Support Agencies

Nothing in these Regulations shall be construed to restrict any EMS or other agency from the occasional provision of Wilderness EMS, provided the agency neither (1) professes to provide Wilderness EMS on a regular basis, nor (2) provides services which may be construed as Wilderness EMS as a regular or major part of its activities.

10.01.04 Non-EMS Wilderness Search and Rescue Agencies Exempt

Nothing in these regulations shall be construed to restrict, limit, or regulate those wilderness search and rescue agencies which do not provide EMS or Wilderness EMS as part of their services.

10.01.05 Applicability of EMS Regulations to Wilderness EMS Agencies

Wilderness EMS agencies shall be bound by all sections of these Regulations, except as specified in this section. Specifically, any EMS vehicles operated by any agency providing Wilderness EMS must meet the requirements of Section 4.

10.01.06 Life Support Units Required

Each licensed Wilderness EMS agency shall maintain at least one Life Support Unit.

10.02 Wilderness Life Support Units - General Requirements

10.02.01 Safety

All Life Support Unit equipment shall be maintained in good repair and operating condition.

10.02.02 Operations

Any automotive vehicle operated by a Wilderness EMS agency with a primary purpose of patient transportation shall meet all requirements of Section 4.

10.02.03 Sanitation

- a. Each Wilderness Life Support Unit shall include a Patient Protection System, which shall be provided with a launderable or disposable inner liner. A new or freshly-laundered inner liner shall be used for each patient.
- b. All Wilderness Life Support Unit supplies shall be stored and transported so that they are protected from water, dirt, and mechanical damage.
- c. Each Wilderness Life Support Unit shall have provisions for the isolation and carry-out of soiled supplies in plastic bags or sealed containers.

10.02.04 Equipment and Supplies

- a. Each Wilderness Life Support Unit shall be stocked with the full required set of

equipment and supplies according to its classification.

- b. Supplies shall be restocked as necessary to maintain minimum requirements.
- c. The Operator (Field Team Leader) and Attendant-in-Charge (team Medical Specialist) of the Wilderness Life Support Unit shall select the equipment and supplies to carry to the patient.

10.02.05 Inspection

All Wilderness Life Support Units shall be subject to, and available for, inspection by the Commissioner for compliance with these Regulations. The Commissioner may conduct such inspection at any time and without prior notification.

10.03 Wilderness Life Support Units - Specific Requirements

10.03.01 Basic Wilderness Life Support Units

- a. Capabilities - A Basic Wilderness Life Support Unit provides Basic Wilderness Life Support.
- b. A Basic Wilderness Life Support Unit shall include, as a minimum, all the following equipment and supplies:
 1. A litter, patient restraint system, and spinal immobilization device meeting the requirements of Section VI (Evacuation), Appendix C, Virginia Search and Rescue Training and Certification Program, Part 1: Ground Search and Rescue. (See Appendix).
 2. A minimum of nine (9) attendants to serve as a litter team, each with adequate personal equipment and clothing to work for extended periods of time in the Wilderness EMS Agency's service area, in any season (as defined in Appendix B of Part 1 of the Virginia SAR Training and Certification Program), including headlamps for night operations; attendants must meet the Commonwealth of Virginia Level I Ground Search and Rescue standards or equivalent Commonwealth of Virginia Level I specialty wilderness search and rescue standards. (See Appendix).
 3. Communications equipment providing:
 - a. Voice communications between the litter team and the Incident Command Post;
 - b. Voice communications between the litter team and other Field Teams of the same agency for which this requirement applies; and
 - c. Voice communications between the litter team and the medical facility receiving the patient or a central medical control (this may be the Incident Command Post, provided the agency has made provisions to station a medical command physician at the Incident Command Post).
 4. Equipment and supplies required for a Class B (Basic Life Support) EMS Vehicle as specified in Section 4.02.02.c.1, except that:
 - a. No fixed oxygen or suction apparatus is required; the portable oxygen system should be capable of providing warm humidified

oxygen for the treatment of hypothermic patients.

- b. No ambulance cot, pillow, linen, backboard, or sandbags are required (but see the requirements for a litter, patient restraint and protection systems, and a spinal immobilization device, above).
 - c. This equipment shall be stored in a Base Camp medical kit, but shall be available for transport into the field at any time, in appropriate field-portable protective containers.
5. Instead of the rescue and extrication equipment listed in Section 4.02.02.c.2, the Wilderness Basic Life Support Unit is required to stock all equipment under Sections VI and VII (Evacuation and Rescue) of Appendix C of the Virginia Search and Rescue Training and Certification Program, Part 1: Ground Search and Rescue. (See Appendix).

10.03.02 Advanced Wilderness Life Support Units

- a. Capabilities - An Advanced Wilderness Life Support Unit provides Advanced Wilderness Life Support.
- b. An Advanced Wilderness Life Support Unit shall include, as a minimum, all the following equipment and supplies:
 1. All equipment and supplies required of a Basic Wilderness Life Support Unit.
 2. Equipment and supplies required for a Class C (Advanced Life Support) EMS Vehicle as specified in Section 4.02.03.c.2, except that:
 - a. No IV ceiling hangers are required;
 - b. The Unit must carry a low-reading electronic rectal temperature probe usable for continuous monitoring.
 - c. The specifications and quantities of medical supplies shall be determined by the agency Medical Director, in agreement with the published works of national wilderness EMS organizations such as the Wilderness Medical Society, Mountain Rescue Association, and National Cave Rescue Commission.

Comments on Section 10.03 (Wilderness Life Support Units -- Specific Requirements): The Virginia Department of Emergency Services (DES) regulates and certifies members of ground search and rescue teams, and is establishing standards for certification of ground search and rescue teams. Thus, this proposal defers to the DES team standards for rescue equipment, rather than establishing a parallel standard. The rescue equipment discussion brings out an interesting question. Does a Wilderness Life Support Unit need to have equipment for search as well as rescue? A team that could provide rescue and EMS services but could not manage a search still might be a Wilderness EMS Agency. Perhaps the solution is for Virginia DES to establish separate rescue and search classifications for teams; then Wilderness Life Support Units would need only to meet the rescue standards. On the other hand, we might want to require that any Wilderness EMS Agency also have minimum search management capabilities, because a long wilderness rescue requires much the same management as a large search operation.

See also the discussion of wilderness EMS equipment on page .

APPENDIX D: PROJECT CONSULTANTS AND PROSPECTIVE CONSULTANTS

This Appendix lists people and organizations who have showed an interest in helping with the Wilderness Emergency Medicine Curriculum Development Project (listed in italics) and those whose names have been suggested by others as possible consultants (listed in a normal typeface). Some consultants will review the Prospectus, some will review the Lesson Plans and Wilderness Emergency Medicine Textbook, and some will serve as faculty instructors. By the next draft of the Prospectus, we will ascertain the interest of potential consultants, and thus will eliminate the "prospective" portion of the list.

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Edward Rotheram, M.D., Head, Division of Infectious Diseases
Ray Townsend, M.D., Attending Staff, Division of Renal and Electrolyte Diseases
Murray Gordon, M.D., Attending Staff, Division of Endocrinology
Sherwood Chetlin, M.D., Head, Division of Rheumatology
Department of General Surgery, Trauma Service
Ric Townsend, M.D., Provisional Staff
Department of Emergency Medicine
Fred Harchelroad, M.D., Attending Staff
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University of Virginia Medical Center,
Charlottesville, Virginia

Department of Surgery
Richard A. Christoph, M.D., Assistant Professor, Emergency Medical Services

National Cave Rescue Commission
Noel Sloane, M.D., National Medical Advisor
Indianapolis, IN

Eastern Region, NCRC
John C. Hemple, Region Coordinator, Valencia, PA
Bruce Bannerman, EMT, Culloden, WV

Wilderness Medicine Physicians (including Wilderness Medical Society Members)
Paul Auerbach, M.D., Nashville, TN
Stu Alt, M.D., Phoenix, AZ
Cameron C. Bangs, M.D., Portland, OR
Michael Callahan, Boston, MA
Dom Carillo, Philadelphia, PA

Fred T. Darvill, M.D., Mount Vernon, WA
William Forgey, M.D., Merrillville, IN
 Philip H. Goodman, M.D., Reno, NV
 Peter Hackett, M.D., Bishop, CA
Ted Heyrick, M.D., Beavertown, PA
Steve McAlpine, M.D., Richmond Hill, GA
Bill Nelson, M.D., Philadelphia, PA
David Newhouse, M.D., Danville, CA
 Allen Steinman, M.D.
Charles E. Stewart, M.D., FACEP, Aurora, CO
R. Swor, D.O., Birmingham, MI
Robert Taber, M.D., Breckenridge, CO
Katherine Uranek, M.D., Philadelphia, PA
 James A. Wilkerson, M.D., Merced, CA
Andy Williams, M.D., Charles Town, WV
William Zwartjes, M.D., Rockport ME

Mountain Rescue Association

(the ASRC is a member of the MRA but is listed separately)

Officers

Walt Walker, President, San Jacinto, CA
 J. Hunter Holloway, Vice President, Golden, CO
 Tim Cochrane, Secretary, Vail, CO
Judy Beehler, Executive Secretary, Yakima, WA
 Ralph Holzhaus, Medical Committee Chairman, Phoenix, AZ
 Paul Williams, Long Range Planning Committee Chairman, Edmonds, WA
 Tim Cochrane, Rocky Mountain Region Chairman, Vail, CO
 Larry Novak, Idaho Region Chairman, Boise, ID
 Marvin Stafford, Arizona Region Chairman, Tucson, AZ
 J. Timothy Fives, California Region Chairman, Valencia, CA

MRA Teams

Mountain Rescue Service, North Conway, NH
 Alaska Mountain Rescue Group, Anchorage, AK
 U.S. Army Northern Warfare Training Center, Fort Greeley, AK
 Central Arizona Mountain Rescue Association, Phoenix, AZ
 Arizona Mountaineering Club Rescue Team, Phoenix, AZ
 Southern Arizona Rescue Association, Tucson, AZ
 Grand Canyon National Park Rescue Team, Grand Canyon, AZ
 Altadena Mountain Rescue Team, Altadena, CA
 Bay Area Mountain Rescue Unit, Stanford, CA
 China Lake Mountain Rescue Group, Ridgecrest, CA
 Inyo County Sheriff's Posse, Bishop, CA
 Joshua Tree National Monument SAR, 29 Palms, CA
 June Lake Mountain Rescue Team, June Lake, CA
 Los Padres Search and Rescue Team, Santa Barbara, CA
 Malibu Mountain Rescue Team, Malibu, CA
 Montrose Search and Rescue Team, Montrose, CA
 Riverside Mountain Rescue Unit, Riverside, CA
 Saddleback Search and Rescue Team, Orange, CA
 San Diego Mountain Rescue Team, San Diego, CA
 San Dimas Mountain Rescue Team, San Dimas, CA
 Sierra Madre Search and Rescue Team, Sierra Madre, CA
 Sylmar Mountain Rescue Unit, Valencia, CA
 Sequoia-Kings Canyon National Park Rescue Team, Three Rivers, CA
 Yosemite National Park Rescue Team, Yosemite National Park, CA
 North Shore Rescue Team, North Vancouver, B.C.

Central Idaho Mountain Rescue, Banks, ID
 Idaho Mountain Search and Rescue, Boise, ID
 Palouse-Clearwater Search and Rescue, Kendrick, ID
 Salt Lake County Sheriff Search and Rescue, Salt Lake City, UT
 Glacier National Park, Essex, MT
 Alpines, Hood River, OR
 Hood River Crag Rats, Hood River, OR
 Corvallis Mountain Rescue Unit, Corvallis, OR
 Portland Mountain Rescue, Portland, OR
 Alpine Rescue Team, Evergreen, CO
 Albuquerque Mountain Rescue Council, Albuquerque, NM
 El Paso County Search and Rescue, Manitou Springs, CO
 Garfield SAR, Glenwood Springs, CO
 Grand County Search and Rescue, Winter Park, CO
 Grand Teton National Park Rescue Team, Moose, WY
 Larimer County Search and Rescue, Inc., Fort Collins, CO
 Mountain Rescue Aspen, Inc., Aspen, CO
 Rocky Mountain National Park Rescue Team, Estes Park, CO
 Rocky Mountain Rescue Group, Boulder, CO
 Summit County Rescue Group, Breckenridge, CO
 Vail Mountain Rescue Group, Vail, CO
 Colorado Ground Search and Rescue, Inc., Boulder, CO
 Western State Mountain Rescue Team, Gunnison, CO
 Bellingham Mountain Rescue Council, Bellingham, WA
 Central Washington Mountain Rescue Council, Yakima, WA
 Everett Mountain Rescue Unit, Everett, WA
 Mount Rainier National Park Rescue Team, Longmire, WA
 Mountain Rescue Council--Seattle, Seattle, WA
 Olympic Mountain Rescue, Bremerton, WA
 Olympic National Park Rescue Team, Port Angeles, WA
 North Cascades National Park, Sedro Wolley, WA
 Skagit Mountain Rescue Unit, Mount Vernon, WA
 Tacoma Mountain Rescue Unit, Tacoma, WA
 Baxter State Park Mountain Rescue Team, Millinocket, ME
 Aerospace Rescue and Recovery Service (MAC), Scott Air Force Base, IL
 Pennsylvania Search and Rescue Council Affiliates
Rescue Task Force, Pennsylvania Emergency Health Services Council, Camp Hill, PA
Pennsylvania Bureau of Forestry
Pennsylvania Bureau of Parks
Greater Philadelphia Search and Rescue
Keystone Search and Rescue, Altoona, PA
Laurel Hill Nordic Ski Patrol, Pittsburgh, PA
Rescue 40 Search and Disaster Team, Koppel, PA
Search, Evacuation, And Rescue, County of Huntingdon
Somerset County Emergency Management Agency
Special Medical Rescue Team, New Florence, PA
Northeast Search and Rescue, Stroudsburg, PA
 Pennsylvania Wing, Civil Air Patrol

 Virginia Search and Rescue Council Affiliates
 Dogs East, Rockville, MD
Ralph Wilfong, EMT-P, SAR Officer, Virginia Department of Emergency Services, Richmond, VA
 Baywood Search and Rescue
 Virginia Wing, Civil Air Patrol

 National Ski Patrol System

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