PROLONGED PREHOSPITAL EMERGENCY CARE COURSE GUIDE

DEPARTMENT OF HEALTH
Office of Emergency Medical and Trauma Prevention
Education, Training and Regional Support Section
P.O. Box 47853
Olympia, WA 98504-7853
(800) 458-5281, Ext. 2

We wish to dedicate this Handbook to
Dr. William Henry.

"His tireless efforts on behalf of training programs
for prehospital wilderness medicine
will not be forgotten."

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INTRODUCTION

Purpose of the Prolonged Prehospital Emergency Care Course Guide

The Prolonged Prehospital Emergency Care Course Guide has been developed to help Search and Rescue Organizations, EMS Regions, administrators and instructors plan and implement a Prolonged Prehospital Emergency Care Course for EMS providers certified in Washington state.

This Course Guide contains necessary information for designing, developing and conducting a Prolonged Prehospital Emergency Care course, such as:

1. suggestions for course content and planning including
    a) class size
    b) scheduling of classes
    c) recommended facilities
    d) audio-visual aids
2. instructor and student prerequisites
3. guidelines for conducting the course
4. recommendations for student evaluation
5. suggestions for implementation, and
6. process for applying for course approval.

Finally, the course guide is a statement of policy that sets forth minimum standards for developing the structure and quality of Prolonged Prehospital Emergency Care Courses.

Objective of the Course Guide

The standards set forth in this course guide will be used as a guide for the development and evaluation of Prolonged Prehospital Emergency Care Courses. Washington state recognizes training in Prolonged Prehospital Emergency Care as specialized training per WAC 246-976-040. The standards of practice for First Responders, EMTs, ILS Technicians and Paramedics are based on the competency skills for each of the professions as identified in the respective Department of Transportation Curricula and as modified by the Washington State Department of Health. The Prolonged Prehospital Emergency Care Course should adhere to these standards of practice.

Curriculum Description

Instructional content of the Prolonged Prehospital Emergency Care Course should include, as a minimum, the successful completion of identified objectives which fulfill local, regional and state needs and satisfy the requirements of this curriculum section. The curriculum should be organized to provide the EMS provider with knowledge required to understand fully the special skills that are taught in this course. The course should be designed to provide the knowledge which allows the participant to arrive at decisions based on accepted medical knowledge and permits the professional growth of the EMS provider.

The program shall consist of two components: didactic lecture and practical skill stations. Learning objectives to be achieved by the EMS provider need to be included.

Course Topics/Modules

1. Introduction to Prolonged Prehospital Emergency Care
2. EMS Systems
3. First Aid Equipment And Supplies
4. Search And Rescue (SAR) Techniques
5. Survival Skills
6. Trauma Management
7. Medical Emergencies
8. Environmental Emergencies
9. Psychological Emergencies

General Educational Objectives

General educational objectives of the Prolonged Prehospital Emergency Care Course and specific objectives for the above topics can be found in the attached document entitled, CHAPTER TWENTY FOUR, FROM THE WILDERNESS MEDICAL SOCIETY, Wilderness Prehospital Emergency Care (WPHEC) Curriculum, Wilderness Medical Society Prehospital Committee, E. Otten (Chairman), W. Bowman, P. Hackett, M. Spadafora, D. Tauber*" as modified by the March 1, 1996 meeting of the Wilderness EMS Training Workgroup.*

Planning

It is recommended that the sequence of topics/modules be presented as listed. A comprehensive skill station providing an overview of the course may be presented at the beginning of the course to set a baseline for course direction. Individual skill stations may be incorporated into the lectures or conducted at the end of the course. Creativity in the design and implementation of the skill stations is encouraged.

GUIDELINES FOR DESIGNING AND DEVELOPING A PROLONGED PREHOSPITAL EMERGENCY CARE COURSE

The following pages are intended to be an opportunity for a quick review of some of the basic elements of course development. This serves as a beginning point, or a starting place and should be supple-mented with additional training and education, as well as readings from literature in education and training for EMS providers and curriculum development. These guidelines are not the "only" approach to course development.

Getting Started

1. A good first step is the review of Department of Transportation curricula for First Responders, EMT-Basics, ILS Technicians and Paramedics. These curricula will provide the standard of practice. It is anticipated that Prolonged Prehospital Emergency Care Course developers will individualize their content and processes to meet the needs of their specific region or county.
2. Review the application form included in this guide to familiarize yourself with the information that is requested.

Developing Objectives

Objectives provide the direction in which to proceed in developing the Prolonged Prehospital Emergency Care Course. They are statements of end outcomes, that is, where do we want participants to be when they finish this course? This is the first step in a competency based curriculum.

1. Course objectives are statements of capabilities or competencies that describe what the course graduates will be able to do upon completion of training. Objectives should be simply stated and measurable. In other words, an evaluator must be able to determine if the participant has accomplished a given objective. Objectives are <u>not</u> statements of what instructors will teach, but what the participants will learn!
   Example:
   > "The participant will be able to identify two methods of preventing hypothermia", or
   > The participant shall list two contraindications for CPR in a prolonged care environment".
2. The competencies defined in the DOT curricula are those which the Department of Health has defined as minimum skills and knowledge that a First Responder, EMT-Basic, ILS Technician or Paramedic must hold. Course objectives must address some or all of these.
3. Define sub-objectives (or unit objectives) for each course objective. A course objective is the broad, end outcome. Sub-objectives are the smaller steps that lead to achievement of the broader course objective.
   <u>Example course objective:</u>
   a) Identify unique wilderness illnesses or injuries not typically seen in an urban environment."
   <u>Example Sub-objectives:</u>
   a) Learn cause and effect of cold water submersion.
   b) Learn effect of lightning strikes.

Defining and Structuring Content

If a number of well defined sub-objectives have come out of the prior work, the way is mapped! The next question to be asked is "What classroom, resources and learning activities (practical skill stations) content will enable participants to reach a group of objectives?"

1. Textbooks, audiovisual aids, personal knowledge and experience of instructors, and any other resources should be reviewed to determine content that will assist participants in meeting the defined objectives. Content must include all the learning activities and information necessary for the basic level of knowledge and skills as defined in the objectives. Learning activities can include any number of adjuncts to the traditional lecture, such as role playing, small group problem solving, projects, etc., which stimulate a learning process.
2. Identify content that is best suited for the didactic or practical skill stations. Most of the content can and should be reinforced in more than one way. For example, symptoms of hypovolemic shock might be taught by lecture as well as by demonstration during the practical skill stations session.
3. Develop unit lesson plans for each topic using sub-objectives and learning activities which include readings, audio-visuals and content to meet objectives. Lesson plans need not be elaborate. They help keep the instructor focused on what learning needs to take place and are very helpful in assisting participants to understand the structure of learning expected.
4. Whenever possible, coordinate practical skill stations to closely follow the lecture. Although the realities of schedules and space considerations can make this very difficult, learning is greatly enhanced when the participant can observe and implement patient care skills as soon as possible after learning the theory and steps in the classroom setting.
5. Arrange lectures in the order to be taught and project the amount of time anticipated for classroom needs and practical skill stations.

PREREQUISITES AND RECOMMENDATIONS

Course Approval

The County Medical Program Director (MPD) and the Department of Health (DOH) shall approve course curriculum and lesson plans consistent with county patient care protocols and regional and county patient care procedures.

Curriculum Outline

A full syllabus (lesson plans for all topics) must be submitted with *the Application for Prolonged Prehospital Emergency Care Course Approval*. Sub-objectives should be arranged in outline form in the order to be taught, along with the class schedule, to form a "Curriculum Content Outline." In addition, textbooks and/or other resources used in the course need to be listed.

Participant Prerequisites

The proposed Prolonged Prehospital Emergency Care training course is intended for currently certified prehospital providers. Students taking this training should be currently involved with a search and rescue organization and be familiar with functioning in an outdoor environment.

Instructor Prerequisites

Instructors should be credentialed by Wilderness Medical Associates or the National Association of Search and Rescue (NASAR). The county MPD and DOH may also approve other instructional personnel consisting of physicians, nurses and allied health professionals knowledgeable in specific subject matter of a given lesson.

Recommended Class Size

The recommended class size should be no more than 30 - 35 participants for lectures and an instructor/participant ratio of 1:6 for the practical skill stations.

Scheduling of Classes

Scheduling of classes will depend on the need for this course. Regional and local EMSTC Councils may assist in identifying a need for the course.

Recommended Facilities

Classroom facilities should provide adequate space, lighting, comfort and privacy for effective teaching and learning. Adequate classroom resources with which to accomplish course objectives, such as chalkboard, audio-visual materials, written materials, etc., should be available. In addition, adequate resources should be provided for teaching and practice of skills and procedures before implementation of such skills with patients.

Participant Evaluations

Evaluation forms (for participants to evaluate the course) need to be developed and submitted with the course application. Other methods of evaluation are encouraged.

Course Length

There are no “set” hours required for a Prolonged Prehospital Care Course. However, the course should cover all topics specified and meet all of the objectives as identified. Student competency determines the length of instruction.

Protocol Quiz

Upon completion of the course, the participant shall take and pass the County MPD prolonged prehospital emergency care protocol quiz to the satisfaction of the MPD. At this time the MPD may issue an “EMS Specialized Training Recognition” Card for the Prolonged Prehospital Emergency Care training level.

Course Completion Documentation

Upon completion of the protocol quiz the course instructor shall submit a Course Completion Verification Form with all signatures to DOH.

APPENDIX #1

PROCESS FOR OBTAINING PROLONGED PREHOSPITAL EMERGENCY CARE COURSE APPROVAL

Contact the Office of Emergency Medical and Trauma Prevention's Education, Training and Regional Support Section to obtain the Prolonged Prehospital Emergency Care Course Guide and Application Form.

⇓

Complete the Prolonged Prehospital Emergency Care Course Application Form

⇓

Obtain necessary signatures:

- County Medical Program Director
- Local EMSTC Council Chair

⇓

Mail or fax application (per instructions in the Prolonged Prehospital Course Guide) to:

Office of Emergency Medical and Trauma Prevention
Education, Training & Regional Support Section
P.O. Box 47853
Olympia, WA 98504-7853
FAX # (206) 705-6706

⇓

This office will notify you in writing of course approval or disapproval. If disapproved, suggestions for meeting requirements for approval will be provided.

⇓

Still have questions?
Call the Education, Training & Regional Support Section at (800) 458-5281, Ext. 2.

APPLICATION
FOR

PROLONGED PREHOSPITAL EMERGENCY CARE COURSE

Training Agency_____

Mailing Address_____

Instructor_____ Phone # ( )_____

Course Developed for_____for the following level(s) of EMS providers:
Search & Rescue Organization

(Check levels that apply) _____BLS _____ILS _____ PARAMEDIC

APPROVAL SIGNATURES

This course is consistent with the needs identified in the Regional Plan and those identified by the local EMSTC Council.

_____	_____	_____
Local EMSTC Council Chair (Print/Type)	Signature	Date
_____	_____	_____
County MPD (Print/Type)	Signature	Date
_____	_____	_____
DOH/EMTP-ETRS Section (Print/Type)	Signature	Date

ENCLOSURES REQUIRED

Please attach the following PPEC Course Components:

1. Course Topics/Modules
2. Course Objectives and Sub-Objectives
3. Lesson Plans
4. Participant Evaluation Form(s)

Obtain required signatures and mail complete package to:

DEPARTMENT OF HEALTH
OFFICE OF EMERGENCY MEDICAL AND TRAUMA PREVENTION
EMS Education, Training & Regional Support Section
P.O. Box 47853
Olympia, WA 98504-7853
1 (800) 458-5281, Ext. 2.

CHAPTER TWENTY FOUR

from the
Wilderness Medical Society's
Wilderness Prehospital Emergency Care Curriculum *

A. Introduction

The following curriculum has been developed by the Wilderness Prehospital Emergency Care Committee of the Wilderness Medical Society (WMS) as a guide for the development and implementation of a course which is classified as a "Wilderness Prehospital Emergency Care (WPHEC) Curriculum". *In publishing these recommendations, the WMS does not define itself as either a certifying or licensing agency.* The contents of the proposed recommendations for this curriculum represent a consensus opinion of the WMS WPHEC Committee, which is based on the personal experiences of its members, position papers on wilderness medicine published by the WMS, and study by committee members of existing courses in WPHEC. The contents of this document have been approved by the Board of Directors of the WMS. Organizations that follow these recommendations may designate their curricula as 'in accordance with the guidelines of the WMS'. This is a model curriculum; individual sections may be used based on course needs and regional circumstances. The WMS neither approves or disapproves teaching methods, nor does it test students for knowledge or skills.

Prehospital Emergency Care (PHEC) is defined as care given a patient during the time between discovery of the illness or injury and the patient's arrival at the hospital or other emergency medical facility. It can include:

a) medical emergencies when no physician is present and the patient is in danger of imminent death;
b) illnesses or injuries where preliminary care is necessary and appropriate to stabilize the patient, avoid further injury or complications, and allow transportation to definitive medical care; and
c) illnesses or injuries that are not serious enough normally to require a physician's care.

Wilderness PHEC may be provided on several levels of complexity and sophistication depending on the training of the caregivers and the amount of equipment available. The simplest level is self-help care for recreational group members where first aid and rescue training may be at basic levels, equipment is limited, and improvisation necessary. The next level is Search and Rescue (SAR) group and organized Emergency Medical Services (EMS) care, where rescuers trained at least to the First Responder or EMT-Basic level may be available and equipment is more complex and sophisticated. The highest level is expeditionary emergency care given by ILS Technicians, paramedics, nurses or physicians in isolated areas, where personnel may be highly trained and there is less emphasis on choosing equipment based on its portability.

Wilderness Medical Society Prehospital Committee: E. Otten (Chairman), W. Bowman, P. Hackett, M. Spadafora, D. Tauber

Wilderness PHEC differs from urban PHEC in the following ways:

1) It is provided outdoors where the environment may be unfriendly and difficulties in obtaining food, water and shelter may be significant. Basic survival of both the patient and caregiver may be a major concern.
2) Definitive medical care is usually hours or days delayed because of location, bad weather, lack of transportation or lack of communication.
3) Illnesses and injuries occur which are not commonly seen in the urban environment. Examples include acute mountain sickness, deep frostbite, decompression sickness and wild animal maulings.
4) Common illnesses and injuries require different approaches. The caregivers must learn extended care so that complications and unnecessary disability can be prevented. The basic necessities of food, water, stabilization of body temperature, disposal of body wastes and psychological support must be provided for each patient.
5) Advanced medical rescue techniques such as relocation of dislocations, wound cleansing, use of prescription drugs, intravenous fluid administration, thoracostomy tube placement, endotracheal intubation, cricothyroidotomy, and indwelling urinary catheter placement may be required.
6) Urban protocols that rely upon rapid transport to a medical facility and radio communication with a control physician may be impossible to follow. Specially prepared wilderness protocols will be necessary.
7) The amount of medical and first aid equipment that can be carried by a recreational wilderness party, or even the best equipped wilderness SAR group with helicopter support, will be limited. The caregiver must learn to improvise and choose equipment based to some extent on its weight, bulk, multiple uses and likelihood of use.
8) Wilderness caregivers must be realistic about their abilities to manage serious illnesses and injuries, acknowledging that fatalities will occur in circumstances where they might not if the victim could be taken rapidly to a well-equipped hospital.
9) Certain standard urban protocols, such as the requirement that CPR be started in all cases of cardiac arrest and continued until the patient arrives at the hospital, may be unrealistic or hazardous to caregivers.

This curriculum is designed for students already trained at least to the First Responder level or equivalent. It will be useful as well for physicians, physicians' assistants and nurses. These professionals often see patients after the PHEC has already been provided, tend to be overly dependent on the type of medical equipment found in hospital and physicians' offices, and are not familiar with the objectives or techniques of WPHEC, either by virtue of training or experience.

In any course in WPHEC, sufficient time should be allocated to produce competence. In addition to didactic instruction, there should be ample 'hands-on' instruction, preferably conducted in an outdoor environment.

The general educational objectives of the curriculum are:

1. To give the student a review of basic principles of anatomy, physiology, and emergency care, emphasizing their application to and, if necessary, modification for, unique problems within a wilderness environment;
2. To give the student a review of common illnesses and injuries, emphasizing modifications of assessment and care in a wilderness environment;
3. Instruction of the student in the causes, assessment, and treatment of *unique wilderness illnesses and injuries not typically seen in an urban environment;*
4. Instruction of the student in *extended care* of the type needed in a wilderness environment before a victim can be evacuated to definitive medical care;
5. Instruction of the student in the *principles of wilderness survival, Mountain Rescue, and victim extrication, 'packaging' and transportation;*

6. To offer suggestions for contents of *wilderness emergency care kits and improvisation* of emergency medical equipment and supplies; and
7. Instruction of the student in techniques of *prevention* of wilderness injuries and illnesses.

B. EMS Systems

D. Medical-legal considerations

1. Topics: licensing, jurisdiction, liability, duty to respond, negligence, standards of care, 'Good Samaritan' laws, consent, abandonment, death, coroner's case, documentation and medical control.
2. Objective: familiarize the student with the legal environment associated with prehospital care, the importance of acting within a given scope of training, and the critical need for documentation.

E. Communications

1. Topics: techniques, radio equipment and frequencies, on-line and off-line medical control using MPD approved prolonged emergency care protocols and local/county or regional patient care procedures.
2. Objectives: to delineate the types of medical control and associated problems including the limitations of communications in a wilderness setting, and foster an understanding of the development and use of written protocols for prehospital care.

C. First Aid Equipment and Supplies

Recommended minimum for BLS personnel:

Depending on the experience and training of the Washington State certified EMS provider and as allowed by approved MPD protocols: bandages, nasal airway, splints and slings, patient-assisted antihistamines, patient-assisted epinephrine injection for allergic reactions, thermometer, rewarming pads and devices, snakebite kit, tourniquet, bag-valve-mask and traction splint.

For ALS personnel as allowed by approved MPD Protocols:

All of the above plus Anti-arrhythmics, non-narcotic analgesics, antihistamines, epinephrine injection for allergic reactions, antivenin, narcotic analgesics, corticosteroids, diuretics, endotracheal tube, indwelling urinary catheter, intravenous fluids, laryngoscope, nasogastric tube, thoracostomy tube,

D. Search and Rescue (SAR) Techniques

1. Organization

a. Topics: federal, state and local responses, National Association for Search and Rescue, planning and resources.
b. Objectives: to familiarize the student on how organizations responsible for SAR are accessed, and how they plan and coordinate a SAR.

2. Operations

a. Topics: general SAR operations, detection, patterns and techniques of search, ropes and knots, specialized equipment.
b. Objectives: to familiarize the student with the SAR field situations and operation, including personnel, equipment, supplies, and detection and search methods, teach the students how to be an effective team member and to familiarize the student with how to set up and operate radio communication equipment.

3. Disaster planning and triage

a. Topics: natural disasters, mass casualties, triage, resources, planning.
b. Objectives: to study various types of disasters, the types of casualties encountered, principles of triage, and the organization of an immediate response.

4. Mechanics of Transportation

a. Topics: medical evacuation over ground, air, water, and ice; types of vehicles; improvisation of litters; litter and patient carries; use of pack animals; constructing and managing aircraft landing zones.

b. Objectives: to familiarize the student with methods of transporting the sick and injured, teach how to improvise equipment, and explain the fundamentals of different types of medical evacuation.

5. *Unique SAR problems*
   a. Topics: cave, vertical rock, mountain, surf, whitewater, lake, ice, desert, rain forest, dive, dam, flood, mineshaft, and high wind rescues.
   b. Objectives: to familiarize the student with some of the problems associated with special environmental SAR operations in order to understand the limitations of SAR personnel and equipment.
6. *Environmental hazards*
   a. Topics: high altitude, weather (wind, precipitation, temperature extremes, lightning), ice, avalanche, earthquake, wildfire, volcanic eruption, wild animals (dangerous, poisonous, venomous), poisonous plants and mushrooms, flood, hazardous whitewater, and ocean currents and tides.
   b. Objectives: to familiarize the student with natural environmental hazards both relating to them as a rescuer and to the patient.

E. Survival Skills

1. *Topics:* Priorities, self rescue, personal survival kit, clothing selection, shelter and fire building, water disinfection, food gathering, signaling, celestial and compass navigation, and cold weather, desert, sea, and tropic survival.
2. *Objectives:* As the care provider learn the basics of survival training in diverse environments, including immediate actions necessary for basic survival, protection of a victim, planning for relocation, and acquiring additional resources.
3. *Supplies:* Delineation of minimum personal survival supplies and equipment that should vary depending on 24 or 48 hour rule. (for Example see Appendix A)

F. Trauma Management

1. *Assessment*
   a. Topics: Initial assessment, focused history and physical exam, mechanisms of injury, resuscitation, airway management, impalement, shock, burns, bleeding control, bandaging, splinting, detailed physical exam and ongoing assessment, and pain control per MPD protocols.
   b. Objectives: to learn the standard approach to the trauma victim based on PRE-HOSPITAL TRAUMA LIFE SUPPORT (PHTLS) guidelines, with enhanced consideration of principles of shock prevention and treatment, care of burn wounds, basic wound care and bandaging, splinting, prevention and treatment of infection, and use of prehospital analgesics.
2. *Orthopedic*
   a. Topics: anatomy, fractures, dislocations, amputations, compartment syndrome, splinting, splints, slings, litter carries, improvisation and relocation of shoulder and digit dislocations as allowed by MPD protocols.
   b. Objectives: to learn the relevant anatomy of the bones and joints, the mechanisms associated with common fractures and dislocations, and management of injuries to include relocation of shoulder and digit dislocations (by paramedics as per MPD protocols), splinting, pain control (by paramedics as per MPD protocols), and identification of complications.
3. *Neurologic*
   a. Topics: anatomy, head injury, intracranial hemorrhage, concussion, increased intracranial pressure, coma, skull fracture, seizure, spinal cord injury, cervical spine immobilization, and central and peripheral neurologic exam.
   b. Objectives: to learn the basic anatomy of the brain and spinal cord, identification of common injuries, a method for a pertinent and simplified neurologic exam, and treatment of head injuries, spinal cord injuries, increased intracranial pressure and spinal cord injuries.

4. *Eye, ear, nose and throat*
    a. Topics: anatomy, occluded airway, eye protection, ocular foreign body, corneal abrasion, eye infections, snow blindness, eye patching, intraocular injuries, epistaxis, facial fractures, tooth avulsion, toothache, mandible dislocation, laryngeal injury, ear infections, sinus infections, pharyngitis and perforated tympanic membrane.
    b. Objectives: to learn the basic anatomy of the eyes, ears, nose and throat; common eye injuries and the proper technique for patching an eye; control of epistaxis and identification and remediation of life-threatening airway problems.
5. *Chest*
    a. Topics: anatomy, pneumothorax, tension, pneumothorax, rib fractures, flail chest, pulmonary contusion, sucking chest wound, pericardial tamponade, heart and great vessel injury, tracheal injury, esophageal foreign body, and needle thoracostomy as per MPD protocols.
    b. Objectives: to learn the basic anatomy of the thorax and its contents; identification of common injuries; and treatment for manageable intrathoracic injuries.
6. *Abdomen/pelvis*
    a. Topics: anatomy, intra-abdominal injuries, pelvic fractures, straddle injuries, urinary retention, use of pneumatic anti-shock garment.
    b. Objectives: to learn the basic anatomy of the abdomen and pelvis; identification of intra-abdominal injury; treatment for evisceration of abdominal contents, urinary retention as per MPD protocols and pelvic and genital injuries.
7. *Special trauma*
    a. Topics: the pregnant victim, the pediatric victim, blast injuries, gunshot wounds, barotrauma, asphyxiation, avalanche injuries.
    b. Objectives: to learn the unique problems associated with trauma during pregnancy; the injured child; and the mechanisms involved in ballistic injuries, blast injuries, underwater injuries, and the specific types of injuries encountered in avalanche and landslide victims

G. Medical Emergencies

1. *Cardiorespiratory*
    a. Topics: cardiac arrests, myocardial ischemia and infarction, chest pain, pulmonary edema, asthma.
    b. Objectives: to learn basic cardiorespiratory physiology; identification of the patient with cardiac arrest, pulmonary edema, myocardial infarction or ischemia, and the specific therapeutic modalities for each as per MPD protocols; evaluation and management of the patient with chest pain; guidelines for initiation, continuation, and discontinuation of CPR in the setting of a wilderness environment; evaluation and treatment of the patient with asthma by EMT-Basics, ILS technicians or paramedics with patient assisted medication as per approved MPD protocols or other reactive airway disease. per approved MPD protocols.
2. *Gastrointestinal*
    a. Topics: abdominal pain, the acute abdomen, gastrointestinal hemorrhage, nausea and vomiting, diarrhea, constipation, hemorrhoids.
    b. Objectives: to learn the basic anatomy and physiology of the gastrointestinal tract; signs and symptoms of the common causes of abdominal pain; the acute abdomen; appropriate therapeutic modalities per approved MPD protocols; the evaluation and management of gastrointestinal hemorrhage, nausea, vomiting and diarrhea; fluid and electrolyte replacement per approved MPD protocols; prevention and treatment of hemorrhoids and constipation.
3. *Genitourinary*
    a. Topics: renal colic, vaginal bleeding, pregnancy and childbirth.
    b. Objectives: to learn the basic anatomy and physiology of the genitourinary system; evaluation and pain control and management of the patient with kidney stones per

approved MPD protocols, vaginal hemorrhage and conditions related to pregnancy; emergency childbirth and problems unique to the wilderness environment.

4. *Metabolic/allergic*
   a. Topics: diabetes, hypoglycemia, ketoacidosis, allergic reactions, anaphylaxis.
   b. Objectives: to learn the immediate and long-term management of problems related to diabetes per approved MPD protocols; evaluation, management and prevention of local systemic allergic reactions and anaphylaxis per approved MPD protocols.
5. *Neurologic*
   a. Topics: headache, cerebrovascular accidents, seizures.
   b. Objectives: to learn the basic anatomy and physiology of the nervous system; evaluation and management of the patient with headache, seizures per approved MPD protocols, and cerebrovascular accident.

H. Environmental Emergencies

1. *Physical*
   a. Topics: high altitude physiology, high altitude pulmonary edema, high altitude cerebral edema, acute mountain sickness, hypothermia, cold water immersion, frostbite, near-drowning, lightning injury, heat illness, sunburn.
   b. Objectives: to learn the physiological changes that occur at various altitude levels; understand the signs and symptoms of altitude illnesses, and their prevention and treatment; the body's response to heat and cold; the signs and symptoms of hypothermia, frostbite, heat cramps, heat exhaustion, and heat stroke; prevention and treatment of disorders related to environmental temperature; treatment of near-drowning and lightning injuries; the effects of ultraviolet radiation on the skin and eyes; prevention and treatment of solar radiation-induced injuries.
2. *Plants*
   a. Topics: poisonous plants, poisonous mushrooms, plant dermatitis.
   b. Objectives: to become familiar with common poisonous plants and mushrooms; signs, symptoms, and treatment of poisoning; principles of therapy regarding contact dermatitis.
3. *Animals*
   a. Topics: venomous marine animals, arthropods, and snakes; nonvenomous animal bites and injuries; rabies; tick-borne diseases; mosquito-borne diseases; other zoonoses.
   b. Objectives: to become familiar with the common venomous animals and insects of North America, including animal identification, signs and symptoms of envenomation, and treatment modalities for bites and stings; care for nonvenomous bite wounds, recognition and treatment of common zoonoses.

I. Psychological emergencies *(This should be a very minuscule part of the training)*

1. Topics: acute psychosis, patient restraint, drug abuse, grief, depression, stress management for both the care givers as well as the patient’s or victim’s family members that may be involved in the situation.
2. Objectives: to learn the presentations of common psychological problems, including grief response, acute psychosis, post-traumatic stress disorder, and depression; problems associated with drug abuse; methods of patient restraint.

KING COUNTY SEARCH & RESCUE SAR SURVIVAL
EQUIPMENT LIST
Appendix A

DAY PACK (24 HOUR PACK)

- **MAP**
- **COMPASS**
- **MATCHES**
- **NAVIGATION KIT (SEE BELOW)**
- **FLASHLIGHT OR HEADLAMP**
- **EXTRA BATTERIES & BULB**
- **KNIFE**
- **50' TO 100' NYLON LINE**
- **WATER (1 QT)**
- **FOOD (2 LUNCHES & SNACKS)**
- **TOILET PAPER (DOUBLE WRAP)**
- **FIRST AID / EMERGENCY KIT**
- **WATER TREATMENT PILLS OR FILTER (SEE BELOW)**

FRAME PACK (48 HOUR PACK)

(ALL 24 HR ITEMS PLUS)

- **TARP (9'X12') OR TENT**
- **INSULATION PAD**
- **SLEEPING BAG (TRIPLE WRAPPED)**
- **STOVE & FUEL**
- **COOKING & EATING UTENSILS**
- **FOOD (HOT DINNER & BREAKFAST)**
- **WATER (1 QT)**
- **EXTRA CLOTHING (WRAPPED)**

CLOTHING:

(SYNTHETIC INSULATION MAY BE SUBSTITUTED FOR WOOL)

- **WOOL SOCKS**
- **WOOL PANTS**
- **WOOL SHIRT**
- **WOOL HAT**
- **WOOL GLOVES**
- **JACKET OR SWEATER**
- **BOOTS**
- **RAINGEAR**

NAVIGATION KIT:

- **360 DEGREE PROTRAGT**
- **SCALE (IN INCHES and TENTHS!**
- **PENCILS**
- **SMALL NOTE PAD ("RITE IN RAIN")**

WATER TREATMENT:

BRING WATER TREATMENT PILLS OR WATER FILTERS, DO NOT DRINK LAKE OR CREEK WATER WITHOUT TREATMENT.

"SAMPLE"

PROLONGED PREHOSPITAL EMERGENCY CARE TREATMENT PROTOCOLS FOR CHELAN COUNTY, WASHINGTON

THE FOLLOWING PROLONGED PREHOSPITAL EMERGENCY CARE TREATMENT PROTOCOLS HAVE BEEN DRAFTED TO ESTABLISH OPERATIONAL PROTOCOLS TO BE USED IN THE CONTEXT OF PROLONGED OR DELAYED TRANSPORT. THEY ARE DESIGNED TO ASSIST IN THE MANAGEMENT OF PROLONGED PREHOSPITAL EMERGENCIES, AND ARE NOT INTENDED TO REPLACE ANY EXISTING COUNTY PREHOSPITAL EMS GUIDELINES OR PROTOCOLS. RATHER, THEY ARE INTENDED TO SUPPLEMENT THE CURRENT EMS PROTOCOLS IN SPECIAL CIRCUMSTANCES WHERE, DUE TO THE REMOTE LOCATION OR EXTREME CONDITIONS, IMMEDIATE TRANSPORT TO MEDICAL FACILITIES IS NOT POSSIBLE.

Please feel free to send comments or suggestions to:

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INTRODUCTION

This document represents prehospital emergency care protocols that have been developed for use in the specialized treatment context of **delayed or prolonged transport** to definitive care.

Special problems are encountered by **wilderness search and rescue groups, back-country rangers, rural EMS squads, disaster response teams, and other EMS providers working in the context of delayed or prolonged transport to definitive care**. Although treatment principles in emergency care are generally universal, some EMS treatment protocols and techniques obviously require modification to fit special conditions. Problems occur when clinical protocols for the context of delayed or prolonged transport differ from DOT clinical protocols for the conventional EMS context of rapid transport.

The clinical treatment protocols for this program were derived from relevant and available docu-ments, such as "Wilderness Medical Society Position Statements, and from a review of the current medical literature, and the Wilderness Medical Associates protocols. As a clinical reference, this document contains clinical treatment protocols that have been determined to represent reasonable and currently acceptable procedures and techniques for clinical practice in EMS.

The scope of this document is limited to clinical treatment protocols for the specialized context of delayed or prolonged transport that might differ from conventional DOT protocols for rapid transport. The following topics are included:

- CARDIO-RESPIRATORY ARREST
- DISLOCATIONS
- SPINE INJURY
- WOUNDS

This document **does not** address clinical treatment protocols for the conventional EMS context of rapid transport that are essentially universal and require no significant modification.
It is assumed that EMS personnel will apply Prolonged Prehospital Emergency Care Treatment protocols only under the following conditions:

1. They are working in the **specialized context of delayed or prolonged** transport.
2. They have been **trained** in these modified procedures and techniques.
3. They are operating according to these patient care **treatment protocols** or standing orders that have been approved by the Chelan County MPD
4. They have been **authorized by the** Department of Health to apply these modified treatment procedures and techniques.

Note that EMS in the delayed or prolonged context does not remove the need for Medical Control, although patient care treatment protocols and standing orders may be more practical than direct voice communication.

Note also that state and local EMS agencies (not the Chelan County MPD) have the authority and responsibility to define EMS regulations and statutes**,** including state and local regulations for authorizing specialized application of modified treatment procedures and techniques in EMS. They also have the authority to define standards and criteria for specialized training.

Prolonged Prehospital Emergency Care Treatment protocols are presented in a format that allows treatment protocols or standing orders for the widest variety of possible applications. These treatment protocols are comprehensive and include a great deal of background information and explanation, this material can easily be deleted as necessary, leaving a document that is a succinct and brief summary of treatment procedure.

In some areas of clinical practice there is still no clear consensus of medical opinion. The assessment and treatment of cardiac arrest in severe hypothermia, for example, still is a subject of controversy and debate. Prolonged Prehospital Emergency Care Treatment protocols represent reasonable and currently acceptable procedures and techniques for clinical practice in EMS.

CARDIO-RESPIRATORY ARREST

THE NEED FOR EMS CLINICAL PROTOCOLS FOR DELAYED OR PROLONGED TRANSPORT

Conventional EMS standards recommend that ALS/BLS procedures, once initiated in the field, be discontinued only if:

- The patient recovers
- The patient is pronounced dead by a physician
- Rescuers are exhausted

This approach is generally appropriate for the conventional EMS context of rapid transport. These standards, however, can be impractical and even dangerous in the context of delayed or prolonged transport, especially in severe environmental conditions.

Most hospital Emergency Departments and some EMS agencies have adopted guidelines for discontinuing the prolonged use of ALS/BLS procedures. EMS protocols for the specialized context of delayed or prolonged transport need to define some reasonable criteria for discontinuing the prolonged use of ALS/BLS procedures in the field. These protocols can also provide some reasonable basis for making informed decisions in the field regarding triage and urgency of evacuation.

SUMMARY OF CLINICAL PRINCIPLES

1. Defibrillation is generally required to reverse cardiac arrest and to restore functional cardiac activity. It can be effective if applied soon after the onset of cardiac arrest. Chest compression (by current technique) does not produce enough tissue perfusion to provide effective circulatory function over long periods of time. Early defibrillation should be emphasized in the treatment of cardiac arrest in any treatment context.
2. Most medical authorities currently agree that if cardiac arrest is sustained longer than 30 minutes without even the temporary return of a spontaneous pulse (i.e. continuous ventricular fibrillation or asystole) there is no reasonable chance of normal recovery in normothermic victims, and that further applications of ALS/BLS procedures provides no benefit to the patient.
3. Although chest compression and ventilation are traditionally taught together in conventional EMS training (i.e. CPR), they actually represent two separate treatment procedures, each with its own clinical indication. It is important to remember that ventilation is a treatment procedure that can be used with chest compression if no pulse is present, or without the concurrent use of chest compression, if a pulse is present.
4. Normal recovery can and does occur after prolonged ventilation, and prolonged ventilation without chest compression is indicated if the patient has functional cardiac activity but does not have adequate spontaneous ventilation.
5. Normal recovery rarely, if ever, occurs if the cardiac arrest comes as a result of trauma.
6. Severe hypothermia causes cardiac irritability and presents the risk of induced ventricular fibrillation by application of chest compression in a patient who has functional cardiac activity with a pulse that cannot be palpated under field conditions. The use of ALS/BLS procedures in severe hypothermia is still the subject of research and debate and no consensus of medical opinion is available. Prolonged Prehospital Emergency Care Treatment protocols provide a practical approach to the patient in these difficult circumstances.

Cardiac arrest in the face of severe hypothermia will present the greatest dilemmas for the rescuers. Under these circumstances there are reports of survival and complete recovery following prolonged deep cold exposure and cardiac arrest. Should the victim be found in a cold environment with any signs of life such as particularly shallow respirations or very slow pulse then resuscitation efforts such as CPR should not be instituted as they may cause the patient to go into ventricular fibrillation. Careful transport of these patients to the nearest facility where they may be rewarmed should be undertaken. Should the patient be found with no signs of life and a reasonable extrication period then CPR should be performed. There have been suggestions that the rate of compressions be slower because the patient is in a state where less oxygen is necessary. Given the fact that conventional CPR provides only about 10 to 15 percent of the normal cardiac output, there is no reason for slowing the compression cycle. THE RESPIRATORY RATE SHOULD BE SLOWED TO PREVENT SEVERE ALKALOSIS.

If the extrication is going to be prolonged or the continuing CPR in these patients puts the rescuer at significant danger then resuscitative efforts should be suspended.

In circumstances where electrocution or lightning causes cardiac arrest, standard CPR should be employed. The patient may benefit from precordial thumps. Early and aggressive CPR should be employed with hopes of reinstating cardiac rhythm and spontaneous ventilation. Should precordial thumps and early CPR not revive the patient in 30 minutes, then there is little or no likelihood that continuing CPR is of benefit to the patient. Under these circumstances, particularly when extrication and CPR is going to be prolonged, these efforts may be discontinued. Clearly those victims of ischemic cardiac arrest, traumatic arrest or submersion are not likely to benefit from CPR. There are circumstances where prolonged CPR has been successful in patients with severe hypothermia. Any efforts at prolonged CPR in patients other than those who are severely hypothermic will be futile and should not be encouraged, particularly if the health and safety of any of the rescuers might be placed at risk.

NORMOTHERMIC PATIENTS

DEFINITIONS

1. Cardiac arrest - the absence of functional cardiac activity. The most common cause is a sudden cardiac dysrhythmia - usually fibrillation or asystole.
2. Respiratory arrest - the absence of effective spontaneous respiration.
3. Patients with core temperatures over 90 F (including mild hypothermia) are managed the same as normothermics regarding cardio-respiratory arrest.

ASSESSMENT

1. Cardiac arrest is determined in the field by the absence of a spontaneous pulse palpated at the carotid artery. It can also be determined by the presence of ventricular fibrillation or asystole on a cardiac monitor.
2. Respiratory arrest is determined in the field by the absence of effective spontaneous respiration.
3. Core temperature is determined in the field by the use of a thermometer by clinical signs, or circumstances.

TREATMENT

1. Initiate ALS/BLS procedures according to conventional EMS standards for rapid transport.
2. If cardiac arrest is sustained longer than 30 minutes without even the temporary return of a spontaneous pulse, chest compression and ventilation can be discontinued in normothermic patients.
3. If cardiac arrest is sustained longer than 30 minutes without even the temporary return of a spontaneous pulse, defibrillation and ALS medications can be discontinued in normothermic patients.
4. If a pulse or any other sign of functional cardiac activity is present, ventilation should be continued as long as possible even, during prolonged transport.
5. If severe trauma is evident by history or exam and there are no signs of life after establishing an airway and ventilation, or signs of life are lost during treatment and transport, CPR or other ALS techniques are of no benefit to the patient and should be withheld.

SEVERELY HYPOTHERMIC PATIENTS

DEFINITIONS

1. Severe hypothermia - core temperature below 90° F(32° C). Core is determined in the field by the use of a thermometer by clinical signs, or circumstances.
2. Cardiac arrest - the absence of functional cardiac activity. The most common cause is a sudden cardiac dysrhythmia - usually ventricular fibrillation or asystole.
3. Respiratory arrest - the absence of effective spontaneous respiration.

GENERAL PRINCIPLES

1. Respiratory arrest can occur with or without cardiac arrest.
2. Ventilation can provide effective respiratory function over long periods of time. Prolonged ventilation without chest compression is indicated if the patient has functional cardiac activity but does not have effective spontaneous ventilation.
3. Hypothermia ("metabolic icebox") provides some temporary protection from the effects of cardio-respiratory arrest and prolongs the possibility of normal recovery with or without the use of BLS/ALS treatment procedures. The duration of this protective effect is unknown **and treatment procedures in the field should not cause significant delay in evacuation to definitive rewarming and effective resuscitation.**
4. Because of the protective effect of severe hypothermia, **resuscitation efforts are not discontinued according to the same time criteria used for normothermic patients.**
5. Severe hypothermia causes cardiac irritability. Physical stimuli (includes jostling, exercise, chest compression) can cause ventricular fibrillation in a cold heart that is functioning effectively.
6. Because the severely hypothermic heart is irritable and ventricular fibrillation can be induced by physical stimuli, it is important to accurately determine that functional cardiac activity is absent before beginning chest compression. In severe hypothermia, functional cardiac activity can be present but the pulse might not be palpable under field conditions:
   - Pulse rate can be very slow and pulse pressure is usually reduced in severe hypothermia.
   - Environmental conditions can make even a strong pulse difficult to feel.
7. Cardiac tissue in severe hypothermia is resistant to defibrillation and anti-dysrhythmia medications. Use of anti-dysrhythmia agents before rewarming can cause significant accumulation which can have toxic effects when the victim is rewarmed. These procedures can be harmful and are generally withheld until core temperature has been raised to 86° F.
8. Cold water submersion may be protective if the patient is cooled in the water prior to submersion. Because of the body mass of the adult, no protection is provided if the victim is quickly, totally submerged and drowns. Under these circumstances the patient may be considered a "normothermic" cardiopulmonary arrest secondary to drowning even though the body, when recovered, is "cold." Children cool more quickly and may be protected even in a rapid submersion.

ASSESSMENT

In order to avoid the possibility of causing ventricular fibrillation in a cold but functioning heart, **take 1-2 minutes to feel for the presence of a carotid pulse**. If no other clinical signs of life are present, the absence of a palpable pulse indicates the absence of functional cardiac activity.

If a pulse is not palpable in the field, functional cardiac activity is always considered to be present in the severely hypothermic patient if any of the following clinical signs of life are present:

- Spontaneous ventilation
- Response to positive pressure ventilation
- Any spontaneous movement or sound
- Organized rhythm on cardiac monitor
- Audible heartbeat on auscultation

TREATMENT

BLS/ALS procedures in the field have no significant positive effect on normal recovery and should not be initiated in the field if:

- Core temperature is less than 60° F(15°C)
- Chest is frozen or non-compliant
- Victim has been submerged for more than 1 hour
- Obvious lethal injury is present
- These procedures significantly delay evacuation to controlled rewarming
- These procedures put rescuers at risk

Ventilation is generally safe and can be effective even for prolonged time. Use oxygen, heat, and humidity as possible. Indications for the use of endotracheal and nasotracheal intubation are generally the same whether the patient is normothermic or hypothermic, although insertion can be more difficult in the hypothermic patient.

Chest compression should be done in severe hypothermia if functional cardiac activity is absent.

Defibrillation and anti-dysrhythmia medications should not be used unless core temperature has been raised to 86° F (30° C *).*

BLS/ALS procedures should be discontinued in the field if:

- Rescuers are exhausted or these procedures put rescuers at risk
- These procedures significantly delay evacuation to controlled rewarming. It is possible that ALS/BLS procedures can be effective in severe hypothermia even if they can only be used intermittently during evacuation. These procedures can be discontinued during a technically difficult or dangerous phase of an evacuation, and restarted when evacuation conditions permit.

Use of ventilation is appropriate if it does not significantly delay transport to rewarming. Ventilation rates must be slowed because the patient is not producing as much $C0_2$. "Normal" tidal Volumes 800-1000 cc and ventilation rates (14-16 breaths per minute) may produce a severe respiratory alkalosis. Ventilate at 7-8 breaths/minute and 800 cc tidal volume to minimize the effect.

DISLOCATIONS - GENERAL

DEFINITIONS

1. Direct injury - dislocation is caused by force applied directly to the joint.
2. Indirect injury - dislocation is caused by lever or torque force applied at a distance from the joint.
3. Simple dislocation - indirect injury to:
   - Shoulder
   - Patella
   - Digits

GENERAL PRINCIPLES

1. **In any treatment context**, an attempt to reposition or reduce any dislocated joint into anatomical position should be made if distal circulation is impaired.
2. An attempt to reduce a simple dislocation into anatomical position should be made if transport time to definitive care is delayed or **prolonged greater than 2 hours, even if distal circulation is normal.**
3. Attempt reduction as soon as possible after injury. Muscle spasm increases over time, and reduction is more difficult the longer the joint remains dislocated.
4. Check circulation and nerve function before and after any manipulation of any injured bone or joint.
5. Specific assessment of simple dislocations is described under specific dislocations.
6. Reduction of simple dislocations is generally performed by applying firm and steady traction and then moving the injured joint into normal anatomical position. Specific techniques are described under specific dislocations.
7. Discontinue an attempt at reduction if:
   - Pain is significantly increased by manipulation
   - Resistance to movement is encountered
   - Crepitus is felt by practitioner or patient

   In these cases, a fracture should be suspected and the joint should be immobilized as comfortably as possible in the position of injury for transport.

DISLOCATION - SHOULDER

GENERAL PRINCIPLES

1. Simple anterior dislocations generally occur when the arm is in the position of 90° abduction and full external rotation ("throwing a baseball"). Posterior force (from a fall, moving water, etc.) at the lower arm or elbow causes a levering action which dislocates the head of the humerus anteriorly out of the glenoid.
2. Recurrent anterior dislocations are common because the anterior joint capsule is weakened.
3. Associated injury to axillary nerve and brachial plexus is common. Although it does not change treatment, this injury should be documented prior to relocation.
4. Fractures that occur with simple anterior dislocations are generally minor and do not change treatment procedure, or alter the necessity to reduce the dislocation.
5. Posterior dislocations are uncommon, but may occur with seizures or with an indirect force applied to the humeral head. Posterior dislocations are generally treated the same in the field as anterior dislocations.

ASSESSMENT

Mechanism of injury is consistent with simple dislocation:

1. Patients commonly describe the injury accurately as a "dislocated shoulder."
2. History of recurrent dislocation is common.
3. Patient is unable to reach their hand across to touch the uninjured shoulder.
4. The injured shoulder generally shows a typical "hollow spot" deformity under the acromion that is not present on the uninjured side.
5. Check and document status of peripheral nerves before and after treatment. Check the brachial plexus by testing motor/sensory function in both hands. Check the axillary nerve function by testing sensory function over the deltoid muscle.

TREATMENT

1. Check and document distal circulation and sensation.
2. If definitive care will be delayed more than two hours, make an attempt to reduce the dislocation using one of the following methods:
   - Traction and external rotation
   - Simple hanging traction

PROCEDURES:

Traction and external rotation:

- Apply light, gentle and steady traction along the axis of the humerus. If done correctly, this should cause a significant reduction in pain.
- While maintaining firm, gentle and steady traction, guide the patient into a comfortable supine position.

1. Guide the arm first into a position of about 90 degrees abduction, and then into a position of full external rotation ("throwing a baseball"). Maintain firm, gentle and steady traction during this movement.
2. Positioning of the arm should cause no significant increase in pain, and will generally reduce pain if done correctly. Movement must be gradual and slow as positioning often takes up to 15 minutes. Movement that is too fast or unsteady results in muscle spasm and pain. The pain of muscle spasm is relieved by discontinuing movement and holding the joint in position using firm, gentle and steady traction.
3. When the position of 90 degrees abduction and full external rotation has been attained ("throwing a baseball"), hold the arm in that position and maintain firm, gentle and steady

traction to relieve muscle spasm.

4. When the joint is in the correct position and muscle spasm is effectively relieved, the dislocation will generally reduce spontaneously within 15 minutes. Joint reduction will usually be felt by both the patient and the rescuer.
5. If reduction does not occur, guide the arm into more abduction (up to 120 degrees = "high baseball" position). Continue firm, gentle and steady traction and wait at least 15 minutes for spontaneous reduction.
6. Note that strong traction/counter-traction is not used in this method of reduction. Note also that there is no need to lever the joint into position by force or to apply pressure in the axilla with the rescuer's foot.
7. After reduction (or to check for reduction), first adduct the arm by bringing the elbow to the patient's side, and then internally rotate the arm. Free movement without increased pain indicates that the dislocation probably has been successfully reduced.
8. Recheck and document distal circulation and status of peripheral nerves.
9. Sling and swathe for immobilization.
10. Immobilize as comfortably as possible in the position of injury and transport if the attempt at reduction is unsuccessful or if:
    - Pain is significantly increased by manipulation
    - Resistance to positioning is encountered
    - Crepitus is felt by patient or practitioner

ALTERNATE METHOD (SIMPLE HANGING TRACTION:

1. Apply firm, gentle and steady traction along the axis of the humerus. If done correctly, this should cause a significant reduction in pain.
2. While maintaining firm, gentle and steady traction, guide the patient to a comfortable prone (lying on their stomach) position with the injured arm hanging down freely over the edge of a supporting surface (table, flat rock, etc.).
3. The axilla should be at the edge of the supporting surface and should be protected by padding.
4. Stabilize the patient on the supporting surface to prevent falling.
5. As the weight of the hanging arm relieves muscle spasm and pain, spontaneous reduction often occurs.
6. Reduction generally occurs sooner if weight is added to the hanging arm. About 10-15 pounds is generally sufficient. Weight should be taped or strapped to patient's arm (having the patient hold the weight increases muscle tone and prevents reduction).
7. Spontaneous reduction is clearly felt by the patient. Reduction by this method may take at least 60 minutes.
8. After reduction, roll the patient onto their back, keeping the injured arm close to the trunk during movement.
9. Recheck and document distal circulation and status of peripheral nerves.
10. Sling and swathe for immobilization.
11. Immobilize as comfortably as possible in the position of injury and transport if the attempt at reduction is unsuccessful or if:
    - Pain is significantly increased by manipulation
    - Resistance to positioning is encountered
    - Crepitus is felt by patient or practitioner

DISLOCATION - PATELLA

GENERAL PRINCIPLES

1. Simple lateral dislocations occur when a knee that is partially flexed has valgus stress applied, and the knee is then forcibly extended (e.g. gymnastics, dancing, etc.). The patella and patellar tendon almost always dislocate laterally, much like a cable slips off a pulley (which is the actual mechanism here.)
2. Recurrent dislocations are common because the medial patellar tendon stabilizers are weakened.
3. Concurrent injury to adjacent nerves and vessels is rare.

ASSESSMENT

1. Mechanism of injury is consistent with simple dislocation.
2. Patients commonly describe the injury accurately as a "dislocated kneecap."
3. History of recurrent dislocation is common.
4. Early exam (before swelling) clearly shows the patella dislocated laterally. The patella is not located over the anterior knee as in the opposite knee.
5. The patient typically has severe pain.

TREATMENT

1. Check and document distal circulation and any associated injury to peripheral nerves.
2. If definitive care will be delayed more than 1 hour , make an attempt to reduce the dislocation.
3. Loosen the patellar tendon by flexing the hip and straightening the knee.
4. At the same time that the hip is being flexed and the knee straightened (i.e. in the same motion), gently push the patella medially back into normal anatomic position.
5. Recheck and document distal circulation and status of peripheral nerves.
6. Immobilize the leg in full extension. Immobilize as comfortably as possible in the position of injury and transport if the attempt at reduction is unsuccessful or if:
    - Pain is significantly increased by manipulation.
    - Resistance to positioning is encountered.
    - Crepitus is felt by the patient or practitioner

FINGER AND TOE INJURIES

SUMMARY OF CLINICAL PRINCIPLES

1. Isolated finger and toe injuries are painful but usually easily managed.
2. There few complications from simple management techniques.
3. A hand which is non-functional because of an injury can be treated quickly and stabilized permitting almost normal function.

ASSESSMENT

1. A fracture or dislocation of a finger or a toe is angulated or rotated and most painful at one isolated point.
2. Initially there will be little swelling.
3. There is limited range of motion.

TREATMENT

1. Wrap the injured digit with gauze so that you can get a firm grip without slipping.
2. Apply firm traction
3. Gently move the injured digit into alignment with the adjacent digit.
4. If the injured digit will not easily align with the adjacent digit you must apply firm traction, gently hyper-extend the injured area, and apply firm pressure with your thumb just distal to the injured area. Now, continuing to apply firm traction you should be able to realign the injured digit with the adjacent digit.
5. You and the patient will probably feel a gentle pop as the injury is reduced.
6. Buddy tape the injured digit to the adjacent digit.
7. Check the neuro-vascular status. If impaired you must try to repeat #4.
8. The patient can then be allowed to use their extremity as much as pain allows.
9. If the reduction is unsuccessful splint the injury in the position of comfort.

SPINE INJURY

DEFINITIONS

1. Positive mechanism - mechanism of injury with a reasonable potential to cause an unstable injury to the spine. Positive mechanisms include:
   - Fall from a significant height
   - High-impact motor vehicle accidents
   - High-impact explosions/blast injuries
   - Direct blunt or penetrating injuries near the spine
   - Other high-velocity/high-impact injuries
2. Negative mechanism - mechanism of injury with no reasonable potential unstable spine injury. Negative mechanism generally include:
   - Forces or impacts that are known to be very minor
   - Forces or impacts that are known to involve only specific and limited areas of the body and do not include the head, neck, or back
3. Positive exam
   - Spine pain
   - Spine tenderness
   - Abnormal motor or sensory function
4. Negative exam
   - No spine pain
   - No spine tenderness
   - Normal motor and sensory function
5. Reliable exam - patient meets all of the following criteria:
   - Calm
   - Cooperative
   - Sober
   - Alert
6. Unreliable exam - possible causes includes:
   - Brain injury
   - Intoxication
   - Severe multi-system injuries or severe distracting injury
   - Severely altered mental status or reduced level of consciousness
   - Acute Stress Reaction (ASR) and "pain-masking" that generally occurs during the initial phase of severe trauma
7. Positive spine injury - spine injury is assumed to be present
8. Negative injury - spine injury is assumed to be absent

SUMMARY OF CLINICAL PRINCIPLES

1. Because "positive mechanism" for spine injury is by necessity, a vague term, emphasis in field assessment has been placed on clinical criteria. The evidence available in the current medical literature concludes that specific clinical criteria provide safe, accurate and dependable assessment of possible unstable spine injury when the trauma victim is calm, cooperative, sober and alert. These clinical criteria can also be applied to the great number of trauma patients with uncertain or nonspecific mechanisms of injury.
2. Pain response is often abnormal in victims of significant trauma during the time period immediately following injury. Fear, confusion, and multiple or distracting injuries often result in an acute autonomic type of stress reaction (Acute Stress Reaction) and a variable period of "pain-masking." For this reason, all victims of severe trauma who have a "positive mechanism" for spine injury should generally be treated with full spine immobilization during the initial phase of patient management. In the conventional EMS context of rapid transport, these patients can quickly and safely be transported to hospital facilities for further assessment.
3. Extended patient management during delayed or prolonged transport provides the opportunity for repeated examination of the injured patient over a period of time. With the progression of time, the patient exam can become reliable as the patient becomes more alert and response to pain becomes reliable. Treatment can then be modified according to changes in the patient's condition.
4. If spine injury is suspected but cannot be localized or if the exam is unreliable, the entire spine should be immobilized. If spine injury can be accurately and reliably localized, the injured segment (i.e. cervical, thoracic, or lumbar) can be immobilized (applying the concept of the spine as a long bone with a joint at either end). The injured segment is splinted according to the usual splinting principles of "joint above to the joint below." Selective splinting of the injured spine is safe and effective, and provides a practical solution to the problem of patient comfort and safety during prolonged patient management.

ASSESSMENT

1. Positive (or uncertain) mechanism + positive signs or symptoms = positive spine injury
2. Positive (or uncertain) mechanism + negative exam and unreliable exam = positive spine injury
3. Positive (or uncertain) mechanism + negative exam and reliable exam = negative spine injury
4. Negative mechanism + negative exam + reliable exam = negative spine injury

TREATMENT

1. Positive spine injury - the spine should be returned to normal anatomical position and splinted in that position for transport.
2. If location of the specific site of spine injury is impossible or unreliable, splint the entire spine.
3. **If injury can be localized and is limited to a specific area of the spine** with a reliable exam splint the injured area:
    - C-spine Splint from head to pelvis. Lateral movement of the pelvis and legs can be harmful and must be avoided. Limited anterior/posterior movement of the legs at the hip is not harmful and can be necessary for patient comfort and safety during prolonged management, i.e., pillow under the knees.
    - T-spine Splint from head to pelvis. Immobilize the legs at the hip, but anterior/posterior position, i.e., pillow under the knees, can be changed for patient comfort and safety during prolonged management.
    - L-spine Splint the T-spine, pelvis and hips. Hips can be splinted in a position of comfort. C-spine can be free for patient comfort and safety during prolonged management.

WOUNDS

Conventional EMS protocols recommend that wounds be managed by control of bleeding only. Impaled objects are stabilized and transported in position. This approach is generally appropriate for the conventional EMS context of rapid transport. Wounds and impaled objects are best transported quickly to definitive treatment in a hospital.

Wounds often develop significant infection, however, unless they are cleansed early. Early treatment of high-risk wounds is especially important to control serious infection if evacuation is prolonged.

Stabilization of impaled objects can be impossible or impractical under some field conditions. Impaled objects that cannot be effectively and safely stabilized can cause significant patient packaging problems and can cause serious tissue damage during transport. This problem is magnified if transport is prolonged, especially in extreme environments during prolonged evacuation over difficult terrain.

SUMMARY OF CLINICAL PRINCIPLES

After initial bleeding is controlled, some well-established, simple and safe wound management principles can be applied in the field to help control infection.
Selected impaled objects should generally be removed in the field if:

- They are not deep or near large vessels.
- They cannot be effectively stabilized.
- The patient cannot be effectively packaged or safely transported.
- They do not penetrate the chest, abdomen, neck, or head.

The objective of field treatment is to cause the least tissue damage. Under these conditions, impaled objects should be removed only if removal is simple, safe and easy. Wound closure in the field by sutures or adhesive strips is not recommended. Wounds that do generally require evacuation to physician care for closure include:

- Cosmetic wounds.
- Wide, gaping wounds.
- Wounds that involve injury to underlying structures.

Evacuation to physician care for wound closure is based on the following principles:

1. Wounds of the distal extremities (e.g. hands, feet) are best treated by early closure (within 6 hours).
2. Wounds of the head and trunk can generally be treated by early closure (up to 24 hours)
3. Wounds that cannot be closed within the time criteria for early primary closure (and most high-risk wounds) can be treated by delayed closure on about the 4th day after injury if they are clean and without signs of infection. If evacuation for early closure is impractical or impossible the wound should be treated in the field as a high-risk wound during prolonged evacuation for delayed closure.

Field providers in special situations need treatment protocols for tetanus and rabies prevention and for the use of antibiotics that are based on well established clinical principles.

ASSESSMENT

Attention in the care of wounds should first be directed toward the assessment of internal injuries in major body cavities and injury to underlying structures in the extremities.

The effect of bleeding from multiple wounds is cumulative. Total blood loss = looses from all external bleeding + loss from internal bleeding. Assessment and management of blood loss is especially important for prolonged patient management.

Open wounds - injury that extends through the full thickness of skin.

- Lacerations
- Avulsions
- Amputations
- Puncture wounds

Shallow wounds - injury that disrupts skin but does not extend through full thickness

- Abrasions
- Minor superficial burns

High-risk wounds - wounds with high potential for infection

- Bite wounds
- Dirty or contaminated wounds
- Crushing injuries
- Badly contused areas
- Ragged wounds
- Wounds over injured bone, joint, or tendon
- Puncture wounds
- Objects remaining in the wound (sticks, rocks, gravel, etc.)

Wound infection - increased bacterial growth and increased inflammation at the wound site.

Impaled object - foreign body that extends through the skin into underlying tissues.

TREATMENT

Initial wound management in any context requires that bleeding be stopped by the use of direct pressure. Immobilization, elevation and cold compresses can also be helpful to control bleeding and pain. If bleeding is easily controlled, wounds should generally be cleansed in the field to help control infection if transport time is greater than 2 hours.

Wound closure in the field by suture or adhesive strips is not recommended as an EMS procedure. Wounds that require evacuation to physician for closure include:

- Cosmetic wounds
- Wide, gaping wounds
- Wounds that involve injury to underlying structures.

Antibacterial dressings are generally not used in routine wound treatment. They should be used, however, in the treatment of high-risk wounds and shallow wounds to help control infection if transport time is greater than 2 hours and the patient is not allergic to the medication. **Patients who are allergic to iodine, shellfish, or seafood should not receive any povidone-iodine solutions** (these are generally the brown antiseptic solutions).

1. Open wounds:
    - Stop initial bleeding according to conventional clinical treatment protocols for rapid transport.
    - Direct pressure is effective if the wound is clearly seen and steady pressure is maintained for at least 15 minutes.
    - Elevation and cold compresses can also be helpful to control initial bleeding.
    - Immobilization helps protect the newly formed clot.
    - Tourniquets can be used to control severe bleeding associated with amputations. Pressure on proximal arteries ("pressure points") is generally not effective in the control of severe bleeding. Tight bandages usually work best.
    - If bleeding is easily controlled, cleanse the wound if transport time is greater than two hours.
    - Remove foreign material.
    - Wash the skin around the wound with soap and clean water.
    - Irrigate the wound with clean water.
    - Cover the wound with a dry sterile dressing.
    - After the bleeding is controlled and the wound is dressed check for distal circulation. The dressing may need to be loosened if distal circulation is poor.
2. Shallow wounds:
    - Cleanse the wound if transport time is greater than two hours.
    - Use the procedure that is used for open wounds, but wash the wound surface directly with soap and clean water. Apply an antibacterial dressing (i.e., BACITRACIN OINTMENT) directly to the wound surface after cleansing.
    - **Do not use antibacterial dressings if the patient is allergic to the medication.**
    - Cover the wound with a dry sterile dressing.
3. High-risk wounds:
    - Stop bleeding.
    - Cleanse the wound as thoroughly as possible if transport time is greater than 2 hours.
    - Apply <u>diluted</u> 1% povidone-iodine solution directly to the wound surface after cleansing **if the patient is not allergic to the medication**.
    - Cover the wound with a povidone-iodine dressing.
    - Immobilize the wound site to help control further bleeding and infection.
    - Evacuate to physician care for definitive treatment.
4. Wound infection:
    - Remove all foreign material and pus from the wound.
    - Allow the wound to drain.
    - Cleanse the wound at least 2 times daily and apply diluted 1% povidone-iodine dressings using the same procedure that is used for high-risk wounds.
    - Apply frequent hot soaks to the wound site. 30 minute soaks done at least three times per day is optimal.
    - Immobilize the wound site to prevent spread of infection.
    - Evacuate to physician care for definitive treatment.
5. Impaled objects:
    - Impaled objects that cannot be effectively stabilized should be removed if removal is simple, safe and easy.
    - Impaled objects that prevent safe and effective patient packaging or transport

- Should be removed if removal is simple, safe and easy.
- Should not be removed if they penetrate the head, neck, chest, or abdomen.

6. Evacuation to physician care for wound closure is based on the following principles:
   - Wounds of the distal extremities (e.g. hands, feet) are best treated by early primary closure within 6 hours.
   - Wounds of the head and trunk can generally be treated by early primary closure up to 24 hours.
   - Wounds with objects that cannot be easily removed, or exposed bone, joints, tendons, etc., should be evacuated promptly.
   - Wounds that cannot be closed within the time criteria for early primary closure (and most high-risk wounds) can be treated by delayed primary closure on about the 4th day after injury.
   - If evacuation for early primary closure is Impractical or impossible, the wound should be treated in the field as a high-risk wound during prolonged evacuation for delayed primary closure.

Tetanus immunization booster should be given as soon as possible after injury, although a delay of up to 48 hours is considered safe. Evacuate to physician care for tetanus prevention according to the following principles:

- Open wound/shallow wounds
  Tetanus booster is recommended within 10 years.
- High risk wounds
  Tetanus booster is recommended within 5 years.

Evacuate to physician care for rabies prevention according to the following principles:

1. If the animal can be observed for ten days, and the animal remains healthy, no rabies immunization is required. If the animal develops clinical rabies, the patient can then begin the immunization series.
2. If the animal can be killed and the head sent for exam. Immunization is indicated if the exam is positive for rabies.
3. Immunization is generally begun if the bite is from a high-risk animal and the animal cannot be captured for observation or killed for examination. State Health Departments provide information and advice to physicians regarding risk status of the animal.
4. Rabies immunization should be given by a physician as soon as possible after a risk for rabies is identified. A period of at least several days between the bite and initial immunization is considered safe, but there should be as little delay as possible.