

## **An Introduction To The Evaluation And Management Of The Sick Or Injured Patient In Remote And Difficult (Wilderness) Environments: A Medical Student Elective**

The patient assessment, including history and physical examinations and the subsequent formulation of a reasonable problem list and treatment plan, should be the fundamental tool for evaluating sick or injured patients. Unfortunately, this skill set is too often relegated to the backseat in favor of technological diagnostic tools. The wilderness setting offers a unique opportunity to learn and practice these fundamental skills. With little else to rely on, wilderness practitioners are oftentimes forced to make important and difficult decisions based on limited technology. Our goal is to teach practical patient evaluations and treatments and focus on topics that are not routinely emphasized in medical school curricula.

This elective has three distinct teaching phases. In each, we stress history and physical examinations and discuss why certain general and specific findings occur and evolve and how to interpret them. Integrated in this will be some fundamentals of normal anatomy and physiology, pathophysiology, pharmacology and environmental topics. The phases include:

**1. Basic topics:** These will be a blend of didactic and case study presentations. The case studies will be presented by the students as an introduction, review or integration of several topics previously covered. These basic topics include three general content areas:

- a) Standard topics – includes overview look at the respiratory, circulatory, neurologic, integumentary, musculoskeletal systems and pharmacology
- b) Environmental topics – these would include thermoregulation, altitude medicine, lightning strikes, environmental toxins and submersion events.
- c) Rescue topics – these will include introductory seminars in rescue and evacuation organization and execution

**2. Practical workshops:** The workshops focus on the demonstration and practice of basic skills relevant to the areas listed above including assessments drills of patients with simulated illnesses and injuries.

**3. Integrative exercises:** These will include simulated patient encounters, including the basics of rescue decision making and treatment in potential unstable environments and where the environment is the problem or contributing to it.

This 2 week course has been run successfully in Canada for the past four years. Nearly 100 students from the Northern Ontario School of Medicine and Medical Schools at University of Calgary, McMaster University, Ottawa University, Queen's University, University of Toronto, and University of Western Ontario have taken one of these courses, coordinated through the McMaster and Ottawa programs. All or part of the elective can be conducted at a rustic area or comfortable wilderness camp.

Attached is a sample topic area, proposed schedule and list of topics with goals and objectives.

## **Sample Topic Progression**

### *Cardiovascular:*

1. Review of the practical basics
  - anatomy and physiology and relevant examination
  - important problems (focus on shock, cardiac ischemia/MI, dysrhythmias) and typical examination abnormalities
2. Treatment
  - medications, tools and procedures (compile a list)
  - limitations of the above
  - demonstration of and practicing skills
  - IV setup, pressure infusers, alternatives /infusion delivery systems
  - hemostatic control
  - CPR/AED
3. Patient assessments
  - one-on-one drills focusing on problem lists and treatment plans
  - simulated rescue focusing on problem lists and treatment plans and using relevant resuscitation and treatment tools and rescue techniques

## **Sample Class Day Schedule**

1. Patient Assessment (PAS) drills focusing on critical system problems (0800 – 0830)
2. Critical System case study presentation and class discussion (0935 – 1035)
3. Critical System “tool” review (1045 – 1200)
4. Spine case study presentation, discussion, and didactic presentation (anatomy, physiology, injuries including mechanism and syndromes) (1300 – 1335)
5. Spine assessment I (protocols, controversies in field assessment, history and physical assessment demonstration) (1340 – 1410)
6. Spine assessment II (one on one practice, PAS drills) (1415 – 1500)
7. Spine management (lifting and moving) (1510 – 1550)
8. Spine packaging (conventional, rescue and improvised tools)  
(1600 – 1700)
9. Small group PAS drills (1705 – 1735)
10. Wrap-up (1740 -1745)

## GOALS AND OBJECTIVES

### General Concepts

At the completion of this topic the participant will:

- A. Verbalize the differences between conventional and prolonged transport medicine.
- B. Define the "Wilderness Context."

### Patient Assessment System

At the completion of this topic the participant will be able to:

- A. Perform a complete patient assessment and identify problems and potential problems.

### Respiratory System

At the completion of this topic the participant will be able to:

- A. Verbalize the difference between respiratory distress and respiratory failure and initiate BLS and ALS treatment for both.
- B. Verbalize an understanding regarding what definitive care is needed and the appropriate evacuation mode.

### Allergies and Anaphylaxis

At the completion of this topic the participant will be able to:

- A. Verbalize the difference between a local allergic reaction and a systemic anaphylactic reaction.
- B. Demonstrate BLS and ALS treatment for Anaphylaxis.

### Circulatory System

At the completion of this topic the participant will be able to:

- A. Identify a patient in compensated and uncompensated shock and initiate BLS and ALS treatment.
- B. Verbalize decision-making tools for managing dysrhythmias in the remote patient care setting.

### Nervous System

At the completion of this topic the participant will be able to:

- A. Identify a patient with signs and symptoms of increasing ICP and initiate BLS and ALS treatment
- B. List the common cause for impaired mental status and level of consciousness in the wilderness context.

- C. Verbalize an understanding regarding what definitive care is needed and the appropriate evacuation mode for nervous system injuries and conditions common in a wilderness environment.

### **Advanced Life Support Skills and Tools**

At the completion of this topic the participant will be able to:

- A. Demonstrate bag mask ventilation, airway adjunct placement, suction devices, and patient positioning.
- B. Demonstrate intubation and surgical airway placement techniques.
- C. Recognize and manage problems with oxygenation and ventilation using mannequins and scenarios.
- D. Demonstrate various techniques for obtaining vascular access and verbalize concepts for managing fluid resuscitation in the wilderness context.
- E. Demonstrate advanced techniques for obtaining hemostasis.
- F. Verbalize and demonstrate techniques for managing pump failure related to traumatic and medical causes.

### **ALS Treatment for Critical System Problems in a Wilderness/Rescue Environment**

At the completion of this topic the participant will:

- A. List the more common critical system problems.
- B. Explain the limitations of commonly used treatments in a wilderness/rescue environment.
- C. List commonly used ALS medications that are most useful in a wilderness/rescue environment.

### **Trauma Management**

At the completion of this topic the participant will be able to:

- A. Verbalize examples of Mechanisms of Injury for trauma specifically related to the wilderness context and discuss management strategies.

### **Musculoskeletal Injuries and Treatment**

At the completion of this topic the participant will be able to:

- A. Identify stable vs. unstable injuries and demonstrate the treatment for both.
- B. Demonstrate various splinting techniques using different materials.
- C. Describe the difference between simple and complex dislocations.
- D. Demonstrate joint reduction techniques for simple dislocations from direct and indirect mechanisms.

## **Wounds and Burn Injury Management**

At the completion of this topic the participant will be able to:

- A. Verbalize how to evaluate wounds, determine high risk wounds and recognize signs and symptoms of infections.
- B. Demonstrate wound cleansing, debridement and hematoma block on a pig's foot.

## **Spine Management**

At the completion of this topic the participant will be able to:

- A. Demonstrate spine evaluation and make a decision to "clear" or not to "clear" a spine for injury.
- B. Verbalize BLS and ALS treatment for spine injuries.
- C. Explain the rationale behind spinal injury assessments in the field.

## **Lifting, Moving and Extrication**

At the completion of this topic the participant will be able to:

- A. Demonstrate moving patients from difficult positions to a supine position as a single rescuer.
- B. Demonstrate moving patients from difficult positions to a supine position as a team of rescuers.

## **Thermoregulation and Frostbite**

At the completion of this topic the participant will be able to:

- A. Identify patients that are mildly and severely hypothermic during a PAS drill and initiate treatment.
- B. Describe the pre-treatment appearance of different degrees of frostbite and discuss the treatment and potential complications.

## **Patient Packaging / Hypothermia Wrap / Patient Carries and Litters**

At the completion of this topic the participant will be able to:

- A. Demonstrate various techniques for packaging and transporting patients in the wilderness context.

## **Lightning Injuries**

At the completion of this topic the participant will be able to:

- A. Verbalize what injuries can be associated with a lightning strike and what the BLS / ALS treatment would be.
- B. Verbalize the difference in triage for a patient in respiratory and/or cardiac arrest related to a lightning strike.
- C. Verbalize preventive strategies.

### **Drowning and Near Drowning**

At the completion of this topic the participant will be able to:

- A. Verbalize what the injuries can be associated with a near drowning incident and what BLS and ALS treatment would be.
- B. Explain the limitations of CPR in a submersion victim in regard to submersion time.

### **Altitude Illness**

At the completion of this topic the participant will be able to:

- A. Verbalize the basic pathophysiology that underlies all altitude illnesses.
- B. Differentiate mild, moderate and severe altitude illness.
- C. Verbalize BLS and ALS treatments for each.

### **Medical Aspects of Avalanche Rescue**

At the completion of this topic the participant will be able to:

- A. Verbalize common causes of injury and death.
- B. Explain the priorities for treatment and resuscitation.

### **Backcountry Rescue**

At the completion of this topic the participant will be able to:

- A. Verbalize the basic principles of search and rescue.
- B. Explain and demonstrate correct use of radios for communications.

### **Diving**

At the completion of this topic the participant will be able to:

- A. Verbalize the basic pathophysiology of decompression sickness and over pressure syndromes.
- B. Verbalize BLS and ALS treatment of each.

### **Wilderness Toxins**

At the completion of this topic the participant will be able to:

- A. Name and describe the two major categories of wilderness toxins.
- B. Verbalize the characteristics and BLS and ALS for common wilderness envenomations, bites and stings.

### **Arthropod Vectors**

At the completion of this topic the participant will be able to:

- A. Name the common arthropod vectors found in North America and describe some common illness and how to treat them.
- B. Verbalize some preventive strategies.

### **Backcountry Medicine**

At the completion of this topic the participant will be able to:

- A. Correctly identify and treat various general medical problems related to the following systems, GI/GU, ENT, Endocrine, pain management, water purification, and infectious diseases.
- B. Formulate the components of an appropriate first kit/medical rescue kit including prescription medications and various bandaging materials and tools.

### **Medical Legal considerations**

At the completion of this topic the participant will:

- A. Verbalize the differences between “duty to act” and “standard of care” and the legal implications associated with providing care in the wilderness/rescue context.
- B. List the six wilderness protocols included in this course that are considered an expanded scope of practice for some health care providers.