



# **A Short Course In Wilderness, Remote, & Expedition Medicine Concepts**

## **Lesson 1: The Remote Medicine Paradigm**

**GMRS, Ltd.**

**Global Medical Rescue Services**

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*Wilderness, Expedition, & Remote Medicine, Rescue, & Survival*

Global Medical Rescue Services, Ltd. is an international firm based in Belize, Central America. We specialize in the provision of medical, rescue, and survival training and services for extremely remote and difficult environments.

Various aspects of wilderness, remote, expedition, operational, military, humanitarian, disaster, international, and industrial medicine all come into play. Each discipline has information, insight, and experiences that are of benefit to all.

The purpose of this short course is to serve as an introduction to a few of the common aspects and issues that are frequently encountered. Indeed, several of the 8 lessons in the program are directly derived from our teachings, as they are sources of frequent questions and problems for providers.

Our goal is to give you a resource that will be of value to you. Some of you will be familiar with some, perhaps even all of this material. If so, pass it on to others. This program is being distributed to you 'unlocked' so that you may copy, cut, and otherwise pass it around as you desire.

All we ask is that you leave the attributions and authorship statements in place, so that others may contact us if they desire.

The course consists of 7 lessons, which will be sent to you every few days:

- Lesson #1: The Remote Medicine Paradigm
- Lesson #2: Remote Leadership & Followership
- Lesson #3: Physician Medical Direction for Remote Medical Providers
- Lesson #4: Remote Medical Guidelines, & Standard Operating Procedures
- Lesson #5: United States Evacuation Protocols
- Lesson #6: United Kingdom & United Nations Evacuation Protocols
- Lesson #7: International Travel As A Medical Provider & Medical Team

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## **Lesson 1: The Remote Medicine Paradigm**

## The Remote Medicine Paradigm

Remote medicine is different from first world medical care, everyone would agree with that. But those without significant remote care experience often fail to appreciate just how different it can be. A paradigm is a set of assumptions, concepts, values, and practices that constitutes a worldview.

The remote medicine paradigm is a worldview that embraces rather than struggles with the differences in medical care between the first world and the wilderness, expedition, and austere settings we operate in.

As a professional medical care provider, you have some appreciation for the differences. Isolation, various limitations, and unusual problems all contribute to making remote medical care a “different breed of cat.” We’ll look at these differences in detail, and others as well in this chapter.

We’ll also discuss the “10 Commandments” of remote medical care, and the most valuable knowledge, skills, and experiences you need to have to provide excellent remote medical care. Finally, we will summarize these points and conclude with our take on what you must do – learn – practice to provide excellent care in a remote setting.

We should also point out to you that you need to have a complete understanding of the differences between traditional medical care and remote medical care, not only to be able to provide it, but also to understand and anticipate the needs and reactions of others.

Supervisors, team leaders, supply personnel, tertiary care specialists, and patients themselves often have no prior experience in a wilderness, expedition, remote, or disaster setting. This can lead to frustration and confusion on their part, as they do not understand why things are not being done as they expect – as they have seen on TV, or according to “the book.”

As a trained and certified remote medical care professional, it will be your job not only to care for patients, but also to be able to help them, your teammates, and your supervisors understand the requirements and limitations of providing effective medical care in the remote setting.

There are many factors that differentiate remote medical care from its traditional counterpart. Can you name some? Factors like isolation, limitations on abilities, problems not commonly encountered in routine care, and prolonged care under difficult, resource limited circumstances come to mind. Let’s examine each in turn.

## How Remote Medical Care Is Different

### Isolation

Be it remote, expedition, far forward, wilderness, or disaster medical care, isolation in one form or another is a nearly universal factor. The isolation can take several, often multiple forms:

You may be isolated by **physical distance**. If you have 100 kilometers to travel, even with a vehicle, that will require a certain amount of time to cover that distance.

You may be isolated by **travel time**. The actual distance may not be great, but if you are on foot, it may require a significant amount of time for travel. An example of this is carrying a patient through the jungle. In that difficult environment, a standard rate of travel may be 100 meters per hour or less. Thus even short distances can require hours to travel.

You may be isolated by **geographic & functional barriers**. A fully equipped trauma center may be 100 meters away, but if it is on the other side of a flooded river, you may not have easy – or any – access to it. Confounding factors, such as road condition, weather; geographical limits such as many hills and curves; route security & the need to travel in a convoy; and other factors can all increase the time needed to cover a given distance.

You may be isolated **culturally**. In some cases you may be with a group you are familiar with and which share your language, values, references, etc. In other cases, not. You may find yourself working through translators the majority of the time. In one case in remote west Himalayan valley we had to work through 6 translators, one dialect to the next, to provide care for a villager from a very remote valley! This sort of isolation can be very stressful.

### Limitations

There are many limitations to medical care that you face in almost all remote medical situations, some obvious, some not. This can be a source of considerable frustration to inexperienced providers, who are used to being able to access resources with a word, phone, or radio call.

It can also be a source of sadness and grief, as providers play the ‘if only I had this, I could help this patient’ game. This problem has produced post-event stress, depression, and even led providers to cease providing remote medical care. It must be recognized early on and managed appropriately.

Some limitations we face include:

**Limited diagnostic capability.** You will have a very limited traditional diagnostic capability. The technology that we take for granted in urban settings, such as x-rays and MRI scanners, advanced laboratory studies, and similar aids are generally not available to medical providers in remote settings. You will need to learn excellent “bedside” examination skills as well as the use of small diagnostic tools and forgotten techniques.

**Limited therapeutic capability.** You will be limited by your therapeutic capacity as well. Surgery, critical care units, many medications, physical therapy, and most other treatments are not available. Generally, you will be limited by what you can carry with, either personally or in a vehicle.

This gives rise to an important concept: “**Imperfect solutions to impossible problems.**” By that, we mean that in the remote setting definitive care, treatments, and solutions are often not possible; and problems may simply have to be managed rather than solved. This can be a source of considerable frustration and distress to both medical providers and patients. Priorities are different in the field. It is important to understand this concept, and come to terms with it. It is truly a reality of the remote medicine paradigm.

**Limited re-supply & support.** Re-supply and support are constant concerns in remote medical care. You may have limited – or no – ability to replenish your supplies. So when something is gone, it’s gone! This will require you to decide which patients receive medications and treatments, which can be managed with alternatives, and potentially which patients receive no specific therapy at all. We’ll discuss this more in the chapter on remote triage.

**Limited personnel & assistance.** There will rarely be enough help and personnel to assist you in the remote setting. This means you must be able to plan ahead, “multi-task,” and develop the ability to provide clear bedside instructions to patients and team members, so that they can assist you as needed.

**Limited weight & volume capacity.** Finally, you will be very limited by the weight & volume of what supplies you can carry with you. Even when vehicle or building based, you will have significant limits on what you can have available to you, even if you have access to an unlimited supply chain. This will require you to be very selective in what you choose to take with you.

We call this concept the “**mass:utility ratio**” since we are really concerned with both weight and volume. Supplies and materials must be very useful, ideally have multiple uses, and be as small and light as possible. The more weight and/or volume something has, the more important it needs to be for you to consider using it in the remote setting. We suggest you ponder the implications of the mass:utility ratio when planning every aspect of your logistics.

## Atypical Problems

The remote medical setting has all of the usual “normal” medical problems seen in the first world plus all of the potential problems that living and working in a remote setting can bring plus all of the unique problems found in that geographical location! To be a medical provider in a remote setting you must master care of all three of these problem sets. In particular, you can expect to be challenged by:

**Multisystem trauma conditions.** First world trauma is often confined to isolated fractures and head injuries from falls and motor vehicle accidents, low velocity (handgun) wounds, stabbings, and similar problems. In the remote setting – because of the activities patients are participating in – patients are much more likely to experience catastrophic trauma involving multiple fracture sites and joints, high speed multiple vehicle accidents, high velocity gunshot wounds, agricultural machinery accidents, burns, and similar injuries. The setting, the nature of the patient’s activities, and the mindset of engaging in risky behaviors that perhaps a patient would not do at home all contribute to the increased trauma risk.

**Unusual environmental injuries.** Remote settings are much more likely to be exposed to heat, cold, lightening, dust, guano/dung, animal attack, and natural toxins or hazardous plant materials. An example of this is naturally occurring asbestos deposits – it would be impossible for most patients in the first world to be exposed to asbestos in the 21st century, yet some indigenous populations mine asbestos to make a white wash paint for their homes!

**Exacerbation of chronic conditions.** The stresses associated few urban people live and work in areas with endemic Malaria, Dengue, Yellow Fever and countless other infectious diseases. These however are part and parcel of everyday life in the remote setting.

**“Rare” medical illnesses.** Rare that is, in the first world. Hypothyroid related goiters, Turner’s syndrome, and countless other “weirdomas” tend to come out of the woodwork as soon as your presence becomes known.

**Prolonged care.** You may have extended access times, extrication times, and transport times. You may be responsible for caring for patients for hours, days, or indefinitely. This means that you are very likely to see the progression of an illness or injury process, physiological changes, and the impact (or lack of) of your interventions. Thus you must be familiar with the entire anticipated “natural course” of the illness or injury that you are treating, in order to judge the effectiveness of your interventions and treatments. Extended contact time with patients has additional implications. Longer care also means a greater opportunity for errors and mistakes to creep into the situation. It also means that nutrition, hydration, waste products, fatigue, and environmental factors become of greater concern, not only for the patient but for the providers as well.

## Concepts vs. Cookbooks

Another idea that we stress is “**Concepts vs. Cookbooks**” meaning that you not only need to know *what* to do for any given situation, you must understand *why* you are doing one thing and not another, *what* your treatment goals are, *where* you want the patient to finish up, and *how* you are going to get there. Understanding why, what, where, and how is critical to be able to:

- Anticipate potential complications from the patient’s condition, and complications from your interventions & treatments.

- Understand the end goals of your treatment plan, which in turn allows you to be able improvise solutions, a critical skill in the remote setting.

- Adapt to changing conditions and situations, rather than sinking when a patient “falls off” your carefully memorized treatment flow chart. Algorithms and flow charts are helpful and certainly have their place in remote medical care. BUT, you must be able to work outside and beyond them, as no algorithm or flowchart can anticipate every possible case.

We can state with complete confidence that:

**“The essence of remote medical care is  
Knowledge + Skills + Experience + Improvisation.”**

All of these elements are required, and understanding the concepts underlying these elements is the only way to be an effective medical provider in the remote setting. To be prepared, you must understand the “why” of your medical care. Strive to master all four elements, in equal measure, during your training and your life...

That being said, there certainly is a place for learning through the use of flow charts and step-by-step training... you have to crawl before you can walk. Systematic training of the sub-components of a procedure or process is the easiest way for most of learn. Then, put the pieces together.

But don’t stop there, which is what most people do. Strive for a comprehensive understanding of the critical components, so that you can use inductive reasoning to solve problems with what you have available. As a simple example, we all know that hypoglycemia – critically low blood sugar – is treated by administering sugar products. These are commonly available in paste and tablet form, which some people do not have available, and some people are afraid to administer because the patient is not awake enough to swallow. This is a foolish concern, but do you know another solution? We use ‘Pop Rocks’ type melt in your mouth candy... shelf stable forever and a reliable sugar source with little chance of aspiration...

## “The 10 Commandments: The Keys To Success In Providing Effective Remote Medical Care”

Striving to master even one of the Knowledge – Skills – Experience – Improvisation elements of the remote medical care paradigm may seem an overwhelming, perhaps even impossible task.

However, some areas are clearly of greater importance than others. We have identified these critical elements as the “10 Commandments” of effective remote medical care. These identify and prioritize the most critical Knowledge – Skills – Experience – Improvisation elements for you. Lets introduce them now :

- #1 – Leadership.
- #2 – Rapid Assessment.
- #3 – Bleeding Control.
- #4 – Airway Control.
- #5 – Neurologic Stabilization.
- #6 – Orthopedic Stabilization.
- #7 – Pain Control.
- #8 – Infection Control.
- #9 – Metabolic Control.
- #10 – Sanitation & Hygiene Control.

Simple enough, right? If only! Mastery of these ten topics is the work of years, if not a lifetime. Yet competence in all of these is the goal of our programs. Let’s briefly examine each of these 10 Commandments.

### **Commandment #1 – Leadership**

The first, most important, and most difficult commandment to learn is leadership. You manage *things*, you lead *people*. Leadership encompasses many elements, including:

- Direct leadership of your team to accomplish the goals and objectives of your remote medical care mission. Being a team leader.
- Followership, & being dedicated to doing whatever is needed. Being a team player.
- Fear & stress control in yourself, your team, and your patient. Panic kills, control of fear protects both you and your team. Stress control is obtained through both training and experience.

- Understanding the concept of the “**Risk:Benefit Equation**” and being able to apply it to say “No” when needed. Protecting the team.

- Becoming comfortable with the concept of “**Purposeful Chaos**” and maintaining composure, control, and class during extraordinarily difficult circumstances.

### **Commandment #2 – Rapid Assessment**

Our second point is that you must be able to perform rapid and accurate assessments – assessments of several things, often simultaneously. You must be able to assess, and reassess:

- **Scene safety.** This includes getting a global impression of the scene as well as seeking out clues to mechanisms of injury and illness; identifying actual and potential hazards; and identifying actual and potential resources for management of the problem.

- **Patients,** using our “TABC2D2E5T” methodology that we will teach you in our programs. In cases of multiple patients, you need to be able to triage and assign priorities.

- **Your team.** Safety. Mental & physical health status. Stress and fatigue levels. Hydration, nutrition, and waste status.

- **Yourself.** Safety. Mental and physical health status. Stress and fatigue levels. Hydration, nutrition, and waste status. Be honest with yourself, and remember Commandment #1 – Leadership – you must care for yourself so that you can care for your team.

### **Commandment #3 – Bleeding Control**

One of the most lethal problems to address in remote medical care is the ability to control massive hemorrhage. There are numerous techniques that you will learn and will be used in the field, including:

- Direct pressure and binding/packing techniques.
- Chemical hemostasis and thermal cautery techniques.
- Rational, early tourniquet use and removal techniques
- Ligation, surgical control techniques, and adjuncts.

**Commandment #4 – Airway & Breathing Control**

Potentially one of the most difficult problems in remote medical care is the ability to control massive hemorrhage. There are numerous techniques that can and should be used in the field, including:

- Nasal airways and improvised upper airway controls.
- Surgical cricothyroidotomies in low-light, confined space, and other difficult environments.
- Retrograde intubations in low-light, confined space, and other difficult environments.
- Various ‘blind’ and direct adjunct intubation measures
- Ventilation management in low-light, confined space, and other difficult environments.

**Commandment #5 – Neurologic Stabilization**

It is a particular and unique aspect of remote medicine that we must be able to rapidly and reliably diagnose patients with spine injury, especially cervical spine injury. To do this, excellent skills and specially designed protocols are needed to:

- Conduct an accurate neurologic evaluation of the patient in low-light, confined space, and other difficult environments.
- Systematically clear the patient of a possible spine injury with a high probability, thus avoiding the need for spinal immobilization.
- Reliably immobilize and manage a patient in spinal immobilization in all conditions and for extended periods of time.

**Commandment #6 – Orthopedic Stabilization**

Orthopedic injuries constitute a large percentage of the trauma conditions encountered in remote medical care. Providers must have extensive training and experience in:

- Diagnosis of fractures, dislocations, sprains, strains, and related conditions without the use of radiology studies.
- Rapid, safe, and comfortable reductions of fractures and dislocation to minimize long-term injury.
- Effective splinting and casting techniques that maximizes patient's function and the ability to care for themselves.

### **Commandment #7 – Pain Control**

This is critical. Quite apart from the comfort of our patients, pain has a significant negative impact on a patient's shock status, as well as how they may be able to be managed or evacuated, and ability to care for themselves. Several specific areas of field pain management to be mastered include:

- IV sedation & IV anesthesia.
- Regional anesthetic blocks, including dental skills.
- Use of various oral & topical medications, including prescription, non-prescription, and indigenous therapies.
- Adjunct therapies such as TENS units, iontophoresis, and electric-stimulation.
- Hypnosis, biofeedback, and related mind -body pain control modalities and techniques.

### **Commandment #8 – Infection Control**

Damaged tissues require prompt and specific treatment in the remote setting to minimize the risk of local infection and/or systemic sepsis. Excellent wound care, removal of foreign material, and debridment of non-viable tissue is needed. You will learn:

- Wound care and repair, including rotations, small grafts, flaps, and plastic surgery grade repair.
- Rational infection control, prevention, antibiotic use, & indigenous alternatives for wound care.
- Diagnosis & treatment response monitoring via remote laboratory tests.

**Commandment #9 – Metabolic Control**

The remote environment puts immense stresses on patients, above and beyond their illness or injury. Their needs must be met to provide the best care and ensure optimum possible outcomes. In particular you must be able to control the patient's:

- Fluid/hydration and electrolyte status.
- Nutrition status.
- Body temperature and thermogenesis capability.

**Commandment #10 – Sanitation & Hygiene Control**

Humans produce waste, and it must be dealt with, both to protect against medical complications and to protect the general mood and confidence of the patient. In particular, we will need to manage, eliminate, or control exposure to:

- Human waste products.
- Food preparation waste.
- Medically contaminated waste.
- Pests & vectors attracted by the above.
- Learn the preparation and disinfection of drinking and cooking water.

By using the '10 Commandments' of remote medical care you can:

- Guide your own learning efforts.
- Identify training programs with a rational approach the REAL world of remote medical care, and compare programs to ascertain if they offer what you need, rather than what it is convenient and profitable for them to teach.
- Identify equipment, pharmaceuticals, and materials that have the greatest mass:utility ratio and cost effectiveness for you program.
- Teach select elements of your Knowledge – Skills \_ experiences – Improvisation 'toolbox' to non-medical members of your team, local providers, and others with a need for basic medical care and preparedness.

## Highest Yield Knowledge, Skills, Experiences

Given the above 10 Commandments for providing excellent remote medical care, we can then identify a knowledge/skill/experience set that we must aggressively pursue. Seek out training and experience in all these and more:

- Aggressive basic life-support, patient movement & transport
- Advanced ‘bedside’ low-tech assessment
- Surgical cricothyroidotomies & retrograde intubation
- Alternate fluid administration routes & techniques
- IV anesthesia, regional blocks, & pain control
- Limited resource pharmacology
- Closed orthopedics and manual medicine
- Cervical spine injury clearance
- Trauma & shock management
- Medical & environmental emergency management
- Remote critical/extended care
- Obstetrics, pediatrics, geriatrics, podiatry, dermatology
- Dental skills
- Primary care of common conditions
- Field laboratory testing
- Water purification for teams & villages
- Infection control & wound management/repair
- Improvisational skills
- Self & team rescue skills
- Self & team survival skills

## Putting The Pieces Together: Offering Excellent Medical Care In The Remote Setting

Offering excellent medical care in the remote setting is difficult, much more difficult than in an urban environment, but entirely possible – many outstanding medics have been proving this for thousands of years – if you are willing *to do your part!*

To do this, you *must*:

- Understand that remote care is different.
- Understand what is truly important vs. what matters less in the remote setting – urban emergency department priorities may not apply!
- Understand that the way things are done in a city hospital and/or ambulance may not be the best way – or may even be dangerous to both patient and rescuer – in a remote setting.
- Understand why you are doing or not doing something.
- Be able to adapt to the situation and improvise solutions with limited resources, using the knowledge – skills – experience that you will gain through this program and frequent practice.
- Learn high yield knowledge & skills, and gain experience applying them in the real world.

When you make these principals your guides in learning and performing medical care in remote, austere, wilderness, expedition, or disaster settings you won't go wrong!

### Coming up:

In Lesson #2 we are going to discuss Remote medical Leadership and Followership skills. Both are equally important to success in the field, and medical personnel finds themselves in both roles, often simultaneously.

Be sure and add us to your 'permissions list' or 'white list' so that we arrive in your inbox without delay.

And... Stay Safe!