Facilitated by Adventure & Safety
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Wilderness and Remote First Aid

This will be a practical based 3-day course designed for individuals who will be participating in wilderness activities within hours or days of advanced medical care. This course will enable participants to have an appreciation for the realities of providing First Aid in a Wilderness/ Remote Environment. Emphasis will be on practical skills, decision making and dealing with the outdoors.

Introduction
Wilderness First Aid vs. Urban First Aid
Principle Body Systems - Balance / Homeostasis
Shock & Backcountry Management of Shock
Check, Call, Care
- Accessing E.M.S.
- Primary Survey

Obstructed Airways (Adult, Child, Infant)
CPR (Adult, Child, Infant)
CPR in the wilderness
Secondary Survey
- Assessment & SOAPing

First Aid kits and Supplies
Soft Tissue Injuries
- Wounds & Cleaning
- Burns/ Blisters

Environmental Emergencies
-Thermoregulation - Hypothermia and Hyperthermia
- Cold Related Injuries
- Water Related Injuries
- Lightning

Head and Spinal Cord Injury Management
- Immobilization and Evacuation Issues

Minor Head Injuries
- Eyes, Ears, Nose, Mouth, Dental

Musculoskeletal Injuries
- Sprains, Strains, Fractures
- Reduction and Improvised splinting

Medical Conditions
- Poisoning, Allergic reactions
- Seizures, Diabetes, Stroke
- Gastrointestinal vs. Acute Abdominal

Backcountry water disinfecting
Second Aid and Evacuation
Course Debriefing and Exam

Organization of the body's internal environment

Cell: The basic living unit of the body
75 trillion in all

Intracellular fluid: Fluid found within the cells
Two thirds of the total fluid volume
High concentrations of potassium, magnesium and phosphate ions.

Extracelluar fluid: Interstitial (Inter = between, stitial = space) and plasma makes up one third of the total fluid volume
High concentrations of sodium, chloride, nutrients, carbon dioxide.

Homeostasis
(The Mammal)

The maintenance of static or constant conditions in the internal environment of the body is **essential at all times**. The cells and tissues of the body function and survive within narrow limits of internal environmental conditions

Water: 40 litres or 2/3 of body weight
Daily intake averages 2 L per day with demand
Prolonged heavy exertion can increase the demand to over 6 L per day
Used in the metabolism of food
Main component in the blood (90%)

Oxygen: Essential for all metabolisms – 21 % available

Glucose: Principal nutrient used by all of the cells in the body

Electrolytes: Potassium, sodium, chloride, magnesium

Temperature: Narrow limits above and below 37 degrees Celsius (98.6 F)

Acid/ Base: (PH) Enzymes that control metabolism function best at 37 degrees C

Blood Press.: Blood pressure is a function of blood volume, heart rate, stoke volume, and vessel diameter.

HYDRATION: THE WIWU PRINCIPLE

by Buck Tilton©

As a developing embryo, you nestled in a watery bed and your body weight averaged around 80 percent water, an average that dropped to approximately 74 percent by birth. As an adult, you gurgle along at somewhere around 62 percent water overall, and healthy blood, the red tide of life, surges at between 85 and 90 percent water. Water puddles inside every one of your cells, and flows through the microscopic spaces between cells. In water, oxygen and nutrients float to all parts of your body, and waste products are carried away. When your kidneys remove wastes from your body, those wastes have to be dissolved in water. If your internal water level drops too low, the strain on your kidneys can be damaging.

Digestion and metabolism are water-based processes, and water is the primary lubricating element in your joints. Sweat, almost entirely water, evaporates from your skin, helping to regulate body core temperature in the heat. The water in your blood carries heat from warmer body parts to cooler areas of your anatomy when it's cold. You even need water to breathe, your lungs requiring moisture to expedite the transfer of oxygen into blood and carbon dioxide out of blood.

If you're not drinking enough water to maintain a healthy fluid balance--water ingested equal to water used (the WIWU Principle)--you can alter, and harm, every physiological function of your body. Too bad, as a spokesman for the International Sports medicine Institute once said, "many Americans live from day to day in a dehydrated" state--that is, they don't drink enough water."

The water in your body, the fluid that keeps you alive and well, leaves you at an alarming rate. An average person on a normal day loses between three and six litres of water. One to two litres rushes out as urine, and another one-tenth litre in defecation. (Note: Severe diarrhea can increase fluid lost in defecation to an astounding 25 litres in a 24-hour period.) Moisture lost from the act of breathing would fill from one to two litre water bottles a day, and that rate increases in dry air.

And then there's sweat. Your perspiration totals one to two litres on an average day, but that amount can climb to one to two litres per hour during periods of vigorous exercise. Compared to watching TV all day, one hour of exercise may demand approximately a 50 percent increase in the amount of water your body uses.

How can you tell you're running low on water? At first the signs are subtle. Your urine turns light yellow. You'll get a mild headache, and then start feeling tired. Down merely a litre and a half, your endurance may be reduced 22 percent and your maximum oxygen uptake (a measure of heart and lung efficiency) can be lowered 10 percent. Remember, that can happen after one hour of strenuous work. And your thirst mechanism, that feeling of "Gosh, I need a drink of water!," doesn't kick in until you're about a litre and half low. Down three to four litres can leave your endurance decreased to 50 percent and your oxygen uptake reduced close to 25 percent. By now, if you're observant, you'll have noticed your urine has

turned a dark yellow. With your mind occupied by other things--say lugging a heavy pack uphill--you may suddenly find yourself seriously dehydrated: disoriented, irritable, rapid pulse completely pooped.

Medically, dehydration can be classified into three levels:

Mild: dry mucous membranes (lips and mouth), normal pulse, darkened urine, mild thirst.

Moderate: very dry mucous membranes, rapid and weak pulse, darker urine, thirst.

Severe: very, very dry mucous membranes, an altered level of consciousness (drowsy, lethargic, disoriented, irritable), no urine, no tears, and shock (indicated by rapid and weak pulse, rapid breathing, and pale skin).

So, what's a body to do? Drink, of course, is the answer--but What, How Much, and When? Well, you can certainly get by on plain water. It's worked to keep human bodies functioning for uncounted years. Since internal water is used faster than the need for replenishment is felt, water should be consumed at a disciplined rate. There's considerable benefit from starting each day with an ingestion of a large volume of water, about half a litre. Following that, the International Sports medicine Institute recommends 1/2 to 2/3 ounce of water per pound of body weight per day, ingested periodically throughout the day. Figured in litres, that's about three to four litres per day for the average-sized person. Drink water with meals and snacks, to encourage digestion, and suck down a few swallows before bedtime to replace what you'll lose in sleep.

When exercising, you should be pounding down water on an even more disciplined schedule. Since the human body can only absorb so much water at one time, the rate of ingestion should be matched, as closely as possible, to the rate of absorption. Most of us have been classified for years into a rate-of-absorption range of one-quarter litre per one-quarter hour. Recent research indicated some of us can do better, absorbing as much as one-quarter litre in 10 minutes. That means, for maximum efficiency and well-being, drink about one-quarter litre of water every 10 to 15 minutes during periods of intense exercise. And cool water gets absorbed faster than warm water. In some conditions you will lose water faster than you can replace it. In those conditions, rest breaks, during which fluid is consumed, become important.

Is water the ideal fluid replacement drink? Maybe not always, Ellen Coleman, RD, MA, MPH, of the Gatorade Sports Science Institute, says an ideal fluid replacement drink should meet four prerequisites: 1) it should not cause gastrointestinal discomfort when consumed in large quantities, 2) it should be rapidly absorbed, 3) it should provide energy to muscles, and 4) it should taste good.

Ten years ago it was widely accepted that a drink containing more than two or three percent sugar considerably slowed the rate of absorption. Current research has shown that, even though stomach emptying is slowed somewhat by sugar, the absorption rate from the small intestine is increased by slightly sweetened drinks. Tests indicate that a drink of six to eight percent sugar--specifically glucose, maltodextrin, or sucrose--gets absorbed as fast as plain

water during periods of hard exercise with the added benefit of supplying energy for improved physical performance. Fructose ingestion does not seem to improve absorption or performance.

What about electrolytes (e.g., sodium and potassium) that are lost in sweat and found in many sports drinks? A balanced diet meets even the most active person's requirements for electrolytes, but there are small advantages to having a tiny bit of salt in a sports drink. For one, salt helps you retain water during exercise and, for another; salt stimulates the need to drink. Too much salt, of course, would be counter-productive, causing you to need more water than normal. Actually, most sports drinks are low in salt. Gatorade Thirst Quencher, for example, has about 110 mg of sodium per serving, the same as a cup of two-percent milk.

There are some beverages that, even though they contain water, just don't work well, and may be counter-productive, for hydration. Caffeinated drinks, such as coffee, stimulate fluid loss through urination. Three cups of coffee supply only about two cups of water to your body. Alcohol is a toxin that draws water out of your cells to "water down" increasing blood toxicity." You must drink eight ounces of plain water just to balance one ounce of alcohol. Fruit juices contain too much sugar to meet your body's demands for fluid during exercise.

So drink up, plain water or a sports drink, and remember the WIWU Principle which is still best monitored by using the old maxim: Drink enough to keep your urine clear and copious.

OPEN WOUNDS

By Buck Tilton

The Wilderness Medicine Institute-Articles Archive

In the big food chain, big meat eaters munch smaller meat eaters and humans find themselves, except for an occasional bear attack, comfortably at the top of the order, and ready to eat anything. But then there=s the invisible world or microorganisms in which you might be the food of invading germs. Doorways to that world are invitingly opened when you get scraped, sliced, hacked, or otherwise disturbed along the natural barrier, your skin that stands between you and bacteria, viruses and parasites. Open wound care needs to accomplish three things: ***1) Stop dangerous blood loss***, ***2) Prevent infection, and 3) Promote healing.***

If you=re not the one bleeding, before contacting another person=s blood or other body fluids, you should put on surgical gloves. Human blood may provide a home for many nastiness you don=t want in your body. Almost all bleeding can be stopped with pressure from your gloved hand applied directly to the open wound, and elevation of the wound above the bleeder=s heart. Without gloves you=re at the mercy of the germ gods. You can safely allow many small wounds to bleed to a stop which, in many cases, helps clean them. Heavier bleeding wounds are best stopped with sterile gauze, but when in desperate need you can stuff whatever=s available into the wound and apply pressure to that. Direct pressure should not be applied to heavily bleeding neck wounds (which may shut off the airway) or eye wounds (which may lead to blindness). Neck and eye wounds require careful pinching closure of the wound until the bleeding stops.

WOUND CLEANING

Open wounds should be properly cleaned in order to prevent infection and promote healing. The best method of wound cleaning is mechanical irrigation and the best irrigation fluid is clean fresh water or a solution of diluted povidone-iodine. You can carry povidone-iodine solution in your first aid kit or prepare it by adding an ounce of povidone-iodine to a litre of the cleanest fresh water you can find. Shake it up and wait at least five minutes to allow the iodine time to disinfect the water completely. A teaspoon of salt dissolved in this solution increases its effectiveness. (Warning: this solution is not safe to drink). Draw the solution up into an irrigation syringe. Hold the syringe two to four inches above the wound and perpendicular to the wound, and push down the plunger forcefully. The wound should be tipped allowing the solution to run out. Repeat until at least half a liter of the solution has been forced through the wound. If visible contaminants are left imbedded in the wound, they should be carefully removed with tweezers. The tweezers should be disinfected before use. Then continue irrigation with the second half of the liter of solution.

Without an irrigation syringe, you can put the solution in a plastic bag, punch a pinhole in the bag, and squeeze the solution out forcefully. Or you can melt a pinhole in the center of the lid of a water bottle with a hot needle, and squeeze the solution out forcefully. Irrigation has proven a better method of wound cleaning than scrubbing or soaking unless you=re dealing with a scrape and not a cut in which case a good scrub still works best. Scrubbing of abrasions should be vigorous and often requires three to four people...one to scrub and several to hold the patient down. Scrubbing can be accomplished with

clean fresh water and a gauze pad, but detergents are better, helping to lift out germs and debris.. Good agents for scrubbing include Ivory soap, Green Soap, Betadine Scrub, Hibiclens and Klenz Gel Blu. But any soap will do. If detergents are used, follow scrubbing with a thorough flushing with clean fresh water.

WOUND CLOSURE

After cleaning small wounds, facial wounds, or scalp wounds, if they gape open, they can be closed with closure strips. If hair gets in the way, it can be carefully clipped short, but it should not be shaved off. Begin by smearing a line of tincture of benzoin compound, if you have any, along both sides of the wound. Benzoin is an irritant so take care to keep it out of the wound. Let the benzoin dry for about 30 seconds. Benzoin=s stickiness will help keep the closure strips in place. Touch the closure strips only on their ends. Apply one to one side of the wound and another to the opposite side. By using the opposing strips as handles, you can pull the wound edges together, pulling the skin as close as possible to where it should lie naturally, but without pulling the wound tightly shut.

Large dirty wounds, wounds caused by animal bites and wounds that open a joint space are best left open. They are difficult to clean well enough to prevent infection. Exceptionally dirty wounds should be packed open with sterile gauze to allow them to drain until a physician can be consulted.

WOUND DRESSING

Open wounds heal better and faster if they are kept slightly moist. Begin by applying an antibiotic ointment over the closed cut or scrape. Dress the wound with a non-adherent sterile dressing; making sure it completely covers the wound. Dressings that stick to the wound will slow the healing process. Finish with a protective gauze pad, which you tape in place or wrap in place with a roll of stretch gauze.
Small wounds can be covered with Spenco 2nd skin, which protects, moistures, and soothes. Relatively recent additions to open wound management include micro-thin film dressings such as Tegaderm, and Bioclusive. They have special value if you=re going to say in the woods. They allow air to pass through, so they speed healing, and they are waterproof, so they don=t wash off, and they are see-through, so you can watch the wound for signs of infection as it heals.

WOUND INFECTION

Check all wounds regularly for signs of infection. Signs of infection include 1) Increasing pain, redness, and swelling, 2) Draining of pus from the wound, 3) appearance of red streaks, just under the skin near the wound, and 4) Systemic fever.

If you see signs of infection, open the wound back up and let it drain. You may need to encourage opening and draining by soaking the wound in disinfected, slightly salty hot water. Pack the wound with sterile gauze to keep it open, and re-clean and re-pack the wound at least twice a day. Consult a physician as soon as possible. Long-term care of infection is aided by the appropriate use of antibiotics. A physician should be consulted concerning which antibiotics should be used, and how they should be used. Follow the physician=s instructions implicitly.

The Wilderness Medicine Institute:

THE STOMACH CHURNS: A BACKPACKER=S GUIDE TO THE RUNS:

by Buck Tilton

Darkness approached and a cold, angry wind gnawed at the tent like a mad dog. Camped above tree line in the Wind River Mountains of Wyoming, the torrents of air were not unexpected and only a minor disturbance compared to the bestial gnawing going on behind my belly button. In an attempt to limit exposure of my bare bottom to the ice-toothed storm. I had pre-dug half a dozen-cat holes within dashing distance. Over and over, through the long night, the same scenario was repeated: out of the bag, out of the tent, rush, squat, and rush back. A Everyone can master a grief@, wrote Shakespeare, Abut he that he who has it. @

Diarrhea, the modern word, resembles the old Greek expression for A flowing through @ Ancient Egyptian doctors left descriptions of the suffering of Pharaohs scratched on papyrus, even before Hippocrates, the old Greek, gave it a name a few people can spell correctly. An equal opportunity affliction, diarrhea has laid low kings and common men, women, and children for at least as long as historians have recorded such fascinating trivia. It wiped out, almost more soldiers in America=s Civil War than guns and swords. In the developing world today, acute diarrhea strikes more than one billion humans every year, and leaves more than five million dead, usually the very young. Diarrhea remains one of the two most common medical complaints of humanity.

A Frequent passage of unformed watery bowel movements,@ as described by Taber=s Cyclopedia Medical Dictionary, diarrhea falls into two broad types: invasive and non-invasive. From a bacterial sources, invasive diarrhea, sometimes called Adysentery,@ attacks the lower intestinal wall causing inflammation, abscesses, and ulcers that may lead to mucus and blood (often A black blood@ from the action of digestive juices) in the stools, high fever, A stomach@ cramps from the depths of hell, and significant amounts of body fluid rushing from the patient=s nether region. Serious debilitation, even death, can occur from resulting dehydration and from the spread of the bacteria to other parts of the body. Non-invasive diarrhea grows from colonies of microscopic evildoers that set up housekeeping on, but do not invade, intestinal walls. Toxins released by the colonies cause cramps, nausea, vomiting, and massive gushes of fluid from the patient=s lower intestinal tract. Non-invasive diarrhea carries a high risk for dehydration.

THE LIFE AND TIMES OF SEVERAL GERMS.

I=ll never know what caused the Agony in the Winds. Diarrheal illnesses come and go with the vagaries of what one voluntarily and involuntarily ingests; erupt from numerous sources that include bacteria, viruses, and protozoas; last as briefly as a relatively blessed six hours or as long as a destructive three weeks or more; and strike more fear into the loins of backpackers than headaches, backaches, knee aches, ankle aches, and bear attacks combined and tripled.

Escherichia coli- Bacteria of which there are hundreds of strains, most of them living normal lives in the human gut, has a few rouge types that can cause invasive or non-invasive diarrhea. *Escherichia coli* as a source of non-invasive diarrhea, typically gets swallowed in water, fresh or salt, and produces headache and nausea along with stinky, watery stools in as little as a few hours after ingestion. In one to three days, the sorrow ends. Invasive strains, ingested from water or food, and cause severe

dysentery.

Campylobacter- Another bacterium lives in the intestines of many wild and domestic animals and ends up in plenty of wilderness lakes and streams. *Campylobacter* can also thrive in spoiled food, and gets credit for infecting as much as one percent of the U.S. population every year. After an incubation period of four to seven days, infection brings on general discomfort, fever, cramps, and bloody diarrhea that lasts two to seven days, most often sending the sufferer in search of a doctor.
Salmonella- Bacteria with more than 2,000 types including *S.typhosa,* the source of typhoid fever, brings on an estimated 2.5 million cases of diarrhea a year in the United States. Almost all of the cases arise from contaminated food (especially dairy food products, poultry, meat and eggs) and from a nontyphoid Salmonella that causes, headache, fever, nausea, cramps, and of course, the squirts. Symptoms show up 12-24 hours after ingestion of the germs. Within a few days, the symptoms usually go away.

Shigella- a bacterium responsible for the most dysentery, spreads, as most diarrhea- causing agents, do, by fecal-oral contamination. You ingest the germs by drinking or even swimming infested wilderness water. One to seven days later the illness manifests itself. Fortunately,, most sick people get better after a mild case of cramps and watery stools. But Shigella can cause severe dysentery.

Norwalk virus, non-invasive causes more food-related diarrhea than any other viral source. It spreads easily from one person to another. Though it may last a week, the vomiting and diarrhea the Norwalk virus brings rarely require a physician=s care.

Giardia lamblia- A protozoa, heads the list of water-borne germs that cause A the runs@ and occurs often enough after wilderness trips to be dubbed A backpackers diarrhea.@ After ingesting that little bugs, it takes one to three weeks, and average of nine days, before symptoms show up. Symptoms are among the most unpleasant of non-invasive diarrheas: loose and foul-smelling stools, cramps, rotten-egg burps, loss of energy, loss of appetite, loss of weight, and loss of people who once enjoyed your company. Antibiotic treatment is often indicated.

Cryptosporidium- another protozoa, infects a large number of animals who then leave reminders of their passing in wilderness water. Cramps, nausea, gas, and diarrhea typically cause the patient distress for about a week. In immuno-compromised patients, diarrhea has extended into two years and caused death.

A Traveler=s diarrhea@ to note in passing, is not a specific disease but a syndrome. Although *E. Coli* gets the nod as the cause of the largest number of traveler=s diarrheas, many of the water-borne or food germs may be the source.

UP CLOSE AND PERSONAL.

Whatever the causative agent, a diarrheal illness can be mild, moderate, or severe depending on the frequency of the rush to the bushes, the pain of cramping, the wateriness of the bowel movement, and the vileness of the gas, the latter being often a matter of personal opinion.. All cases, however, have in common the departure of water from humanity=s hindmost orficeBsometimes oceans of fluid, up to 25

liters in 24 hours in the most severe cases. And it=s not just water your body spills onto the ground. An impressive amount of electrolytes (potassium and sodium) can be lost during an episode of diarrhea. Initially, the field management of all diarrheal illnesses looks the same: replace the lost water. Clear liquids are the best choice, liquids such as plain water, broths, herbal teas, fruit juices you can see through. If the illness continue=s and dehydration threatens, the patient will grow weaker with bouts of lightheadedness and dizziness, and he or she will require additional electrolytes. You can pack Oral Rehydration Salts in your first aid kit, or whip up a mixture in your water bottle. To one liter of water add one teaspoon of salt and eight teaspoons of sugar. If you=ve got baking soda, through in a pinch, but you can get by without it. Mix well. Approximately one-third of the solution should be taken every hour along with all the plain water one can manage to get down. Look for clear urine, the most reliable field of a well-hydrated person.

Pepto-Bismol not only relieves some of the torture of diarrhea but also, according to controlled studies, provides reasonable protection against traveler=s diarrhea. Imodium, another and stronger over-the counter drug, reduces the cramps of diarrhea and the frequency and volume of stools. With a prescription, Lomotil probably ranks as most seen at the scene of diarrhea. Beware: anti-diarrheal drugs should not be used if you think you have dysentery. Severe diarrhea, bloody stools, high fever, and tenacious vomiting are indications of something inside you that your body eagerly wants to get out. In case of dysentery, you should not be stopping the flow, and you should be looking for a physician.

In the best interest of the patient, stick to liquids for persistent and voluminous diarrhea. If and when the problem subsides in the field, provide bland foods such as bread, crackers, cereals, rice, potatoes, lentils, pasta, and bananas. Avoid alcohol, caffeine, spices, fruits, hard cheese, and other fat-laden foods.

SIDEBAR: IF AND WHEN DIARRHEA

You never know when some microscopic diarrhea-causing nasty thing will slip through you defenses and into your intestinal tract to create trouble. To best deal with the situation:

16: Carry anti-diarrheal drugs in your first aid kit: Pepto-Bismol for minor cases, and Imodium for more serious problems. Neither of theses drugs should be given to children without first consulting a physician.

17: Carry an emergency supply of toilet paper. Whatever your feelings about TP, you=ll be happier if you have stash hidden away when diarrhea strikes.

18: Bury the bowel movement at least 100 yards from a water source. In a low-use area that gets plenty of sun, you can smear the mess on the surface. In a high-use area, bury the fecal matter in a cat hole approximately one foot deep in organic soil. Cover the matter with soil, and hide evidence of the hole.

19: Wash your hands after each event to prevent sharing the problem.

20: Don=t go swimming to prevent sharing the problem.

21: Don=t help prepare the food to help prevent the problem.

22: Don=t reach into the gorp bag or share your personal eating or drinking gear to prevent the problem.

KEEP THE CRAMPS OUT OF CAMP

Water-borne agents account for most diarrheas contracted in America=s wilderness and many of those germs are deposited by wildlife. Humans, however are increasingly responsible for making other humans sick with the germs they carry in, either their bodies or in their foods. Proven water disinfection techniques along with proper camp hygiene will stop most diarrhea-causing germs from getting an intestinal handhold.

- Disinfect all drinking water via boiling, filtration, or halogenations. Boiling is the safest, and water need only to reach the boiling point to be safe. Filtration works when the filter has been proven top keep all things you want kept out. The best filters remove protozoa and bacteria, and kill viruses with a special resin coating the filter. Halogens (iodine and chlorine) are the least best due to the variable results based on the concentration of the halogen, contact time with the germs, the clarity of the water, the temperature of the water, and the questionable efficacy of iodine and against Giardia and Crytosporidium.
- Carry and properly prepare foods that last a long time before spoilage. Do not eat leftovers. Bacteria that may grow in leftovers will be killed by re-heating, but the toxins produced by the bacteria are virtually unaffected by heat.
- Wash hands after a bowel movement and before preparing food. Use water and soap for hand washing, include the tips of your fingers, and dry your hands after washing.
- Keep everyone even remotely suggestive of illness out of the A kitchen@.
- Do not share bandannas, cups, water bottles, eating utensils, etc.
- Wash and dry all community cook gear after use.
- Properly dispose of human waste at least 100 yards from the nearest water source.

WATER PURIFICATION

Wilderness surface water in the most remote areas carries the risk of illness due to transmission of microscopic organisms, which include:

Bacteria:	Ecoli, Shigella, Salmonella
Viruses:	Hepatitis A
Protozoa:	Gardia lamblia
Parasites:	Round worm

In addition some seemingly remote areas carry surface water that is contaminated with heavy metals and chemicals that may be the result of agriculture, mining or similar industry.

Infection by organic means may be prevented by disinfecting water using one of several means.

Heat: A sure way to ensure safe drinking water is to bring it to a boil. As soon as the water is boiling it is safe for consumption. This method will kill off all harmful organisms.

Filtration: Commercial filters for backcountry water disinfections may be used for Gardia and bacteria. Many filters are not reliable for viruses as the filter pore size is too large. Maximum effective pore size for gardia is 5 microns; for enteric bacteria, it is 0.2 microns. Filters that incorporate the use of activated charcoal will improve the taste of the water.

Disadvantages: Filtration does not remove viruses; units tend to be expensive or prone to breakage. This is a slow process for large groups.

Chemical: Chlorine and iodine (halogens) are effective disinfectants for viruses, bacteria, and protozoan cysts. Both are readily available in liquid or tablet form. Regular household bleach can be used effectively but most people prefer the taste of iodine in larger concentrations. Adding orange peels or drink crystals to the water may suitably mask the unpleasant taste left by the halogens. Be sure to add these after the required contact time. (See table)

Outdoor Pursuit First Aid Kit Item List

Basic Kit **- group of 10 participants for a multi-day trip**

☐	1	Zinc oxide
☐	1	Combine dressing
☐	1	1" Transpore / clear medical adhesive tape
☐	2	Packages of Moleskin
☐	10	4x4 gauze sponges
☐	5	2x3 Telfa pads
☐	10	Exam gloves
☐	1	3" Ace bandage
☐	12	Betadine Ointment pkts (or a bottle)
☐	1	Mouth Barrier rescue mask
☐	1	Bottle of Polar Pure
☐	2	Space blankets
☐	1	Syringe (20cc)
☐	8	Ziplock Baggies - Hot / Cold Packs
☐	5	Maxi-pads / Tampons
☐	1	2" Roller gauze
☐	6	Triangular Bandages
☐	1	Thermometer
☐	1	Tube of Icing sugar
☐	1	Trauma Scissors
☐	1	Tweezers
☐	1	Spray Can of Second Skin / NuSkin
☐	1	Cavit (temporary dental filling / repair)

Medications: ** keep in their original bottles for referencing dosages / age / expiry

☐	20	Acetaminophen - Tylenol (pain/fever)
☐	20	Ibuprofen - Advil (pain)
☐	1	Tube of Hydrocortizone cream (skin rashes)
☐	20	Peptobismal (GI distress/diarrhea)
☐	1	Sting-eze / Afterbite (sting topical analgestic)
☐	10	Ducolax (laxative)
☐	20	Benadryl (anti-histamine)
☐	10	Ex-lax
☐	10	Imodium
☐	20	Gravol (anti-nausea)
☐	10	ASA – low dose Aspirin (for heart)
☐	1	bottle of calamine lotion
☐	?	other personal meds preferences

Reporting:

- ☐ 3 SOAP Patient Assessment Forms (waterproof paper or laminated)
- ☐ 1 Fine Point Sharpie
- ☐ 1 China Marker
- ☐ 2 Emergency Information Contacts (names and phone numbers)
- ☐ 1 Medication information (laminated)
- ☐ 6 Quarters and / or a calling cards for emergency calls
- ☐ Copy of participant medical form

Smaller FA Kit minimums

Contents: (packed in a waterproof stuff sack, sealed, signed and dated when last checked)

- ☐ 1 Box of mixed cloth bandages
- ☐ 1 1" adhesive tape
- ☐ 2 Packages of Moleskin
- ☐ 1 Tweezers
- ☐ 1 Tube of Petroleum Jelly
- ☐ 1 Tube of Icing sugar
- ☐ 10 Ibuprofen - Advil (pain)
- ☐ 12 Betadine Ointment pkts or a bottle
- ☐ 6 Exam gloves
- ☐ 1 Bottle of sunscreen
- ☐ 1 jar of lip balm
- ☐ 10 2x2 gauze sponges
- ☐ 4 Triangular Bandages
- ☐ 8 ZipLock Baggies – Hot - Cold Packs
- ☐ 6 Tampons
- ☐ 1 Trauma Scissors
- ☐ 12 Triple Antibiotic ointment pkts or squeeze tube