

Disaster Medical Self-Sufficiency

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DO YOU WANT TO RESPOND TO A DISASTER to provide medical care? There are certain prerequisites. Not in terms of your medical training – medical care after a disaster is just like medical care before a disaster, only more so: all sort of medical issues, from traumatic cardiac arrest to managing diabetes mellitus and congestive heart failure, and not enough people to provide care.

But there are *self-sufficiency* prerequisites. There is an apocryphal story of the doctor who turned up after a big disaster and told the County Emergency Management Coordinator “I’m here to help. I will need a place to stay, a shower, and something to eat.” And the County EMA coordinator, whose home had been nearly destroyed, and who had no shower for two days, and almost no sleep for the past three days, said some things to him that can’t be repeated here before threatening to have the county police remove him from the county. (I lied. The story isn’t apocryphal. It’s true. I was there. At least for one of those incidents. I suspect it has happened at other places and times, too.)

In order to not be a burden on those you wish to help, you *must* be self-sufficient. You may not be able to be totally self-sufficient – for instance, without law-enforcement training, it’s hard to provide your own security. For that matter, even if you *have* law-enforcement training and a gun, it’s hard to provide security at the same time you’re providing medical care. But you should be as self-sufficient as you can.

Major self-sufficiency requirements for your response to disaster include:

- Security
- Shelter

- Water
- Food
- Communications (and information management)
- Navigation
- Travel
- Medical Self-Care (“Force Protection”) and care for others

This requires having the right equipment. Yes, good equipment is expensive. If, as with most of us, you have to buy it yourself, think of it as a donation to the cause of disaster medical response.

Imagine a really OCD-ish person,¹ one who has been involved in search and rescue and disaster response for 45 years. Imagine the equipment such a person would acquire over the years, and then imagine that this person has made a detailed packing list with lots of footnotes. Better yet, instead of imagining, look at it online: conovers.org/ftp/SAR-Gear.pdf. It may give you some ideas for making your own checklist.

Disclosure: other than having paid \$20 back in ~1969 to become a member of the REI co-op (www.rei.com), which I also heartily recommend to you, I have no financial or other connections to any of the gear I recommend here. Really.

Security

YOU WILL LIKELY NEED to “contact out” your security, either to security officers who will travel and stay with you, or to local law enforcement. Best would be a combination of both, to make sure you have someone dedicated to your security, as well as the advantage of local knowledge. In addition to your common sense, you should consult your security experts and take their advice. If you can find some other organization that is responding, you may be able to stay within their secure perimeter. In search and rescue, we have a saying “a dead rescuer never did anyone any good.” It applies to disaster relief as well.

You should also consider public health issues as part of your security plan as well. A *sick rescuer doesn’t do anyone much good either*. Ever heard stories about an ice rescue gone bad? Or a cave/mine rescue gone bad? The first rescuer doesn’t come back, so a second, and then a third goes in, before people realize that maybe it’s not a good idea to go in. You don’t want to provide such a story for disaster medical lectures. Before going, investigate the expected hazards and prepare for them.

1. Obsessive-Compulsive Disease

My handout on ticks and tickborne diseases at conovers.org/ftp/Ticks.pdf has some advice on insect repellents that might be of use.

Shelter



IN MOST DISASTERS, there is not enough housing. Hotel rooms are seldom available, and if they are, there may be no electricity or running water, and in particular, no hot water (I experienced this just last month, in Binghamton, NY). In some disasters, even finding a place to throw a sleeping bag inside without a roof leaking rain on you is nearly impossible (that happened to me after Hurricane Gustav). You'll need not only a lightweight tent, but a sleeping bag and pad as well.

At this point you may have realized that we are basically talking about backpacking gear. And indeed, after a disaster, even an urban area can turn into a wilderness. So learn from those who frequent the wilderness and enjoy it – not only backpackers, but, since you'll be providing medical care in a disaster-induced wilderness, from wilderness search and rescue teams.

There are many similarities between disaster medical response and wilderness search and rescue:

- **TIME:** In both the wilderness and after a disaster, people can't get medical care right away. It often takes a long time to reach people; sometimes you can't even find the people who need help. And once you find the people and start providing care, you may be stuck giving care for a long time. The option of calling 9-1-1 sometimes doesn't exist, or it may take hours for a response.
- **DISTANCE:** When you want a patient in the backcountry to go to definitive care at a hospital, first, you have to get the patient out of the wilderness. After a disaster, a hospital, particularly a specialty unit such as a burn unit or dialysis unit, may be far away, as local hospitals or specialty units may be closed. Arranging a 3-hour ambulance ride is a lot different than a 10-minute ride to the local hospital – it takes your ambulance and EMS crew out of the area for most of the day.
- **TERRAIN:** Heading across a trackless wilderness to a patient is not for the inexperienced. And after a disaster, roads may be flooded or closed by debris, making travel times far longer than usual. Road signs may be missing, making routefinding (very much needed due to road closures) near-impossible. An axe, bow saw or chainsaw may be needed to clear deadfall from the road to allow passage.
- **WEATHER:** In the wilderness, you can't go inside to get out of the weather. The same applies during many disasters. You have to be able to not only survive but to carry out your tasks effectively regardless of the weather. This requires proper clothing for the environment. (There is no such thing as bad weather. There's only the wrong clothing. —anon Norwegian) For those who collect abstruse bits of disaster knowledge: raindrops not only hurt when they hit your eyes at more

than 60 miles per hour; but they also deform your corneas and make it very hard to see. When you are doing a belly-crawl in a hurricane, a pair of swim goggles seem to be quite helpful.

- **EQUIPMENT:** When heading into the wilderness, you have to choose your personal and medical equipment with care. You can only take what you can carry on your back, and you can't zip back home to get something you forgot. In a disaster, you might be able to drive all the way to where you're going, but you're similarly limited to what you can fit into your vehicle. And sometimes, you'll have to carry all your gear, on your back or in your hands, a significant distance. So choosing sturdy, lightweight equipment is key. In wilderness rescue, we frequently judge items based on their usefulness-to-weight ratio. Things that are very light, or have multiple uses, are prized by wilderness and disaster responders alike.

Back to the subject at hand, shelter: teams often provide lightweight backpacking tents, and tend to get ones that do not require guy lines and stakes. Such freestanding tents may be set up on an asphalt or concrete parking lot, and I've even seen groups of them set up *inside a large warehouse to provide some darkness and privacy for sleep. If you might respond without such group tents, a 1-person REI Quarter Dome T1 tent* (rei.com – great place to get lightweight gear, and recommended as a source) sells for \$150-\$200 and weighs only 2 lbs. 12 oz. A 3-person version costs \$250-\$330 and weighs 4 lbs. 11 oz.

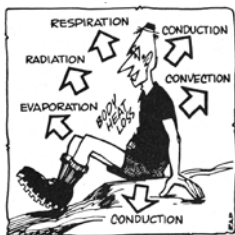
An alternative to a tent is a “jungle” hammock. It can't be set up on a bare floor, but it can be strung between two trees or similar objects, and keeps you up off the ground (useful when it's wet, muddy, or there are fire ants). During the hurricane Katrina response, I used my *Hennessey Hammock* every night; at one point, it was strung up between a couple of pillars on an abandoned hospital. The Ultralite Backpacker Asym Classic costs \$200 and weighs 1 lb. 15 oz.



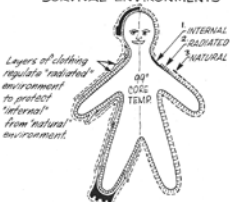
Many experienced backpackers advise people to concentrate more on a good sleeping pad than a good sleeping bag. A sleeping bag gets squished underneath you, and when it's squished, it doesn't insulate. To avoid a cold butt, you need a pad that insulates well. You can get one of the blue closed-cell foam pads from REI for less than \$30. They're fairly warm (R=1.4)². They're fairly light (10 oz), but they're quite bulky. And they're not all that comfortable. Or, you can spend well over a hundred dollars on a *ThermaRest NeoAir mattress*, which is warmer (R=2.5), weighs a tad more (13 oz for a medium), bulks about a tenth, and at least to me, is about as comfortable as my mattress at home. There are a great variety of choices in between.

For a disaster sleeping bag, you probably want a mummy bag of artificial fiber: it's not as affected by water as much as down. You should get a three-season bag rated

2. R is a standard value for insulation, whether it's clothing or the insulation under the roof of your house.



SURVIVAL ENVIRONMENTS



LEAF BAG



GARBAGE BAG

to around freezing (32°F), as you can always make it warmer with a liner inside it or a sleeping bag cover or even a blanket over it. Such a bag costs less than a hundred dollars.

Experienced backpackers and climbers probably have a down bag with a GoreTex or similar exterior, which is half the weight and half the bulk, and three times the cost, but they also use it all the time and know how to take care of it. Only get a down bag if you're willing to baby it.

Shelter includes clothing, particularly for cold and wet environments. You need to know the principles of clothing selection for such environments, starting with the three Ws.

- **WATERPROOF:** if you're going to have to go out in the rain, you need good raingear. GoreTex or other waterproof-breathable material. You need both a jacket and pants.
- **WINDPROOF:** if your waterproof-breathable parka doesn't have pit zips (underarm zippers) for ventilation, and you sweat at all, then you might want to have a separate non-waterproof wind shell. They are very light and some are suitable for mild to moderate rain.
- **WARM WHEN WET:** mountain rescue people have a saying that "cotton kills." Cotton blue jeans and flannel shirts are warm and comfy when dry, but soak up cold water like a sponge and hold it against your skin, losing all insulation value. You need clothes – both tops and bottoms – that retain their warmth when wet. Long (and short) underwear such as Capilene (a brand name of Patagonia, a highly-reputable outdoor clothing company) not only retain most of their warmth when wet, but wick sweat – so that your sweat rapidly spreads and dries – are quick drying (you can wash, wring out, put on, and let it dry on you if necessary), and are treated to retard bacterial growth. That last means that, even after several days without a shower, you don't smell nearly as bad. Wool and polyester fleece have similar qualities.

Always carry a couple of plastic leaf bags so you have emergency shelter from wind and rain; they're light, windproof and waterproof: an ideal survival kit for when it's cold and wet, even in the summer or in the desert.

Any time you deploy to a potentially cool or cold environment, bring a week's worth of wicking, quick-drying underwear (quick-drying bacteriostatic briefs are appropriate in summer, too), and either wool or fleece tops and pants. Consider "soft-shell" pants which have a tough outer surface and a soft, wicking, warm-when-wet lining, and like the underwear mentioned above, may be washed, wrung out, and put back on to dry. I can't say you will enjoy it, just that you *can* do it; it's only a quarter as miserable as wearing wet cotton, and dries maybe ten times as fast. Leaving it hanging overnight to dry is better. Some warm-when-

wet shirts, a couple of wool or fleece sweaters, and hat and gloves or mittens, completes your cool-weather wardrobe.

To learn more about how to select outdoor clothing, see my Clothing Materials Table and attendant essays at conovers.org/ftp/Clothing-Materials.pdf.

Water

HEPATITIS A, GIARDIA, INFECTIOUS DIARRHEA, AMEBIC DYSENTERY... you can get a fascinating variety of illnesses from bad water. And you can't depend on someone else to provide you with potable drinking water. And sparkling clear water can be full of pathogens.

So how do you make sure your water isn't bad? There are many sources of badness in drinking water: industrial chemicals, pesticides, and mine drainage, for example. (Take your water from upstream of such sources of such pollution if you can.) But the most common badnesses are the protozoa, bacteria and viruses that cause disease when ingested. To purify water of these pathogens, there are multiple methods.

Simply bringing water to a boil will kill everything that will cause problems when ingested. You need to boil for 10 minutes to kill spores that can cause wound infections, but those spores won't cause problems if you ingest them.

Or, you can treat water with iodine tablets, available for under \$10 a bottle. Used properly, they will kill off everything you need to worry about, but then the water tastes like iodine (though you can also get pills that remove the iodine taste) and those with thyroid problems shouldn't drink water treated with iodine.

Clorox bleach may be used to treat water, but the amount and the time it must be in contact with the water varies with the temperature and turbidity of the water, and is suitable more for disinfecting large containers of water.

Backpackers tend to use water filters as they can relatively quickly pump water out of a shallow stream, filtering out the relatively-large bacteria and protozoa as they pump, and the carbon in the filter helps absorb pesticides and other chemicals. However, neither this nor other backpacking water filters will remove viruses such as the Hepatitis A virus.

I use an *MSR Sweetwater Microfilter* (11 oz) myself when hiking – it's a good way to get clean water out of a shallow stream or pool into a water bag attached to the pump. However, if you want to protect against viruses, too, then you need to treat the water even after pumping. The best method I've found is to use mixed oxidants from the electrolysis of salt water. This is used commercially in large water treatment plants, and is safe and effective. For \$140, you



can get an MSR MiOx unit, which is the size of a large pen. It uses rock salt, a bit of water, and a couple of batteries to quickly produce a milliliter of mixed oxidant concentrate that you can add to a liter or gallon of water (more concentrated for the gallon, just press the button a few more times). This will kill bacteria, protozoa *and* viruses, and if you only take one water purification device, this is the one to take. It can even be used (with a little time and effort) to purify a multi-gallon water bladder. I do like having a backing filter to prefilter the water, however. This is described further in my article at conovers.org/ftp/Water-Disinfection-Update.pdf.

There are a large number of other ways to purify water – little tiny straws you suck water through, to large gravity-fed filter systems – but none are as appropriate for small groups of responders as what is described above.

Not only do you need to purify water, you need something in which to safely store it. Most people bring a single one-liter water bottle, but a way to store larger amounts is a good idea. An *MSR DromLite bag* that will hold 6 L (1.5 gal) weighs less than six ounces. A multi-use device is the *Sea to Summit Pocket Shower*. Folding up to the size of a couple of cellphones and weighing less than 6 ounces, this serves not only as a water bag containing 10 L (2.5 gal), it also has a tiny shower head, allowing it to be used to take a shower when no running water is available. Unlike the MSR bag, though, it doesn't have an easy-to-use spigot. However it has a very high usefulness-to-weight ratio. Mark that concept – *usefulness-to-weight ratio* – and keep it in mind when selecting gear.

Food

WHEN ONE THINKS ABOUT DISASTER FOOD, one thinks about MREs: military Meals, Ready to Eat. I won't say what one thinks about MREs, but I will tell the story of a Disaster Medical Assistance Team Strike Team that was sent to an island off the Gulf coast right after hurricane Katrina, with cases of mixed MREs as their sole food. However, the cases were mislabeled, and they contained nothing but pepper steak dinners. If you buy me a beer sometime I will tell you what they thought (and said) about MREs. However, being old, I have survived on C rations and even tasted K rations (the canned predecessors to MREs) and I will tell you that MREs are fine and I (and you) can subsist on them indefinitely without being too unhappy (at least if they're not all pepper steak MREs).

MREs are available with flameless heater bags that will heat a main course even in deep winter.

MREs are a bit low in dietary fiber, and high in fat to provide lots of energy for fighting troops, so if you eat a healthy diet, supplement with something high in fiber. Some dried fruit seems to be a fairly universal addition to people's MREs.

I know many DMAT members, who are required to carry a day or so of food in their packs, who just throw in an MRE or two. The only problem with that is that MREs are heavy. There are lighter alternatives. Again, look to backpackers and climbers: they tend to take freeze-dried meals, which are very light. There are also compressed versions that pack small; the *Mountain House brand* is (deservedly) the most popular, though

there are several reasonable alternatives. They do require water for rehydration but if you read and heed the previous section you shouldn't have a problem providing the water.

P.S. Those little tabs of chewing gum in the MREs? No, they're not laxatives. Maybe they should be. But they're just gum. I have this straight from Dr. Askew, who designed MREs and many other interesting foods for the military, including high-carbohydrate pocket milkshakes for working at altitude.

There are other things worth taking; recently the fat in nuts has been found to have health benefits, and fats provide far more energy per unit weight than carbohydrates (starch and sugar) or protein. Almonds are my favorite: salted for the summer, plain for the winter. *Stoned Wheat Thins* are a fairly dense, sturdy cracker that makes a pretty good survival food, though I really like those MRE crackers and have thought about buying a bunch online and throwing into my gear. Granola bars also seem to be popular. I got a commercial heat-sealer, some oxygen-absorbing packets, and I heat-seal my almonds and Stoned Wheat Thins in bags with oxygen absorbers so they stay fresh for months if not years.

Communications

I T'S HARD TO STAY ORGANIZED in the face of a disaster. There are multiple aspects of keeping organized; while this isn't the place to discuss it in detail, using the Incident Command System (ICS) has major benefits, especially since it's now almost universal across the US. As boring as the courses might seem if you've never been in a disaster, you really, really, really need to take some online ICS courses. They are free. Go to training.fema.gov/IS/crslst.asp and take at least IS-100 (there is even a special version for healthcare workers, IS-100.HCb), IS-700, and IS-800.

I recently responded to a disaster (can't tell you the details without permission from the Federal government) where one of the primary needs was for what I call "information first-aid": things were so busy before we got there that keeping track of patient care was very, very fragmented. You should figure out some method of medical charting for when you get there. Simply having pencils and lined paper and some waterproof folders in which to keep your records might be enough. Having carbon paper (remember carbon paper?) to do charting in duplicate may help when you need to send medical records out with a patient. Having a preplanned system for tracking patients and charting on them is even better, but beyond the scope of this tutorial. If you are thinking about some sort of an electronic charting system for your group, remember that you may very well have no electricity; bring a generator and fuel. And check out my blog at ed-informatics.org about design and usability of tracking systems. The electronic medical record (EMR) and tracking system used by the National Disaster Medical System (NDMS) reputedly will be, at some point, released for use by state and other agencies, most likely for free; for interoperability, your organizations might consider using this system.

Cellphones can be quite useful in a disaster, provided you have a way to recharge them (I carry a spare battery, both AC and DC chargers and a solar charger). However, if cellphone towers are down, as after a big earth-



quake or hurricane, they are useless. Satellite phones are very useful for communicating out of the blacked-out disaster area, but *very expensive*.

When cellphones are down, or even when they aren't, FM handheld radios are often used for local communications. Family Radio Service (FRS) radios are cheap – you can often get a pair of them for under \$50, much cheaper if you shop around. You do not want ones with rechargeable batteries. Get ones that run on AA cells since recharging after a disaster may be impossible – though you'd be surprised how quickly stores like WalMart and Kmart open after a disaster, making AA cells easy to get. And lots of organizations have FRS radios, making it easy to talk with them.



If you want something a step up from FRS radios, with better range and more frequencies, consider getting your amateur ("ham") radio license. For about \$100, you can get

a two-band ham handheld radio (www.powerwerx.com for details) that is also legal to use on commercial frequencies, such as those used by many public-safety agencies. (But not the P25-encrypted frequencies used by most Federal agencies – those radios are thousands of dollars each.) After many disasters, even when cellphone



towers are down, some ham radio repeaters are still up, allowing a handheld radio to communicate for many miles. To find out how to get your ham license, check out arrrl.org.



Navigation

MOST ROAD AND STREET SIGNS ARE DOWN. One out of every ten streets is blocked with debris or flooding. Half of the interstates are closed at one point or another. You have some information about which routes are passable but the information is questionable, and likely only reflects a portion of the closures.



You drive into the disaster area, heading for your assigned rendezvous. However, when you follow the GPS directions, you run into a closed highway. You do have a fairly advanced GPS, which gets traffic and construction updates – but as you enter the disaster area, this function stops working. You try to use the "avoid road" function for some of the roads that you know are blocked and the GPS finally says "unable to calculate route."

How do you get to your destination?

The simple answer is to go back to pre-GPS navigation: map and compass. You *did* remember to grab a couple of maps of the area, right? Well, you can use a pencil (not a pen) to start marking closed roads on it. This can be ones that you've heard about, or ones you discovered yourself. You can then plot a route around the roadblocks



and start following it, updating the map as you get more information or discover closed (or occasionally, newly-opened) roads.

Google Maps on smartphones is wonderful, but if you've got no signal, you've got no map. Google Navigation will download maps for your route, but once you move outside your route, you're dependent on a cellphone signal to see more of the map. It's possible to download maps to a smartphone. On my Android phone, I download Open Street Map or USGS topographical maps using the Locus Pro app, then even if there is no signal, I can still navigate with the smartphone's GPS.

Handheld GPS units are useful, but I've found my phone with Locus Pro has pretty much replaced both car and hiking GPS units. Remember to take a spare battery and a cellphone charging unit that takes AA cells; I also carry a solar charger.

A small compass makes a nice complement to your map. When you have no idea where you are, you can use the compass to at least orient the map the right way, making it more likely you'll figure out where you are.

You also need to learn a bit about grid systems, so you can communicate your location, or locations that you've been to and that need help, to others. You need to learn about latitude and longitude, the UTM system and its variant the US National Grid system. There are good resources online to learn about these. There is a great reference to the US National Grid System at earth-info.nga.mil/GandG/coordsys/grids/1Sheet_USNGInstruct_v3.pdf.

If you will ever use a GPS, you also need to learn about *datum*. There are competing datums for grid systems, and if your map is set to one and your GPS is set to the other, your positions may not jive for hundreds of meters. Read about this online at Wikipedia.

If you want to learn more about land navigation – and believe me, anyone who has responded to a disaster usually thinks they need to learn more about land navigation – I suggest you learn a bit about orienteering, which is the sport of running through the woods while navigating to various checkpoints. The principles you will learn apply equally well to navigating while driving. Search the web for "orienteering" and you should find some good tutorials, or get a book on orienteering from amazon.com or rei.com. Better yet, find a local orienteering club and go out and run (or walk) a few orienteering courses; you'll acquire a useful skill while having fun.

Travel

ASSUMING THAT YOU CAN FIND A ROUTE, you'll need to travel to your destination, and likely move from point to point in the disaster area.

If the disaster is far away, you'll likely go by air. So you'll need to pack your gear appropriately for air travel, and rolling luggage is great for moving around airports. But sometimes you'll need to transfer to vehicles, or even travel by foot over terrain where you can't roll luggage. So experienced disaster responders tend to use a rolling duffel that also has backpack straps (I use one). But to be truthful, even the best of the rolling duffels with packstraps are not very comfortable to carry as a pack. As far as I can tell, the *High Sierra 36" Drop-Bottom Wheeled*

Duffel with Backpack Straps (\$140) is best, but it's not nearly as sturdy as my Tumi luggage nor my backpack. Many opt just for a big backpacking pack. Such a pack will set you back about \$150.

If you'll be traveling across rugged terrain or through debris – which is likely – you'll need good foot protection. Federal disaster teams require military-style boots, and you can find fairly good military-style boots (as well as cheap, poorly-designed ones). But if you, unlike me, don't have to be in uniform, then a pair of good medium-duty hiking boots is ideal. If responding in deep winter, though, you'll need something warmer. Boots with felt liners such as those made by *Sorel*, and some spare felt liners, are not too expensive (\$135 for a good pair; get ones with the strap around the back to help prevent heel lift while walking) and will prevent frostbite.

You will need to break in your boots prior to deployment. This is critical. Blisters on your feet are no joke. I can't count the number of times disaster responders show up in new boots and then are disabled because after the first couple of days they can barely walk. I would recommend that you walk or hike 30-50 miles in a pair of boots to consider them broken in.

The other thing you need to do is to fit your boots with the proper socks, and make sure you have the proper socks.

The military have focused a lot of effort on the problem, as it's so disabling to troops who have to spend a lot of time hiking and walking, especially during boot camp (there's a reason they call it boot camp!) at Camp Lejeune.

Murray Hamlet, of the US Army Research Institute of Environmental Medicine, in Natick, MA, is the world's leading expert on a number of things, including the use of yaks in warfare, but we are particularly interested in the fact that he spent years of research, using recruits at Camp Lejeune as guinea pigs, on blisters.

One thing he found (and most outdoorspeople know) is that cotton makes bad socks. Wool is much better, even in the summer. It doesn't hold water against your foot, and it doesn't mat down into a hard plate under your foot like cotton, it keeps providing some cushioning for your sole. Here's an excerpt from my essay and table on clothing materials (conovers.org/ftp/Clothing-Materials.pdf).

"As far as I'm concerned, wool has always been in - at least for socks. Socks that are at least partly made from wool are superior to any synthetics. True, they're smelly when wet, and take a long time to dry compared to synthetics. But unlike synthetics, they keep their spring, and avoid matting down under your foot. And the padding provided by wool under your foot is nothing to sneeze at. A good wool sock can extend by hours the time when the bottom of your feet say "no more"! But wool socks were so scratchy that people hated them. Used to be, everyone wore Ragg wool socks made of hard, scratchy wool, and thin liner socks to protect us from the scratchy Ragg socks. (Don't believe those who said it was to prevent blisters.) You can buy things called Ragg socks but they're pale, soft and wimpy imitations of the he-man Ragg socks that were available back in the 1950s and 60s.

"Ah, but if your socks are made of a fine merino wool

- like expensive dress socks only thicker - they aren't scratchy! It used to be that only Rohner of Switzerland made merino-wool socks. Merino wool is soft, tough, and expensive. Their socks are great - I seldom wear anything else. But the only place I can get them is remaindered at sierratradingpost.com. Nobody thought that customers in the U.S. would pay the extra for merino wool outdoor socks.

"But then in 1994, SmartWool started selling expensive merino wool socks, and they sold like hotcakes. And soon everyone was selling merino-blend socks. The footnote to Cotton discusses Hamlet Socks, which Murray Hamlet developed for the military to prevent blisters. They're like SmartWool socks, but inside out, with the terry-loop towel-like bits on the outside of the sock. This prevents blisters better, and you can reproduce this effect by wearing your SmartWools inside out. The Rohner socks I wear all the time are already built inside out like this, and indeed their terry-loop is denser and harder than SmartWool's, which Murray reproduced in his military sock design."

The new sock for the military is known affectionately as the Hamlet sock. These new combat socks are available from suppliers such as brigadeqm.com.

They are made of a slightly inferior wool, so if you want less-scratchy socks that still will prevent blisters, get SmartWool socks - but wear them inside-out. There are REI stores at in most major US cities that carry lots of SmartWool socks. You can also get them from rei.com.

You will want the SmartWool Hiking Socks. They are expensive but worth it.

Medical Care

THIS HANDOUT IS ABOUT SELF-SUFFICIENCY, so I'm not going to be covering the medical supplies and equipment you should take for patient care. That depends on many things; your weight and size limitations, the level of expertise of your medical personnel, and what your particular role will be at the disaster.

But you also need to think about something called *force protection*. You will need to take care of your own medical needs so you can provide care to others. Federal disaster teams have special kits designed to take care of their own team members; a lot of thought has gone into these kits. A standard kit fits into three 2'x2'x3' Rubbermaid boxes. Most of this is IV fluids and supplies, diagnostic equipment including BP cuffs, stethoscopes, a pulse ox, an AED, a standard paramedic-style Advanced Life Support drug bag, and airway/intubation gear. But one fairly large pack is the "sick-call kit" and is filled with common medications, mostly oral but some topical medications, eye medications, and common IV medications including antibiotics. Any team planning to deploy to a disaster would do well to emulate such a kit.

You can also argue that, for teams that may be split up into smaller and smaller units (and during disasters, this always seems to happen) that each team member ought to have a personal medical/first-aid kit. The topic of first-aid kit contents always generates much discussion, and the contents should really depend on the member's personal medical problems, and type of training and expertise. So I'm not going to give specific recommendations. But to get some ideas, you might want to enter





conovers.org/ftp in your browser, then look through the listing for PDF files such as “Everyday-Emergency-Kit” and “Daypack Medical Kit” and “Personal Wilderness Medkit.”

One of the problems I always encounter in disaster medical situations is that the light’s no good. Even when I was young and had a sharper eye, this was a problem. Trying to suture a wound when you can’t really see it just doesn’t work. And even if there is someone free to hold a flashlight (almost never), they always get distracted and end up shining it in the wrong place. So the one piece of “medical” equipment that I always carry, unique to disasters, is a good headlight. For about \$50, you can get an excellent headlight from REI. I have a *Petzl Tikka XP*, which is an outstanding headlight. It takes 3 AAA cells, which fit in the body that straps to your forehead, and, compared to headlights that take larger batteries, the weight on your head is negligible. It has a diffuser you can slide across the lens to provide a broader light.

Whenever possible, you should use *Energizer* disposable lithium AAA cells, as lithium cells perform better in the cold, have a longer shelf life, last longer, and weigh less than alkaline cells. They cost roughly twice as much per battery, but they also last roughly twice as long; it ends up costing the same, and you save weight and don’t have to change batteries as often.

Altered Standards of Care and Altered Contexts

THE PHRASE “ALTERED STANDARDS OF CARE” can excite doctors, lawyers, and legislators. Are hospital staff guilty of manslaughter for the death of patients who could not be evacuated during a disaster? Should hospital staff, like the captain of a ship, go down with the hospital, staying and dying if they can’t get all the patients out to safety?

As fascinating as that subject is, I don’t want to discuss it in a handout on self-sufficiency. I said at the outset that medical care after a disaster is the same as medical care before a disaster. It is, in the sense that the problems are pretty much the same.

However, the *context* is different, in the sense that you may be confronted with the same problems, but you may have limited resources to diagnose and treat them.

Sometimes you may be supplementing staff in a hospital with full capabilities, in which case the context is virtually the same as your everyday job. Other time, you may be working in a tent, with no X-ray machines and minimal lab testing. Or even in a parking lot with nothing but the pack on your back: what we call a truly austere context.

There is already consensus guidance on altering standards of care for different contexts, at least for the most austere context: in the wilderness. The [Wilderness Medical Society](http://WildernessMedicalSociety.org) has a publication, *Practice Guidelines for Wilderness Emergency Care*, that has been refined over decades, and lays out how the standard of care is different in the wilderness for a number of common emergencies. For example, the standard of care “on the street” (where rapid transport to a definitive-care facility is available) for impaled objects is to stabilize in place and transport; in the wilderness it is to attempt removal. In the community, one does CPR until an Advanced Life Support ambulance arrives; in the wilderness one does CPR for half an hour then gives up. This may provide you some guidance in the most austere disaster settings.

More

TO LEARN MORE, so as to be better mentally prepared to respond to disasters, there are many opportunities. I’ll list things available near my home in southwestern Pennsylvania; you may need to search to find similar opportunities if you live elsewhere.

If you want to get more outdoor experience to prepare yourself for austere deployments, join an outdoor club such as the Explorer’s Club of Pittsburgh (pittecp.org) and spend a couple of hours at one of the local REI stores (rei.org) and chat with a knowledgeable member of the sales staff.

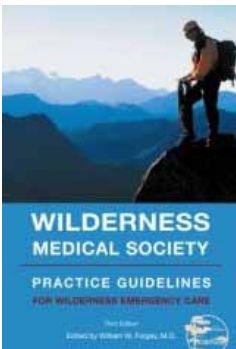
If you want to get your ham license and learn more about radio communications, go to arrl.org (American Radio Relay League) and search for ham radio classes near you.

If you want to get experience at managing complex and time-pressured emergency operations, attend some training and respond to a large lost-person search with Allegheny Mountain Rescue Group (amrg.info), or one of the other Appalachian Search and Rescue Conference (asrc.net) or Pennsylvania Search and Rescue Council (psarc.org) teams.

If you want to do some orienteering, go to wpoc.org and attend one of the meets of the Western Pennsylvania Orienteering Club.

If you want to prepare for practicing your specialty in very austere settings, go to cdsoutdoor.com (CDS Outdoor School) to see a list of wilderness first aid, Wilderness First Responder, and Wilderness Emergency Medical Technician classes and take one. The WEMT classes are suitable for everyone from an EMT-Basic up to a board-certified emergency physician or trauma surgeon.

Finally, you may find a number of resources on my personal website (conovers.org) or by browsing my ftp directory (conovers.org/ftp).



How to Read US National Grid (USNG) Coordinates

FGDC-STD-011-2001

From www.fgdc.gov/usng

Background. The Federal Geographic Data Committee's (FGDC) consensus based USNG standard provides a nationally consistent *language of location -- optimized for local applications --* for maps, Global Positioning System (GPS) receivers, and mapping web portals. It is an alpha-numeric point reference system overlaid on the Universal Transverse Mercator (UTM) numerical grid. Truncated USNG coordinates (geoaddresses) range in precision from 1,000 to 1-meter and provide universal map index values for streets and other features. USNG and Military Grid Reference (MGRS) values are identical when referenced to WGS 84 or NAD 83 datum -- USNG only uses a single 100,000-m Square Identification scheme regardless of datum. This example locates the Jefferson Pier at USNG: 18S UJ 23371 06519.

Grid Zone Designation (GZD):

6° x 8° longitude zone / latitude band.

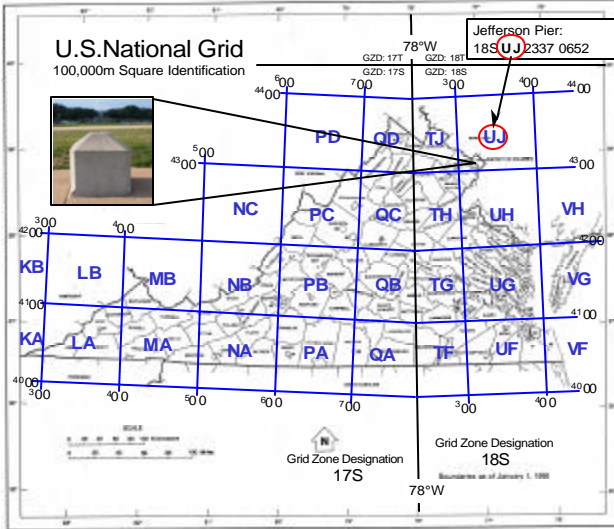
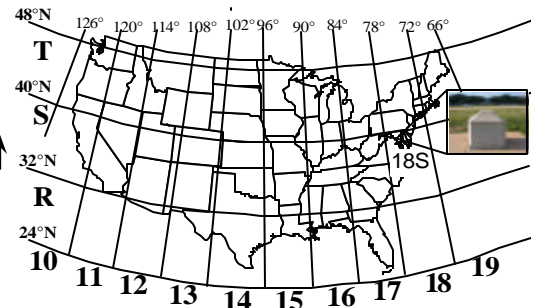
100,000-m Square Identification:

18S UJ 2337 0651

Grid Coordinates:

Read *right*, then *up*.

UTM/USNG Grid Zone Designations



Users determine the required precision. These values represent a point position (southwest corner) for an area of refinement.

Four digits: 23 06 Locating a point within a 1,000-m square.

Six digits: 233 065 Locating a point within a 100-m square.

Eight digits: 2337 0651 Locating a point within a 10-m square.

Ten digits: 23371 06519 Locating a point within a 1-m square.

Only an 8-digit grid is typically required to locate a modest size home out of a local area.

Full USNG: 18S UJ 2337 0651 - World wide unique.

Without Grid Zone Designation (GZD): UJ 2337 0651 - Regional areas.

Without GZD and 100,000-m Square ID: 2337 0651 - Local areas.

Reading USNG Grid Coordinates.

Principal Digits → 07

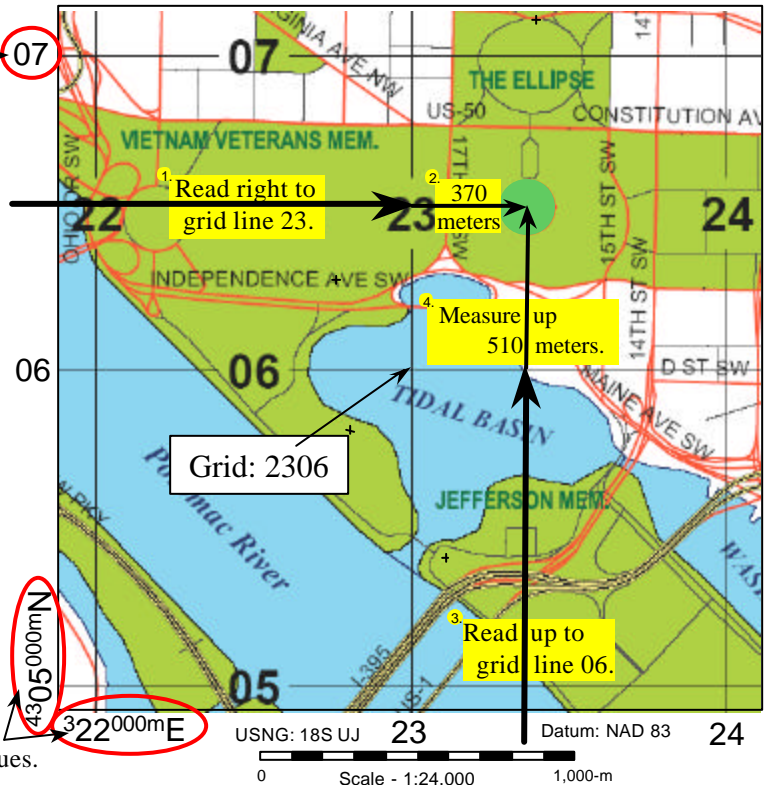
- The UTM 10,000 and 1,000 digit values are known as Principal Digits.

- Coordinates are always given as an even number of digits (i.e. 23370651).

- Divide coordinates in half (2337 0651).

¹ - Read right to grid line 23. ² Then measure right another 370 meters. (Think 23.37)

³ - Read up to grid line 06. ⁴ Then measure up another 510 meters. (Think 06.51)



Grid:	Examples:
228058	FDR Memorial: +
231054	George Mason Memorial: +
2338 0710	Zero Milestone: +
2275 0628	DC War Memorial: +
213017	Ft. Scott Park: