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- The Traveler's Medical Kit

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The Traveler's Medical Kit

SPECIAL REPORT

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THE TRAVEL MEDICAL KIT IS A TRAVELER'S ADDED INSURANCE POLICY. IF all goes well, no Band-Aids will be opened, no pills will be taken, and no one will arrive home with so much as a cold. But if illness occurs on a trip, however minor, attainment of both the business and pleasure goals of the journey are at risk. While abroad, health resources may be hard to find or even nonexistent, so a well-planned travel medical kit can be both the prevention and the cure for minor medical mishaps.

A kit should be tailored to each traveler, their age, and their destination. There are corporate, leisure, and sporting travelers who are going to urban, suburban, and backcountry locations. The tourist in Berlin and the trekker in Bhutan can expect needs as different as the geography they are visiting. Further consideration should be given to length of the trip, the group size, and the medical expertise of the intended traveler.¹ For instance, chemoprophylaxis for a long duration trip can be more complicated than for a short vacation, just as a travel kit for an expedition will be more robust.^{2,3} This article discusses variations on the traveler's medical kit as they apply to an individual traveler.

The Basics — For All Travelers

The best route to a healthful trip is through prevention. Pre-travel immunizations and prophylactic medications are the foundation on which the medical kit is built. No medical kit can treat rabies, hepatitis, or yellow fever, but sound pre-travel care and immunizations can obviate these dangers completely.⁴ An airport survey of US travelers showed that most were unaware of infection risks and did not complete a vaccination regime prior to travel.⁵ Preparation should begin at least one month in advance, and is especially important for elderly, pediatric, and HIV-infected travelers.⁶⁻⁸

Before going abroad, travelers should also ask their health insurance companies what their coverage is while overseas. Many policies cover "reasonable" expenses, but very few pay for evacuation to the United States, which can exceed \$50,000. Many online services (such as CSA Travel Protection and traditional insurers such as American Express) provide expanded coverage that is

priced by duration, location, mode of transportation, and intended activities.⁹ If one utilizes the travel insurance for expensive coverage abroad, a second opinion can serve to better justify an insurance claim. The US Consulate can provide a list of doctors and hospitals which can also be obtained in advance.

A medical kit can be kept in a small nylon bag, stuff sack, or box, as the traveler desires. The most comprehensive container is compartmentalized, compact, and water proof. Several pre-made kits, such as Adventure Medical Kits are available at outdoor stores and range from \$20 to \$400. The simplest kits contain antiseptic, bandages, over the counter medications, and forceps. They are a fine start, but they fall short of addressing a traveler's specific needs.

Documents

The medical kit itself should contain relevant important documents that can serve as a bridge to professional medical care should an emergency occur. Check www.travel.state.gov/travel/tips/tips_1232.html for the most recent recommendations. All travelers should consider carrying:

- A copy of their passport, in case the original is lost or evacuation is necessary;
- A copy of their health insurance plan and a claim form;
- Their immunization record (with dates), ideally on the internationally recognized International Certificate of Vaccination;
- A compilation of their medical history. This history should include current conditions (eg, asthma), current medications (including the strength of contact

lenses or glasses), past illnesses (eg. heart attack), past surgical procedures (eg. appendectomy), medication allergies and their effect (penicillin-rash), and blood-type, if known;

- A copy of their electrocardiogram (EKG), if one has been done, and is medically relevant; and
- Money. A small stash of cash stowed in the medical kit can help insure treatment in the event the traveler is separated from their wallet. Many countries' medical facilities require cash up-front, even in the event of life-threatening illness.

Medications

Prescription medications should always be in the carry-on luggage to avoid loss or delay en route. Not only should there be enough medication for the entire trip, but additional doses should be included, and a complete duplicate supply should be considered. Contact lenses or glasses should also be carried on-board. Medic-Alert bracelets or necklaces should be worn at all times and not carried in handbags. Nonessential items, especially lotions or creams, should remain in the medical kit in the checked-in luggage.

Diarrheal disease, respiratory infections, and dermatologic conditions, as broad categories, are the most frequently encountered travel-related illnesses contracted in developing countries.¹⁰ Non-prescription medications are effective at alleviating many of these complaints and are among the most frequently used items from a travel kit.¹¹

Nonprescription medications potentially useful for many nonpregnant travelers include:

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- Acetaminophen for fever, headaches, or minor aches and pains;
- Antibiotic ointment (Bacitracin, Polysporin) for cuts, scrapes, bites or burns;
- Antifungal creams for athlete's foot, tinea inguinalis, ringworm;
- Antihistamines such as diphenhydramine (Benadryl) for assistance sleeping, allergic reactions and seasonal allergies, and dimenhydrinate (Dramamine) for motion sickness;
- Calcium carbonate (Tums) for acid reflux;
- Ibuprofen (Advil, Motrin) or aspirin for fever; headaches, minor aches and pains, sore muscles, and inflammatory swelling;
- Latex condoms for protection against sexually transmitted diseases, if indicated for such travelers;
- Loperamide (Imodium) for diarrhea; and
- Pseudoephedrine HCL (Sudafed) for nasal and sinus congestion.

Corporate and Leisure Travel

International business trips are fraught with stressors. Often the journey will demand a large investment of time and resources, and can also carry high expectations from colleagues. In addition, the business traveler is subjected to the stress of airports, long flights, immigration lines, foreign currencies, foreign languages, and time changes.

While the air is recirculated on commercial jets, documentation of passengers contracting serious illnesses is rare.^{12,13} The famous report in the *New England Journal of Medicine* of "probable" transmission of multi-drug resistant tuberculosis only recorded a positive skin-test among fellow passengers, and neither illness in exposed passengers nor strain-typing to match the index case were identified.¹⁴ To date, no definitive cases of SARS (severe acute respiratory syndrome) have been transmitted onboard, though the data for such long flights is sparse. Without question, it has become prudent for travelers en route to endemic areas to have protective face-masks, available over the counter in all major pharmacies. The N-95 mask is recommended. It resembles a surgical mask and includes a filter that keeps out 95 percent of particles that are 0.3 microns across or larger.

Colds and other upper respiratory infections have been thought to be readily and frequently contracted onboard airplanes. However, a 2002 JAMA study of 1100 passengers found no evidence that common upper respiratory symptoms increased after travel, though the study was only conducted on the 2-hour San Francisco to Denver route.¹⁵ It is best for the traveler be aware that the risk of infectious transmission is likely to exist and

keep headache and sinus relievers with them. In the event of a bacterial respiratory infection, a macrolide antibiotic will cover the healthy traveler, and a respiratory fluoroquinolone will treat travelers with respiratory comorbidities.

Jet-lag is frequently problematic on business trips when inflexible schedules do not permit adaptation. It is usually apparent when more than 5 time zones are crossed and more often with eastward travel.¹⁶ Traveling toward the east makes it difficult to be alert for morning meetings, whereas westward travel makes late business and dinner meetings initially taxing. Coping strategies include the use of hypnotics during overnight flights and approximately 2-5 mg of melatonin (adult dose) to simulate night time endocrine function. Though there is some controversy, current literature supports the use of melatonin at bedtime to reduce jetlag, and related side effects are few.^{17,18} Another effective strategy, used by NASA astronauts, involves changing bedtime prior to travel in anticipation of the target bedtime. This process may be overly cumbersome for most travelers. Bright lights will suppress melatonin secretion for increased daytime wakefulness.

Jet-lag, specifically after crossing 7 time zones, was shown to significantly increase the likelihood of a schizophrenic break in patients with a history of such pathology. Psychotic breaks were seen with increased frequency, even among persons who had been symptom-free for over a year.¹⁹ Patients with this history should consult their psychiatrists, and may be advised to bring antipsychotic medications along.

Marine transportation and cruise ship passengers are at risk for the diseases endemic to the ports at which they dock. Passengers and crew who disembark may bring aboard infections from land, most notoriously travelers' diarrhea. Motion sickness carries the potential to ruin a scenic trip and continue for hours post disembarkation. Dimenhydrinate (Dramamine 50-100 milligrams each 6 hours) and hyoscine (Scopolamine, which is a tropane alkaloid drug obtained from plants of the nightshade family), transdermal patches applied 4 hours prior to travel, are effective at reducing symptoms. Scopolamine is contraindicated for people with glaucoma or urinary retention. Ondansetron oral dissolving 4 milligram tablets can still be absorbed during vomiting and will help with nausea onboard or at any time during travel. These are all adult doses.

Sexual relationships are a common part of travel for some, and the risk of sexually transmitted diseases, including hepatitis B and C, HIV, gonorrhea, and chlamydia infections can be prevented through proper and consistent condom use. Condoms made of natural materials do not prevent transmission of HIV.

Allergic reactions to foods and hymenoptera stings are more likely to occur overseas than at home since the new ingredients introduced into the diet and types of bees and wasps vary regionally. All travelers with a history of severe allergic reaction should have IM epinephrine (EpiPen), an H1-blocker (diphenhydramine 50 mg q8 hours for 2 days), an H2-blocker (famotidine 20 mg bid), and prednisone 60 mg with them, as detailed below in the Envenomations section of Backcountry Travel. Again, these are adult doses.

Hay-fever, or seasonal environmental allergies, are unpredictable when overseas. Cough, congestion, rhinorrhea, and eye irritation can be inconvenient and uncomfortable. A thorough medical kit should include a nasal steroid such as fluticasone propionate (Flonase), a non-sedating antihistamine such as cetirizine HCl (Zyrtec) 10 mg daily and an antihistamine eye drop such as olopatadine HCl (Patanol).

Women are more prone to more urinary tract infections (UTIs) and yeast infections while traveling than at home due to dehydration and possible changes in hygiene. Fluconazole 150 mg as a single dose should be brought for vaginal candidiasis. An antibiotic such as trimethoprim/sulfamethoxazole (a double-strength tablet, 1 bid for 3 days) or a fluoroquinolone (ciprofloxacin 500 mg bid for 5 days) is wise to include. Phenazopyridine (Pyridium) (200 mg tid for 2 days) is very helpful for UTI pain relief. Note that it turns urine, tears, and contact lenses orange, and patients should know this.

Another necessary item for leisure and for high altitude travel is sunscreen. It is important to cover both UVA, which is involved with photoaging and cancer, and the UVB spectrum, which is directly connected with sunburn as well as cancer. Avobenzone and oxybenzone or zinc provide broad coverage. Though a tee shirt does not sufficiently block UV rays, commercially-available material with SPF ratings do extend protection.

Backcountry and High Altitude Travel

Traumatic injuries

While little mortality data is available around the world, Nepal recorded that the most frequent cause of death in trekkers in the 1980s was trauma, followed by “illness” and acute mountain sickness. As older persons seek adventure in the wilderness, mortality from medical illnesses is likely to increase. In mountainous countries other than Nepal, whose famous Himalayan Rescue Service averts many potential tragedies, mortality from trauma is likely to be higher. Adventure trekkers must have appropriate trauma and high altitude treatments in

their medical kits. Supplies for preexisting medical illnesses are discussed above.

For traumatic injuries and wounds, medical kits should include antiseptics/cleansers, wound adhesives, bandages, splints, antibiotics, and pain control. A list of suggested items follows:

- Basic non-latex (nitrile) hospital gloves for cleaning and bandaging wounds. These are very versatile and useful and help prevent the spread of infections;
- Antibacterial wipes or towelettes;
- A 20 mL syringe for irrigating wounds, since studies show that the pressure of the applied solution is more important than which clean irrigation solution is used; an irrigation shield reduces the splash and narrows the diameter of the stream to increase the pressure and decreases bloody fluid splashing on the caregiver;
- Povidone iodine solution (Betadine) for disinfecting the irrigation water and cleaning around wound margins;
- Lidocaine impregnated first-aid cleansing pads; 4% topical lidocaine jelly such as LMX can aid in pain relief and manipulation;
- Oil of cloves (Eugenol) dental anesthetic for dental injury;
- Dermabond tissue adhesive or other 8-octyl cyano acrylate;
- Wound-closure strips (Steri-Strips) and tincture of benzoin solution for their adhesion;
- Skin staples (3M Precise Disposable Skin Stapler), which is used like a staple-gun once the wound has been cleaned and the wound edges are approximated;
- Antibiotic ointment (bacitracin/neomycin) for minor wounds, abrasions, and those closed with Steri-Strips (ointment cannot be placed on top of Dermabond as it will dissolve it);
- A variety of bandaging materials including non-adhesive sterile dressings like Telfa pads, and gauze roller bandages, 2nd Skin, moleskin and the ever-important, highly versatile duct tape;
- A Sam Splint, which is a lightweight, malleable splint which can be molded into anything from a cervical collar to an ankle splint; and
- Ibuprofen, 800 mg each 8 hours taken with food as needed for pain (adult dose).

When the potential for serious trauma such as a femoral fracture exists, kits should include:

- Intravenous catheters, intravenous tubing, and a few liters of normal saline; and
- Strong pain medication. Note that codeine-containing pills ideally should not be carried across a border and can often be purchased over-the-counter in local

pharmacies to bring on backcountry trips. But narcotic pain relievers such as morphine for IM use and oxycodone/acetaminophen (Percocet 1-2 q 4-6 hours for adults) for pain control, accompanied by a letter from a physician regarding the amount included and its intended use, should be included when access to medicine abroad is expected to be difficult.

Commercial suture and syringe kits are available for sale (Travel Medicine, Inc 1-800-TRAVMED, www.travmed.com) and can be used by the traveler or given to the local health-care provider in areas where syringes may be being reused.

Endemic Diseases

Regionally-based illnesses should be investigated before the trip on the web at www.cdc.gov and addressed in one's pre-travel medical appointment. Trekkers can be exposed to malaria, typhoid fever, meningitis, yellow fever, Japanese encephalitis, cholera, and parasites among others infections. Appropriate immunization and chemoprophylaxis for these diseases is certainly the best medicine.

1) Travelers' Diarrhea (TD)

Diarrheal pathogens are ubiquitous. Avoidance of unpurified water and of foods (lettuce is notorious) that have come into contact with dirty water or hands is of paramount importance. Despite these attempts, diarrhea strikes 20-50% of travelers to developing countries. While rarely life-threatening, 10% of cases last more than a week. Bacteria comprise 50-75% of isolates, while less than 20% of isolates are viruses and less than 5% are protozoan.²⁰

While prophylactic antibiotics for travelers' diarrhea are not recommended, data on rifixamin showed that when given in a dose of 200 mg one to three times daily for 2 weeks to newly arrived US students to Mexico, it provided protection rates of 72%-77% against travelers' diarrhea and travelers' diarrhea requiring antibacterial therapy, respectively ($P < 0.001$ for both). Rifixamin taken three times a day for three days to date has demonstrated little antimicrobial resistance.²¹

Currently not available in the United States, but available over-the-counter in Canada, Dukoral™ is a vaccine developed to prevent cholera but also has efficacy against travelers diarrhea. It is an oral formulation of several inactivated cholera variants and has relatively few side effects as of yet. It is the non-toxic B subunit of the cholera toxin that is also included in the vaccine which conveys some immunity against traveler's diarrhea. In a randomized, double-blind study done in Bangladesh in 89,596 adults and children aged 2 years

and older, Dukoral conferred 67% (95% CI, $P = .02$) protection against episodes of diarrhea caused by enterotoxigenic *E. coli* synthesizing heat-labile toxin (LT-EPEC), 86% protection against clinically severe episodes of LT-EPEC, and 85% protection against cholera.²² Another efficacy study was conducted in 1992 in 502 US students going to Mexico. In this study, the vaccine was given after arrival in Mexico.²³ The study found 50% protective efficacy against EPEC. The oral Dukoral™ vaccine should be taken 14, and again 7 days before travel.

Boiling water for one minute remains the most effective way to kill bacteria (3 minutes to kill viruses), but medical kits should also include water treatment tablets or filters. Iodine tablets and tincture are unreliable for eliminating *Cryptosporidium* unless the treated water sits overnight. Twice the recommended amount should be used when water is visibly dirty. Chlorine is a chemical disinfectant that has variable germicidal activity. Microstrainer portable filters (0.1-0.3 μ) do not remove viruses, though filters impregnated with iodine kill some viruses but may miss *Cryptosporidium* and *Giardia* in cold water. There are no reliable scientific reports evaluating specific brands, but PUR™, MSF™ and Sweet Water™ are the most popular brands.

For treatment, fluid rehydration with an electrolyte solution prevents dehydration and is usually adequate treatment by itself. The World Health Organization's Oral Rehydration Solution packets are readily available, but for the average healthy adult, rehydrating with any fluid that contains both salt and sugar (electrolytes) is sufficient. Rehydrating with water alone can further deplete essential elements. An easy to make and equivalent formulation involves mixing one liter of water with 1 teaspoon of salt, 8 teaspoons of sugar. A banana (for potassium) can be added.

Lactobacillus tablets and yogurt are widely used "home" remedies, but no clinical evidence supports their use. Bismuth subsalicylate (Pepto-Bismol) in high doses (1 ounce or 525 mg every 30 minutes for 8 doses) was effective in several placebo-controlled trials.²⁴ High doses of this salicylate product are unsafe in persons with renal disease or aspirin allergy.

Loperamide (Imodium) and codeine-containing products act as constipating agents and can provide rapid relief in simple TD. Such antimobility agents can worsen disease when the offending bacteria are toxin-producing because they lengthen the amount of time the toxin stays in the intestinal tract. Antimobility agents are discouraged, therefore, when there is a high fever or bloody diarrhea. Promethazine (Phenergan) 25 mg suppositories

or ondansetron oral dissolving tablets each 4-6 hours are effective antiemetics with few side-effects (adult dose).

Antimicrobials can be used after the onset of diarrheal disease, especially when accompanied by fever, vomiting, or bloody stools. Antibiotics will shorten the illness by 1 to 1.5 days. Fluoroquinolones used to be the antibiotics of choice with ciprofloxacin, 500 mg bid for 3 days most often used. However, in some areas of the world, specifically southeast Asia, ciprofloxacin resistance by *Campylobacter jejuni* is approaching 90%.^{25,26} Azithromycin administered as 1 gm PO or 500 mg daily for 3 days is currently an effective regimen in adults.

2) Parasites

Far more common abroad than in the United States, parasites such as *Cryptosporidium* can cause diarrhea, or *Trichuris trichiura* (whipworm) can cause abdominal pain and a breadth of gastrointestinal complaints, and *Giardia lamblia* can cause profuse malabsorptive diarrhea. These diseases can be significantly debilitating and quickly divert a trip. Nitazoxanide (Alinia) in doses of 500 mg twice daily for 3 days in adults can effectively treat these parasites. It is important to differentiate diarrhea secondary to parasite infection from the far more common TD.

3) Malaria

Approximately 7 million Americans travel to malaria-endemic areas annually. Infection rates and antimalarial susceptibilities vary widely by region. Malaria prophylaxis is critically important. Consultation with <http://wwwn.cdc.gov/tavel/default.aspx> or a similar website will elucidate regional recommendations based on resistance patterns. These might include Mefloquine 250 mg per week started 1-2 weeks prior to travel and continued one month post travel. Another option is daily doxycycline 100 mg started 1-2 days prior to travel and also continued for a month post travel. If the neuropsychiatric side effects of mefloquine or the photosensitive or gastrointestinal effects of doxycycline are intolerable then atovaquone-proguanil (Malarone) 250/100 mg daily will also work if taken 1-2 days prior to travel and continued 7 days post travel. Doses for both are for adults. Staying indoors during the prime biting hours of dusk-to-dawn will reduce the probability of infection, as will insect repellent that contains N,N-diethyl-meta-toluamide (DEET), and permethrin-treated bednets.

In the event of prophylactic failure and a more than 24 hours' distance to a medical facility, a self-treatment regimen for malaria should be in all at-risk travelers' kits. Self-care is initiated if a high fever develops with or without persistent headache, muscle aches and weak-

ness, vomiting, or diarrhea. Malaria can be fatal if treatment is delayed. Prompt medical evaluation remains imperative, and attempts should be made to reach appropriate facilities even after treatment is initiated.

For patients who contract malaria and who did not take prophylaxis, or who took prophylaxis other than atovaquone-proguanil, the only drug recommended for self-treatment is atovaquone-proguanil taken as 4 tablets per day for 3 days (1000/400 per day for adults). For patients who were taking atovaquone-proguanil prophylaxis but developed breakthrough malaria, consultation with medical professionals is necessary, and further use of atovaquone-proguanil will be ineffective and could prove dangerous. Potential side effects of Malarone include abdominal pain, nausea, vomiting, and headaches.²⁷

Malarone™ is active against the erythrocytic and exoerythrocytic stages of *P. falciparum* malaria. In 10 clinical trials in adults and children, Malarone cured 96.7% of 521 cases of *P. falciparum* malaria. However, relapses from the exoerythrocytic stages of *P. vivax* and *P. ovale* can occur and may require further treatment with primaquine.

Importantly, several of the prophylactic medications are not recommended for use in presumptive self-treatment. Mefloquine can have serious neuropsychiatric side effects when taken in high doses. Halofantrine (Halfan), which is readily available overseas, may cause cardiac abnormalities and is particularly discouraged in patients taking mefloquine prophylaxis.

A CDC-sponsored malaria hotline is available. See resource #4 for information regarding obesity.

4) Envenomations

Other envenomations, such as bee stings, are even more likely overseas. Rarely, African "killer" bees can form dozens of hives in close approximation and have no seasonal barrier to their swarming activity. EpiPen emergency injections of epinephrine might be included in the kit, and appropriate teaching of its use imparted on the traveler to a true high-risk area. An H₁ and an H₂-blocking antihistamine (Diphenhydramine 50 mg and Famotidine 20 mg adult dose) should be immediately given by mouth if the person having the allergic reaction can swallow. Prednisone (60 mg) should also be given.

Snake and poisonous spider envenomations are generally best managed with thorough wound-care management and medical follow-up.

Acute Mountain Sickness (AMS) and High-Altitude Travel

At 9,000 feet of altitude, approximately 20% of travelers will experience acute mountain sickness. It reach-

es 50% at extremely high altitudes that are > 18,000 ft. Acute mountain illnesses can be as mild as headaches, anorexia, and nausea or as severe as pulmonary (HAPE) or cerebral edema (HACE). There is some evidence that acetazolamide (Diamox) 125-250 mg twice a day, starting the first day of ascent and continuing for 48 hours after reaching maximal altitude, can be used prophylactically. The mechanism is interesting: decreased ventilation and relative hypoxemia contribute to the development of AMS; acetazolamide promotes renal excretion of bicarbonate, causing metabolic acidosis, compensatory hyperventilation and improved oxygenation. Travelers generally reported a tingling sensation in their extremities with use of acetazolamide.

Dexamethasone has been used for prevention but is now mainly recommended for treatment of AMS.²⁸ As a treatment, dexamethasone is given as an 8 mg initial dose, followed by 4 mg every 6 hours in adults.

High-altitude pulmonary edema is a noncardiogenic edema that is caused by hydrostatic forces rather than by either inflammation or primary "pump" failure.²⁹ Nifedipine SR 30 mg orally each 12-24 hours, or 10 mg sublingual each 4-6 hours, reduces pulmonary vascular resistance and pulmonary artery pressure and improves oxygenation in adults.

There are also lightweight, portable hyperbaric bags (Gamow) that are large enough to hold one person. The bag is inflated by a manual air pump, and its pressure simulates descent. Inflation to only 2 psi corresponds to a drop in altitude of approximately 5,000 feet, potentially life-saving in the event of HAPE or HACE. Disadvantages include a weight of approximately 5 kg, potential for claustrophobia in the patient, and the need for continual pumping to maintain fresh air circulation in the bag. These can even be rented for short and long expeditions.

For women taking estrogen-containing birth-control pills, the already increased risk of thromboembolism may be further increased. Physicians may wish to discuss the use of progesterone-only compounds or other methods of birth control while patients are at altitude.

Another necessary item for high altitude travel and any travel medicine kit is sunscreen. It is important to cover both UVA, which is involved with photoaging and cancer, and UVB spectrum, which is more directly connected with sunburn, as well as cancer. ■

Resources

1. Adventure Medical Kits 1-800-324-3517, www.adventuremedicalkits.com. Pre-made basic medical kits.
2. Alertness Solutions, Inc. www.alertness-solutions.com. Products and information about jet-lag avoidance.
3. Centers for Disease Control and Prevention. Health Information for the International Traveler. Atlanta:

U.S. Department of Health and Human Services, Public Health Service, 2008. Available at: 877-252-1200 and <http://wwwn.cdc.gov/travel/contentYellowBook.aspx>.

4. CDC Malaria hotline, Monday-Friday 8am-4:30pm eastern; 770-488-7788. If emergency consultation is required after hours, call 770-488-7100 and request to speak with a CDC Malaria Branch clinician. <http://www.cdc.gov/malaria/travel/index.htm>
5. Chinook Medical Gear Inc. Travel supplies including expedition gear and kits, www.chinookmed.com
6. The Travel Doctor. Outstanding resource for malaria prophylaxis: <http://www.traveldoctor.co.uk/tables.htm>
7. Travel Medicine, Inc. for commercial suture and syringe kits. 1-800-TRAVMED (872-8633); <http://www.travmed.com/scripts/catalog.epl>.
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CME Questions

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18. Which of the following agents is of proven efficacy for the treatment of the hepatic stages of falciparum malaria?

- a. Doxycycline
- b. Chloroquine
- c. Mefloquine
- d. Atovaquone/ Proguanil
- e. Clindamycin

19. The following agent reduces pulmonary vascular resistance in high altitude pulmonary edema.

- a. Amlodipine
- b. Nifedipine
- c. Acetazolamide
- d. Furosemide
- e. Epinephrine

20. Which of the following agents is not indicated for invasive diarrhea due to *Shigella* species

- a. Ampicillin
- b. Ciprofloxacin
- c. Azithromycin
- d. Trimethoprim/Sulfamethoxazole
- e. Rifaximin

Answers: 18. (d); 19. (b); 20. (e)

CME Objectives

The CME Objectives of *Travel Medicine Advisor* are:

- to present the latest data regarding the diagnosis and treatment of various travel-related diseases;
- to present new data concerning recommended precautions and prophylaxis for patients traveling to specific areas of the world; and
- to alert the readers to recent disease outbreaks and epidemics. ■

ISTM Course 2008

The International Society of Travel Medicine is pleased to sponsor Travel Medicine Review and Update, to be held March 14-16, 2008, in Dallas/Fort Worth, Texas. This course is co-sponsored by Mount Auburn Hospital, a teaching hospital of Harvard Medical School. For further information, please go to www.istm.org. ■

PHARMACOLOGY WATCH



Supplement to Clinical Cardiology Alert, Clinical Oncology Alert, Critical Care Alert, Infectious Disease Alert, Internal Medicine Alert, Neurology Alert, OB/GYN Clinical Alert, Primary Care Reports, Travel Medicine Advisor.

Adult Immunization Guidelines from CDC Released

In this issue: Updated Immunization Guidelines from the CDC; Do antivirals have a role in the treatment of Bell's palsy? Topiramate is a promising treatment for alcohol dependence; and FDA Actions.

The *Annals of Internal Medicine* has published updated Adult Immunization Guidelines from the CDC as an early release article on their website dated October 18. Full guideline will be available in the November 20 print edition. The guideline has several important changes and updates.

The new herpes zoster vaccine is added to the guideline this year. The vaccine should be given routinely to all immunocompetent adults age 60 and older. It is not recommended for immunocompromised adults as it is a live attenuated virus. The vaccine is given once in a lifetime, and does not require a booster.

The new human papilloma virus has also been added. The vaccine protects against 4 types of HPV, which causes 90% of genital warts and 70% of cervical cancers. It is recommended for women aged 11 to 26 years. It requires three doses given at zero, 2 and 6 months. It should not be given to pregnant women.

The new pertussis vaccine is coupled with diphtheria and tetanus to form Tdap (Adacel- Sanofi Pasteur). This is a 1-time, 1-dose vaccine that should be given to all adults age 64 or younger when they are scheduled for their next tetanus (Td) booster. Tetanus boosters should be given every 10 years, but the interval may be shortened to as little as two years for high-risk patients including postpartum women, close contact of infants younger than 12 months of age, and all healthcare workers with direct patient contact. It has not been tested in

adults age 65 or older. This vaccine is different from the previously approved Tdap for adolescents aged 10 to 19 (Boostrix-GlaxoSmithKline).

There are now 15 indications for influenza vaccine. New indications include those who have difficulty handling respiratory secretions or have increased risk of aspiration. All women who are pregnant or will be pregnant during the flu season should be vaccinated. All healthcare workers should be vaccinated unless they have strong contraindications.

Hepatitis B vaccine recommendations have changed, and the vaccine is now recommended for all sexually active adults who are not in a long-term mutually monogamous relationship.

Because of several recent large-scale mumps outbreaks in this country, a mumps vaccine booster is now recommended for specific age groups, especially adults who work in healthcare settings. The standard is to give MMR, even if immunity exists for one or more of the components of MMR.

The pneumococcal vaccine recommendations remain the same. The vaccine should be given at age 65 unless the patient has specific risk factors, in which case it should be given to those younger than 65. A small subgroup of patients should be given a second booster. If the vaccine was initi-

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ated under age 65 for high-risk patients, a booster should be given at age 65 or five years after the initial vaccine. If the vaccine was initiated over age 65, a booster should only be given to immunocompromised patients after five years. The vaccine should not be given every five years (a common misconception). In fact, no one should receive more than two doses under any circumstances. There is even some evidence that more than two doses may be harmful and could potentially attenuate the immune response.

Antivirals and Bell's Palsy?

Do antivirals have a role in the treatment of Bell's palsy? This question has been debated for decades, with several small studies indicating a relationship between herpes simplex infections and facial paralysis. Despite this, treatment with acyclovir or valacyclovir has not been proven to be effective in treating Bell's palsy. Regardless, antivirals are frequently prescribed along with oral steroids. A new study confirms that steroids are useful, but antivirals are not. Nearly 500 patients with new onset of Bell's palsy were randomized to 10 days of treatment with prednisolone, acyclovir, both agents, or placebo. The primary outcome was recovery of facial function. At three months, the proportion to patients who had recovered facial function were 83.0% in the prednisolone group compared with 63.6% among patients who did not receive prednisolone ($P < 0.001$) and 71.2% in the acyclovir group as compared to 75.7% among patients who did not receive acyclovir (adjusted $P = 0.50$). After nine months, recovery was 94.4% for prednisolone and 81.6% for no prednisolone ($P < 0.001$) and 85.4% for acyclovir and 90.8% for no acyclovir (adjusted $P = 0.10$). For patients treated with both drugs, recovery was 79.7% at 3 months ($P < 0.001$) and 92.7% at nine months ($P < 0.001$). There were no serious adverse effects in either group. The authors conclude that early treatment with prednisolone significantly improves the chance of complete recovery, while there's no evidence of benefit with acyclovir alone or in combination with the steroid (*NEJM*. 2007; 357:1598-1607).

Topiramate Promising for Alcohol Treatment

Topiramate is a promising treatment for alcohol dependence according to a new study. The drug was shown to be effective in this role in a small study published in 2003. This new, larger multisite 14 week double-blind, randomized, placebo controlled trial enrolled 371 men and women age 18 to 65 years who were diagnosed with alcohol dependence. Up to 300 mg per day of topiramate

was given to 183 participants while 188 were treated with placebo. Both groups were enrolled in a weekly compliance enhancement intervention program. The primary end point was self-reported percentage of heavy drinking days, while secondary outcomes included other self-reported drinking measures along with laboratory measures of alcohol consumption. Topiramate was more efficacious than placebo at reducing percentage of heavy drinking days from baseline to 14 weeks (mean difference 8.44%; 95% CI, 3.07%-13.80%; $P = .002$). Topiramate also reduced all of the drinking outcomes ($P < .001$ for all comparisons). Adverse events were more common with topiramate, including paresthesia (which occurred in over 50% of those on the drug), taste perversion, anorexia and difficulty with concentration. In general, however, the drug was safe and consistently efficacious for treating alcohol dependence (*JAMA*. 2007;298:1641-1651). An accompanying editorial points out that the benefits of topiramate were still increasing at the end of the study, indicating the longer treatment may be more effective (*JAMA*. 2007;298:1691-1692).

FDA Actions

The FDA has announced new warnings on phosphodiesterase type 5 inhibitors regarding hearing loss. The drugs include sildenafil (Viagra, Revatio), tadalafil (Cialis) and vardenafil (Levitra). The agency has received 29 cases of sudden hearing loss associated with use of the drugs dating back to 1996. Most cases were unilateral and temporary.

Modafinil (Provigil) has also been the subject of new warnings including serous rashes and psychiatric symptoms. The drug, which is used for narcolepsy, obstructive sleep apnea, shiftwork disorder, and multiple sclerosis, has been associated with severe rashes including Stevens-Johnson syndrome and toxic epidermal necrolysis. The FDA suggested caution should be exercised when modafinil is given to patients with a history of psychosis, depression, or mania.

An FDA advisory panel has recommended restricting childhood cold medications to children over the age of six years. They also recommend strong limits on marketing these products for younger children. This follows a voluntary withdrawal from the market of infant cough and cold medications by most manufacturers of these products. Voluntary withdrawal involves medications used in children younger than two years. The drugs that contain decongestants and antihistamines have been associated with more than one hundred deaths since 1969. ■