EMRA

International Emergency Medicine

A Guide for Clinicians in Resource-Limited Settings

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Use **left mouse** button to advance one page.
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"Home" key on keyboard jumps to cover.
"End" key on keyboard jumps to last page.

Navigate to specific chapters using the **table of contents**.

Touch **"Escape"** to exit full-screen mode.

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Handbook of International Emergency Medicine

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Introduction

Welcome to the first edition of EMRA's *International Emergency Medicine* handbook. We have drawn upon the experience and guidance of leaders in the field of international emergency medicine from all over the world, who have provided editorial direction and direct oversight of the content. The overall aim of this text is to provide a base of knowledge and preparation for the provision of medical care in resource-constrained environments, where familiarity with and recognition of clinical, social and cultural differences are important factors in securing the health of our patients.

The practice of medicine is very much a *local* issue – with resource availability, major contributors to morbidity and mortality and micro-organism ecology differing substantially from one region to another. As well, the social, financial and bureaucratic responsibilities inherent in licensing and the practice of medicine differ dramatically from nation to nation. While these challenges may seem significant, medical students, residents and attending physicians are seeking international medical experiences in increasing numbers, and many medical education institutions are developing global health mission statements, curricula and leadership. Despite the good intentions of the majority of those seeking medical experiences abroad, pitfalls abound; it is all too easy to fall into the trap of overestimating one's experience, abilities, and ultimate utility in medical arenas outside those in which we are accustomed to practicing. Indeed, when arriving in a new and foreign practice setting, it is easy to become a burden rather than an asset to local providers and health systems. This text seeks to assist the reader in meeting these challenges.

This is a "know before you go" handbook that presents details and information to consider while preparing for an international medical experience. The content is intended to be an easily accessible reference guide for physicians or trainees staffing a casualty department or other acute medical facility.

Given the nature of international medical experiences, some disclaimers regarding personal comportment and the use of this text are required.

- First, do no harm. Lack of supervision or available specialist referral does not justify potentially dangerous medical or surgical therapies or interventions if the provider is not familiar or experienced in their execution, indications, pros, cons, adverse outcomes and other relevant treatment options.
- One should, at all times, respect and adhere to the laws of the country, medical board, licensing body or municipality in which one practices. Medical licensing procedures may differ dramatically, even within the same country, and failure to follow these rules can lead to civil and/or criminal liability.

- One should also remember that, in many societies, physicians and other medical providers are regarded with respect and are afforded positions of relative authority. As such, behavior both inside and outside of the hospital may have a significant bearing on your success as a trainee or provider. It is always important to be aware of and respect societal and cultural norms regarding attire, behavior and language.

- There is a robust section on medical ethics in this book. The case examples, while by no means exhaustive, seek to provide the trainee or practitioner with food for thought regarding medical practice, both at home and abroad. Supervision may be lacking in many international medical settings. Students or trainees who are not licensed or permitted to perform a procedure without supervision in their home institutions, in general, should not be acting without supervision abroad. If one is participating in an observership, it is important to confine one's behavior accordingly. Furthermore, concepts of informed consent may differ substantially from nation to nation and culture to culture. A familiarity with local norms, as well as frequent consultation with advisors or informed local providers, should guide practice.

- This text is not exhaustive. While an effort has been made to provide the most up-to-date information, treatment guidelines and recommendations, medicine is in constant flux; it is the responsibility of the provider to check current local practice guidelines and standards. The recommendations provided in this text may not be suitable for every region or practice setting, and the reader is encouraged to modify these recommendations as is indicated.

Congratulations on your upcoming international medical experience. It is our hope that consideration of the relevant topics and concepts in this text will enrich and diversify your preparation and, ultimately, optimize the care and outcomes of your patients. Good luck and safe travels.

—The Editors

Table of Contents

Types of International Health Experiences

International health care experiences vary widely depending on region, participating providers, and available resources. The success of your experience – in terms of both personal and educational value and the service provided to the local indigenous population – ultimately will be determined by the setting in which you operate. As is always the case in international medicine, providers working in some realms outside of their normal scope of experience may find themselves less equipped than local practitioners in terms of knowledge and first-hand exposure.

Medical Care

The majority of international health care experiences in which trainees and practitioners participate involve health care delivery. Generally, providers are present for a delineated period of time – providing medical treatment and, perhaps, limited education before returning home. While this type of experience is educational for the participant, the impermanence of the situation frequently provides only limited benefits for local populations, and may, in fact, do more harm than good. North American and European providers may have little experience working with the limited resources that typify most health care facilities in sub-Saharan Africa or Southeast Asia. Furthermore, providers who are unaccustomed to and unfamiliar with local contributors to morbidity and mortality may have limited experience in providing care, thus becoming more of a burden to local practitioners than an asset. In addition, language and cultural differences and barriers may be difficult to manage during short interventions.

Development

International development encompasses foreign aid, governance, health care, education, gender equality, disaster preparedness, infrastructure, economics, human rights, environment, and associated issues. Development missions within the rubric of health care typically involve the provision of medical care in times outside of crises or natural or man-made disasters. The intent of most

international medicine development projects is the capacity-building of local providers or health care infrastructures. International development projects may consist of a single, transformative project to address a specific problem, or a series of projects designed to target several aspects of society. Successful projects involve problem-solving reflective of the unique culture, politics, geography, and economy of a region. Health care professionals functioning in development settings may be providing medical care, while at the same time educating local practitioners or seeking to impart an improved capacity to provide quality health care to a local populace.

Disaster Response (Disaster Relief)

Many international medical experiences are framed in terms of providing emergency relief in the setting of a natural or man-made disaster. The health care needs of populations in these settings differ significantly from those in international *development* missions. Depending on the nature of the disaster, populations may substantially lack basic needs, including food and shelter. Health care, while an important component of crisis response, may be only one part of the provision of care to such a population. Disaster-affected populations also have significant mental health and other needs that may be quite different from those required outside times of crises. For example, in the days immediately following the 2004 tsunami in Southeast Asia and the 2010 earthquake in Haiti, health facilities were overcome with the burden of acute traumatic injury. Crush injuries and broken bones were common, and providers and missions had to tailor their responses to these realities. Within weeks of the disasters, however, the burden of disease shifted away from acute traumatic injury to managing chronic and infectious diseases and the psychiatric needs of the population.

Refugee/Internally Displaced Person (IDP) Health

Refugee care may be divided into *emergency, post-emergency* and *repatriation*, with differing needs at each stage. A detailed and thoughtful assessment of the initial health care needs of the refugee population during the emergency phase is vital. Refugee and IDP populations frequently have many of the same requirements as populations dealing with disaster. By definition, refugees and IDPs migrate from one area to another, commonly rendering them without basic resources. These populations frequently concentrate in urban slums or impromptu camps where overcrowding, malnutrition, violence and poor sanitation are commonplace. In addition, refugee populations often live within communities and cultures distinct from their own; as such, their ability to care for themselves and provide for their families is limited.

Health care providers serving refugee populations both during and after an emergency phase may find the provision of medical care challenging. Once the initial crisis is over, refugee populations may face significant economic disadvantages and discrimination by the local indigenous society, as well as high rates of violence, infectious disease and malnutrition. Safety is a concern both during and after the emergency phase; therefore special attention should be paid to the most vulnerable members of a refugee group. Psychiatric services should become an important consideration in all phases of refugee care.

Post-conflict

The provision of health care in post-conflict settings has received greater attention in recent years, as many countries emerge from national strife and begin the process of health care system development. The challenges inherent in post-conflict settings are immense. Typically, many war-torn nations have experienced significant "brain drain," wherein the country's native health care professionals have fled as refugees or sought safety in regions with security and better employment options. Health care facilities may have undergone significant looting; there may be few health care infrastructures left to support the provision of care. Despite the end of open conflict, security problems may persist: crime increases and combatants become unemployed, but not necessarily disarmed; and health care parameters may continue to decline, despite the end of conflict. There is some evidence that the immediate post-conflict phase is associated with an increased transmission of sexually transmitted diseases, including HIV. As soldiers return home, social networks are re-established and crime and substance abuse increase; health care systems struggle to meet the preventive medical needs of their populations. Interactions with members of the military, including peacekeeping forces and former combatants, sometimes complicate the process of recovery and the provision of care.

Practicing Medicine in Resource-Limited Settings

Practicing medicine in resource-limited settings is educational, rewarding and challenging. Medical treatments, laboratory studies and radiographic tests commonly relied upon at "home" institutions often are unavailable. Additionally, populations in these settings frequently lack access to the most basic necessities, such as food, clean water, adequate shelter, and sanitation. These factors contribute to an increased prevalence of disease and poorer health outcomes. Caring for patients and making an impact in such communities requires patience, resourcefulness, creativity and a long-term commitment. The problems encountered in these regions can sometimes seem too vast to comprehend; inevitably, medical providers who practice in resource-limited environments will feel overwhelmed. Carefully considering the challenges ahead and the specifics of the region to be visited can help prepare you for the experience.

Here are some things to consider:

- **Health care challenges in different regions are distinct.** Each region will have its own patterns of disease and illness with unique issues that may include malnutrition, lack of clean water, overcrowding, and adverse environmental/geographic conditions.
- **Health care resources may be minimal.** The technologies that seem ubiquitous in hospitals in wealthy nations are rarely available in low-resource communities. Additionally, specialized consultation services are often scarce.
- **Cultural context is important.** Successful health promotion and treatment of disease can be greatly influenced by the cultural norms of a society. Addressing the health care needs of a population requires an understanding of, and respect for, the local culture and beliefs.
- **Infrastructure can be problematic.** Transportation and road conditions often are unreliable, and power sources can be intermittent and unpredictable.
- **Politics.** Political instability can complicate the delivery of health care and potentially lead to a dangerous work environment.

A number of resources are available online to help you prepare for your trip. The Center for Disease Control and Prevention (CDC) and World Health Organization (WHO) websites have region-specific information.

Pre-Departure

Background

Careful preparation prior to departure is essential to success in the field. Nothing is more important to building global health expertise than high-quality field experiences. Failures in planning can have a serious impact not only on your career, but also on your personal health and safety. On the other hand, thoughtful preparation and outstanding performance in the field will augment your skills and help you gain the respect of your partners.

➲ REMEMBER!

- ✓ Never panic.
- ✓ Prepare well.
- ✓ Be nice.
- ✓ Work hard.

These are essential steps for developing definitive global health mastery.

Framework for Planning

One Year Ahead

- Research and identify potential sites for an international rotation.
- Discuss with your program director/supervisor your intention to participate in an international experience.
- Identify global health mentors to assist in optimizing a high-yield experience.
- Speak to peers or colleagues who will be influenced by your absence.
- Investigate and understand the local medical licensing and practice requirements and conditions in the location you're planning to visit.

Six Months Ahead

- Identify faculty members to serve as references or letter-writers.
- Verify that your passport is valid for at least six months AFTER your return date and renew, if necessary. Also ensure that there are at least several open pages with room for additional travel stamps.
- Begin the application process for funding/scholarships, if applicable.

Three Months Ahead

- Apply for visas, if necessary. Check your destination country's embassy website for specific information.
- Purchase evacuation insurance and supplemental medical travel insurance.
- Schedule an appointment with a travel clinic to obtain appropriate vaccinations and prescriptions for the region where you will be working. (http://wwwnc.cdc.gov/travel/destinations/list.aspx)
- Meet with a faculty member or mentor to outline rotation goals and objectives.
- *Resident physicians:* Submit graduate medical education (GME) and other institution-specific approval paperwork, including malpractice coverage forms.

Two Months Ahead

- Book plane tickets. Traveling on major international carriers is always best.
- Arrange for payment of your rent, loans, utilities, and other bills while away.

One Month Ahead

- Ensure that your email account is accessible worldwide.
- Create a Skype or other internet telephone account. A headset may be useful.
- Arrange for care of pets and plants.
- Contact your bank to let it know you will be traveling abroad. Confirm that your ATM card will work internationally and that your passcode is comprised of *numbers* (many foreign ATM keypads do not have letters).
- Inform your credit card company of all countries you may potentially visit. Obtain a PIN number for the withdrawal of cash from an ATM in case of emergency. MasterCard and Visa are preferred cards abroad.
- Purchase travel items (mosquito net, electrical adapters, phrase books).
- Identify an emergency contact.
- Verify that a post-exposure prophylaxis (PEP) is available at your field site, or arrange to bring it with you.
- Provide emergency contact information to the program leadership at both your home and field locations. Emergency contact information should include your full name, citizenship, passport number, date of birth, professional title, home institution, mobile number, email, home address, and emergency contact information.

One Week Ahead

- Photocopy your passport, visa, and travel documents, and give a copy to your professional administrator and emergency contact.
- Scan important travel documents, including your passport, visa, medical license, and medical school diploma. Load information on a USB flash drive, or email yourself and your emergency contact.
- Back up your hard drive, if traveling with your laptop.
- Photocopy your medical license, board certifications, medical school/residency diploma and any other applicable licenses. Bring several copies.
- Consider contacting the U.S. Postal Service (www.usps.gov) to hold mail delivery.
- Store valuables in a safe place.
- Fill prescriptions.
- Reconfirm specific travel details (including contingencies) to final destination.

Two Days Ahead

- Pack.
- Empty the refrigerator of perishable items.
- Identify the amount and type of currency needed and a safe plan for its use, transport, and storage. Obtain recent U.S. currency (peach-colored 20s and new 10s) for emergency use; however, local currency is preferable.
- Check and charge camera, laptop, and cell phone batteries.
- Set up an "out of office" reply on your email accounts.
- Leave a house key and itinerary with a neighbor or emergency contact.
- Reconfirm international flights. Print and pack a copy of your itinerary; you may need it to gain entrance into airports abroad on your journey home.
- Recheck the political and security situation in your country/region of destination.

One Day Ahead

- Take out half of what you packed, and leave it at home!

After You Return

- Create and submit professional reports (financial, programmatic, scholarly, etc.).
- Submit evaluation forms to your leadership team.
- Schedule a debriefing session.
- Continue to take your anti-malarial medications, as prescribed.
- Send a thank-you note to your overseas co-workers.

Seek medical attention if you develop a fever or flu-like symptoms within a year of return, as some tropical diseases have delayed presentations. Also advise your physician of specific exposures (animal bites, animal scratches, insect bites, unexplained rashes, and others).

Example Packing List

Packing needs for field assignments will vary by context. This list is neither exhaustive nor intensive. It should be used as a starting point for preparation and developed over several months prior to departure.

Documents	
Passport* (plus an additional copy)	Trip cancellation insurance*
Visa* (plus an additional copy)	Driver's license*
Immunization card* (plus an additional copy)	ATM/credit cards*
Air ticket* (plus an additional copy)	Cash*
International evacuation insurance* (plus an additional copy)	Copy of medical school/residency diploma/board certification(s)
Medical insurance card*	Copy of medical license
CV/résumé	Hospital ID badge
Extra passport photos	Business cards
Address/Contact List*	
Local airline office	Local U.S. embassy/consulate
Family, friends, neighbors	Arrival/airport/hotel contacts
Lost ATM/credit card reporting	Evacuation insurance contact
Health insurance information	
Gear	
Money belt*	Day pack
Alarm clock	Headlamp/flashlight
Mosquito net	Sunglasses
Rain protection	Duct tape
Swiss Army knife (no carry-on)	Sewing kit
Ear plugs*	Pocket tissues
Toilet paper	Luggage locks (for hotel, not flight)
Quick-dry travel towel	Flip-flops
Bandana/scarf	Travel clothesline
Laundry detergent	Sink stopper
Pocket medical references	White coat
Stethoscope and/or other necessary medical equipment	Travel guide
Phrasebook	Water purifier or tablets
Plastic, zippered bags	Extra personal protective equipment: gloves, face mask (surgical or N-95), and eye protection
Electronics	
Notebook computer/handheld device	Electrical adapters/converter
Identification badge*	Surge protector
Extra batteries	Modem/phone adapters
Wireless device/laptop and power cord*	Other cables and adapters
Blank CD-ROMs	Camera and charger*
Flash drive*	Unlocked cell phone and charger*
Memory cards for camera	
First Aid Kit	
Sutures and needle driver	Nitrile gloves
Alcohol wipes	Cloth tape
Skin-closure strips	Self-adhesive blister pads
Safety pins	Spare eyeglasses/contacts
Vitamins	Antiemetic medication
Motion sickness medication	Topical antibiotic
Oral birth control medication	Bronchodilator/inhaler
Acetaminophen/NSAIDS	Nasal decongestant/allergy medication
Condoms	Tweezers
Adhesive bandages	Fluconazole antifungal medication
Prednisone/corticosteroid	Antihistamine
Laxative	Anti-diarrheal
Sunscreen	Ciprofloxacin
Hand sanitizer	Post-exposure prophylaxis
Mosquito-repellant	Antimalarial medication
Toiletries	
Toothbrush/toothpaste	Dental floss
Shampoo/soap	Comb/brush
Deodorant	Razor/shaving cream
Contact lens kit	Eyeglasses
Sunscreen	Makeup
Mirror	Lotions/creams
Lip balm	Prescription medicines*
Facecloth	Tampons
Extras	
Notebook/journal/pens	Photos from home
Gum/candy/energy bars	Powdered beverage mix (for iodine tablets)
Magazines/novels	Playing cards/games

**Pack in carry-on luggage.*

Security While in the Field

Situational Awareness

Safety begins with developing a situational awareness of your surroundings and identifying potential threats to reduce the likelihood of a dangerous incident. Because each region poses unique hazards, it is important to evaluate each context with great care. Situational awareness should encompass information on the country, the region, and the communities in the operational area, including, but not limited to:

- Identification of social groups within the population. (Pay particular attention to vulnerable people and causes of social friction.)
- Identification of interests, policies, and capabilities of existing stakeholders (governments, non-governmental organizations, faith-based groups, and others).
- Description of relationship between stakeholders and interested parties, including the effectiveness of government and civil infrastructure (police, fire and emergency services, for example).
- Identification of locations and situations that pose an increased security risk (high criminality and political instability, for example).
- Create an actionable plan to avoid or mitigate the impact of known hazards.

Your own research and experience are the best sources of information for developing an operational awareness of the situation you will find in the field.

General Security Guidelines

- Take time to plan activities. Try to determine the exact routes you intend to take before traveling. Know where you are and where you are going on a map.
- Dress and behave appropriately. Pay close attention to local customs.
- Developing skills in locally relevant languages is important. (Start with useful words and phrases needed to interact with people.)
- Educate yourself about the local security conditions (e.g., location of the nearest police station, emergency system procedures, and potential safe areas).
- Walk with companions, if possible, and NEVER walk alone at night.
- Use well-traveled and lighted routes.
- Maintain a low profile and avoid disputes or commotion in the streets.
- Never hitchhike or accept a ride from strangers.
- Maintain calm. Panic never helps.

Emergency Evacuation

Despite the best planning, conditions sometimes deteriorate to the point that field assignment staff may need to evacuate quickly. Your research and planning should include knowledge of your project's contingency plans, including emergency evacuation procedures.

Health and Sanitation

Good Sanitation

- Wash your hands often with soap and clean water, or use an alcohol-based hand sanitizer.

Consume Safe Food and Drinks

- Eat foods that are packaged or are freshly cooked and served hot.
- Do not eat raw meats or seafood. Only eat fruits and vegetables with intact peels, or those for which you've removed the peels yourself.
- Drink only bottled, boiled, or chemically treated water; and bottled or canned carbonated beverages. Ensure the seal on bottled beverages has not been tampered with.
- Avoid tap water, fountain drinks, and ice cubes.
- To disinfect your own water: boil for one minute, or filter the water and add two drops of household bleach or one half of an iodine tablet per liter of water.
- Use bottled, boiled, or chemically treated water to wash dishes, brush your teeth, and wash and prepare food.

Animals and Insects

Use insect repellent that contains one of the following active ingredients: DEET, picaridin (KBR 3023), oil of lemon eucalyptus/PMD, or IR3535.

When outdoors, wear lightweight, long-sleeved shirts; long pants; and a hat. For greater protection, clothing may also be sprayed with repellent containing permethrin or another EPA-registered repellent.

- Remain indoors in a screened area, or use insect repellent frequently on uncovered skin during peak biting periods.
- Sleep under a mosquito net (preferably treated with permethrin).
- Spray rooms with products effective against flying insects, such as those containing pyrethroid.
- Stay away from all animals, including dogs and cats.
- If you are bitten or scratched, wash the wound well with soap and clean water followed by a povidone-iodine solution. **Seek medical care immediately**.

Regional Considerations

Before traveling, research the local geography, climate, culture and common diseases. This information will help you determine what to pack and what vaccinations are necessary prior to travel. Be sure to bring enough of your everyday prescription medicines to last for the duration of your trip; keep them in their original prescription bottles in your carry-on luggage. Remember to bring adequate and appropriate insect-repellant and clothing to avoid insect bite exposures.

Vaccinations

Recommendations

Arrange to receive vaccinations *at least* four to six weeks prior to travel. Protect yourself from illnesses present in other parts of the world, and prevent the importation of infectious diseases across international borders. Necessary vaccinations depend on your destination, whether you will be spending time in rural areas, the season of travel, age, health status, and previous immunizations.

Routine vaccinations are recommended for *all* travel if not up-to-date, including: **MMR (measles/mumps/rubella vaccine), DPT (diphtheria/pertussis/tetanus vaccine), poliovirus, influenza, and varicella**.

In addition to the routine vaccinations listed above, the following vaccinations are recommended for specific regions (*shaded solid* on grid):

Country	HAV	HBV	Typhoid	Rabies	Meningococcus	Polio	JEV	Yellow Fever
Antarctica								
Carribean	■	■	■	■				
Central Africa	■	■	■	■	■	■		■
East Africa	■	■	■	■	■	■		■
East Asia	■	■	■	■			■	
Eastern Europe & Northern Asia	■	■	■					
Indian Ocean Islands	■	■	■	■				
Mexico & Central America	■	■	■	■				
Middle East	■	■	■	■				
North Africa	■	■	■	■				
North America		■						
South Asia	■	■	■	■		■	■	
Southeast Asia	■	■	■				■	
Southern Africa	■	■	■	■				
Southern & Western Pacific	■	■	■					
Temperate South America	■	■	■					
Tropical South America	■	■	■	■				
West Africa	■	■	■	■	■	■		
Western Europe		■						

HAV = Hepatitis; HBV = Hepatitis B Virus; JEV = Japanese Encephalitis Virus
Adapted from The Centers for Disease Control and Prevention (CDC).

Required vaccinations: The only vaccine *required* by International Health Regulations (IHR) is the yellow fever vaccination for travel to certain countries in sub-Saharan Africa and tropical South America. The meningococcal vaccination is required by the government of Saudi Arabia for annual travel during the Hajj, the Islamic pilgrimage to Mecca.

Pitfalls

Vaccinations are highly effective at preventing certain infectious diseases; however, they are not completely infallible. The vaccinated traveler should assume that some risk persists of contracting the disease(s) against which he or she has been vaccinated.

North America

Countries: Canada, United States of America

Recommended Vaccinations

- Routine vaccinations are recommended, if not already up-to-date.
- Hepatitis B: Recommended for all unvaccinated persons who might be exposed to blood or body fluids, have sexual contact with the local population, or be exposed through medical treatment.
- Rabies vaccination: Only recommended for travelers involved in any activities that might bring them into direct contact with bats, carnivores, and other mammals.
- Common Diseases: The incidence of communicable diseases is unlikely to prove a hazard for international travelers greater than that found in their own countries. There are, of course, health risks; but, in general, the precautions required are minimal.

Mexico and Central America

Countries: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama

Recommended Vaccinations

- Routine vaccinations, **PLUS** hepatitis A, hepatitis B, and typhoid; consider rabies and yellow fever (North and Northeastern regions).
- Typhoid: Recommended for all unvaccinated people, especially if visiting smaller cities, villages, or rural areas and staying with friends or relatives, where exposure might occur through food or water.

Recommended Medications

- Antimalarial drugs, if traveling to a high malaria-risk area.
- Over-the-counter diarrhea medication and/or a prescription for ciprofloxacin 500 mg PO BID x 3-5 days.

Common Diseases

- Diarrhea in travelers is common and may be caused by bacteria, viruses, and parasites.
- Other diseases found in the area include: Dengue fever, filariasis, leishmaniasis, onchocerciasis ("African river blindness"), and gnathostomiasis (roundworms).

Temperate South America

Countries: Argentina, Chile, Easter Island (Chile), Falkland Islands (U.K.), South Georgia and the South Sandwich Islands (U.K.), Uruguay

Recommended Vaccinations and Special Prescriptions

- Routine vaccinations, **PLUS** hepatitis A, hepatitis B, and typhoid; consider rabies and yellow fever (North and Northeastern regions).
- Antimalarial prophylaxis (certain areas only); see regional recommendations in Chapter 3.
- Over-the-counter diarrhea medication and/or a prescription for ciprofloxacin 500 mg PO BID x 3-5 days.

Common Diseases

- Diarrhea in travelers is common and may be caused by bacteria, viruses, and parasites.
- Other diseases found in the area include: Dengue fever, American trypanosomiasis (Chagas disease), leishmaniasis, histoplasmosis, and coccidioidomycosis.

Tropical South America

Countries: Bolivia, Brazil, Colombia, Ecuador, French Guiana (France), Guyana, Paraguay, Peru, Suriname, Venezuela

Recommended Vaccinations and Special Prescriptions

- Routine vaccinations, **PLUS** hepatitis A, hepatitis B, and typhoid; consider rabies.
- Yellow fever: *This vaccine is required in many countries in this region; check CDC website for specific regions/country requirements.*
- Antimalarial prophylaxis
- Over-the-counter diarrhea medication and/or a prescription for ciprofloxacin 500 mg PO BID x 3-5 days.

Common Diseases

- Diarrhea in travelers is common and may be caused by bacteria, viruses, and parasites.
- Other diseases found in the area include: Dengue fever, American trypanosomiasis (Chagas disease), leishmaniasis, bartonellosis, or oroya fever (a sand fly-borne disease), onchocerciasis, louse-borne typhus, and schistosomiasis.

Southern and Western Pacific

Countries: American Samoa, Australia, Christmas Island (Australia), Cocos (Keeling) Islands (Australia), Cook Islands (New Zealand), Fiji, French Polynesia, Guam (U.S.), Kiribati, Marshall Islands, Micronesia, Nauru, New Caledonia (France), New Zealand, Niue (New Zealand), Norfolk Island (Australia), Northern Mariana Islands (U.S.), Palau, Papua New Guinea, Pitcairn Islands (U.K.), Samoa, Solomon Islands, Tokelau (New Zealand), Tonga, Tuvalu, Vanuatu, Wake Island

Recommended Vaccinations and Special Prescriptions

- Routine vaccinations, **PLUS** hepatitis B and typhoid; consider rabies.
- Japanese encephalitis: Recommended for some countries in this region. See the CDC web site for more information.
- Antimalarial prophylaxis
- Over-the-counter diarrhea medication and/or a prescription for ciprofloxacin 500 mg PO BID x 3-5 days.

Common Diseases

- Diarrhea in travelers is common and may be caused by bacteria, viruses, and parasites.
- Other diseases found in the area include: Leptospirosis, dengue fever, Japanese encephalitis, filariasis, chikungunya, and measles. Rabies has been reported. Ciguatera poisoning from ingesting reef fish is common.

Caribbean

Countries: Anguilla (U.K.), Antigua and Barbuda, Aruba, Bahamas, Barbados, Bermuda (U.K.), Cayman Islands (U.K.), Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique (France), Montserrat (U.K.), Netherlands Antilles, Puerto Rico (U.S.), Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, Turks and Caicos Islands (U.K.), Virgin Islands, British Virgin Islands, U.S.

Recommended Vaccinations and Special Prescriptions

- Routine vaccinations, **PLUS** hepatitis A, hepatitis B, and typhoid; consider rabies.
- Antimalarial prophylaxis
- Over-the-counter diarrhea medication and/or a prescription for ciprofloxacin 500 mg PO BID x 3-5 days

Common Diseases

- Diarrhea in travelers is common and may be caused by bacteria, viruses, and parasites.
- Other diseases found in the area include: Dengue fever, leptospirosis, ciguatera poisoning (which results from eating toxin-containing reef fish), histoplasmosis, tuberculosis, and HIV. Cholera recently has been reported in Haiti and the Dominican Republic.

Middle East

Countries: Bahrain, Cyprus, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirates, Yemen

Recommended Vaccinations and Special Prescriptions

- Routine vaccinations, **PLUS** hepatitis A, hepatitis B, and typhoid; consider rabies.
- Antimalarial prophylaxis
- Over-the-counter diarrhea medication and/or a prescription for ciprofloxacin 500 mg PO BID x 3-5 days

Common Diseases

- Diarrhea in travelers is common and may be caused by bacteria, viruses, and parasites.
- Other diseases found in the area include: Cutaneous leishmaniasis, visceral leishmaniasis, West Nile virus, schistosomiasis, measles, polio (Yemen), avian influenza (H5N1), and meningitis.

North Africa

Countries: Algeria, Egypt, Libya, Morocco, Tunisia, Western Sahara

Recommended Vaccinations and Special Prescriptions

- Routine vaccinations, **PLUS** hepatitis A, hepatitis B, and typhoid; consider rabies.
- Antimalarial prophylaxis
- Over-the-counter diarrhea medication and/or a prescription for ciprofloxacin 500 mg PO BID x 3-5 days

Common Diseases

- Diarrhea in travelers is common and may be caused by bacteria, viruses, and parasites.
- Other diseases found in the area include: Dengue fever, filariasis, leishmaniasis, schistosomiasis, tuberculosis, hepatitis B, hepatitis C, and avian influenza (H5N1).

Central Africa

Countries: Angola, Cameroon, Central African Republic, Chad, Congo, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Sudan, Zambia

Recommended Vaccinations and Special Prescriptions

- Routine vaccinations, **PLUS** hepatitis A, hepatitis B, polio and typhoid; consider rabies.
- Yellow fever
- Meningococcal vaccine
- Antimalarial prophylaxis
- Over-the-counter diarrhea medication and/or a prescription for ciprofloxacin 500 mg PO BID x 3-5 days

Common Diseases

- Diarrhea in travelers is common and may be caused by bacteria, viruses, and parasites.
- Other diseases found in the area include: Dengue fever, filariasis, leishmaniasis, onchocerciasis ("river blindness"), African trypanosomiasis ("African sleeping sickness"), schistosomiasis, HIV, tuberculosis, hepatitis B, hepatitis C, plague, polio, histoplasmosis, and hemorrhagic fevers.

Southern Africa

Countries: Botswana, Lesotho, Namibia, South Africa, Swaziland, Zimbabwe

Recommended Vaccinations and Special Prescriptions

- Routine vaccinations, **PLUS** hepatitis A, hepatitis B, and typhoid; consider rabies.
- Yellow fever
- Meningococcal
- Antimalarial prophylaxis
- Over-the-counter diarrhea medication and/or a prescription for ciprofloxacin 500 mg PO BID x 3-5 days

Common Diseases

- Diarrhea in travelers is common and may be caused by bacteria, viruses, and parasites.
- Other diseases found in the area include: Dengue fever, filariasis, leishmaniasis, onchocerciasis ("river blindness"), African trypanosomiasis ("African sleeping sickness"), schistosomiasis, African tick bite fever, tuberculosis, and HIV.

East Africa

Countries: Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Somalia, Tanzania, Uganda

Recommended Vaccinations and Special Prescriptions

- Routine vaccinations, **PLUS** hepatitis A, hepatitis B, and typhoid; consider rabies.
- Yellow fever
- Meningococcal
- Antimalarial prophylaxis
- Over-the-counter diarrhea medication and/or a prescription for ciprofloxacin 500 mg PO BID x 3-5 days

Common Diseases

- Diarrhea in travelers is common and may be caused by bacteria, viruses, and parasites.
- Other diseases found in the area include: Dengue fever, filariasis, leishmaniasis, onchocerciasis ("African river blindness"), African trypanosomiasis ("African sleeping sickness"), schistosomiasis, polio, tuberculosis, HIV, avian influenza (H5N1), and hepatitis C.

West Africa

Countries: Benin, Burkina Faso, Cape Verde, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Liberia, Mali, Mauritania, Niger, Nigeria, Saint Helena (U.K.), Senegal, Sierra Leone, Togo

Recommended Vaccinations and Special Prescriptions

- Routine vaccinations, **PLUS** hepatitis A, hepatitis B, and typhoid; consider rabies.
- Yellow fever
- Meningococcal vaccine
- Antimalarial prophylaxis
- Over-the-counter diarrhea medication and/or a prescription for ciprofloxacin 500 mg PO BID x 3-5 days

Common Diseases

- Diarrhea in travelers is common and may be caused by bacteria, viruses, and parasites.
- Other diseases found in the area include: Dengue fever, filariasis, leishmaniasis, onchocerciasis ("river blindness"), African trypanosomiasis ("African sleeping sickness"), schistosomiasis, polio, tuberculosis, HIV, and hepatitis C.

Indian Ocean Islands

Countries: British Indian Ocean Territory (U.K.), Comoros, Madagascar, Mauritius, Mayotte (France), Réunion (France), Seychelles

Recommended Vaccinations and Special Prescriptions

- Routine vaccinations, **PLUS** hepatitis A, hepatitis B, and typhoid; consider rabies.
- Antimalarial prophylaxis
- Over-the-counter diarrhea medication and/or a prescription for ciprofloxacin 500 mg PO BID x 3-5 days

Common Diseases

- Diarrhea in travelers is common and may be caused by bacteria, viruses, and parasites.
- Other diseases found in the area include: Dengue fever, filariasis, leishmaniasis, onchocerciasis ("African river blindness"), schistosomiasis, hepatitis C, and HIV.

South Asia

Countries: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka, Tibet

Recommended Vaccinations and Special Prescriptions

- Routine vaccinations, **PLUS** hepatitis A, hepatitis B, and typhoid; consider rabies.
- Japanese encephalitis
- Antimalarial prophylaxis
- Over-the-counter diarrhea medication and/or a prescription for ciprofloxacin 500 mg PO BID x 3-5 days

Common Diseases

- Diarrhea in travelers is common and may be caused by bacteria, viruses, and parasites.
- Other diseases found in the area include: Dengue fever, filariasis, visceral leishmaniasis, cutaneous leishmaniasis, leptospirosis, polio, measles, avian influenza (H5N1), HIV, hepatitis C, and tuberculosis.

Southeast Asia

Countries: Brunei, Burma (Myanmar), Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand, Timor-Leste (East Timor), Vietnam

Recommended Vaccinations and Special Prescriptions

- Routine vaccinations, **PLUS** hepatitis A, hepatitis B, and typhoid; consider rabies.
- Japanese encephalitis
- Antimalarial prophylaxis
- Over-the-counter diarrhea medication and/or a prescription for ciprofloxacin 500 mg PO BID x 3-5 days

Common Diseases

- Diarrhea in travelers is common and may be caused by bacteria, viruses, and parasites.
- Other diseases found in the area include: Dengue fever, malaria, filariasis, Japanese encephalitis, plague, avian influenza (H5N1), schistosomiasis, leptospirosis, measles, polio, and HIV.

East Asia

Countries: China, Hong Kong SAR (China), Japan, Macau SAR (China), Mongolia, North Korea, South Korea, Taiwan

Recommended Vaccinations and Special Prescriptions

- Routine vaccinations, **PLUS** hepatitis A, hepatitis B, and typhoid; consider rabies (widespread in China and Mongolia).
- Japanese encephalitis
- Over-the-counter diarrhea medication and/or a prescription for ciprofloxacin 500 mg PO BID x 3-5 days

Common Diseases

- Diarrhea in travelers is uncommon, but may be caused by bacteria, viruses, and parasites.
- Other diseases found in the area include: Japanese encephalitis, measles, dengue fever, chikungunya, leishmaniasis, plague, schistosomiasis, leptospirosis, and rabies.

Northern Asia and Eastern Europe

Countries: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kosovo, Kyrgyzstan, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan

Recommended Vaccinations and Special Prescriptions

- Routine vaccinations, **PLUS** hepatitis A, hepatitis B, and typhoid; consider rabies.
- Japanese encephalitis
- Antimalarial prophylaxis (certain areas only; see regional recommendations in Chapter 3)
- Over-the-counter diarrhea medication and/or a prescription for ciprofloxacin 500 mg PO BID x 3-5 days

Common Diseases

- Diarrhea in travelers is uncommon, but may be caused by bacteria, viruses, and parasites.
- Other diseases found in the area include: Tick-borne encephalitis, diphtheria, tuberculosis, avian influenza virus H5N1, HIV, and hepatitis C.

Western Europe

Countries: Andorra, Austria, Azores, Belgium, Canary Islands (Spain), Denmark, Faroe Islands (Denmark), Finland, France, Germany, Gibraltar (U.K.), Greece, Greenland (Denmark), Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Madeira Islands (Portugal), Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Spain, Sweden, Switzerland, United Kingdom

Recommended Vaccinations and Special Prescriptions

- Routine vaccinations, **PLUS** hepatitis A, hepatitis B, and typhoid; consider rabies (only if relevant exposure is possible).
- Antimalarial prophylaxis *not* required
- Over-the-counter diarrhea medication and/or a prescription for ciprofloxacin 500 mg PO BID x 3-5 days

Common Diseases

- Diarrhea in travelers is uncommon, but may be caused by bacteria, viruses, and parasites.
- Other diseases found in the area include: Tick-borne encephalitis, leishmaniasis, variant Creutzfeldt-Jacob, measles, and avian influenza virus H5N1.

Travel Medicine

Malaria Prophylaxis

Background and Epidemiology

Malaria is caused by four protozoan species of plasmodium: *P. falciparum, P. vivax, P. ovale* and *P. malariae*. A parasite in monkeys, *P. knowlesi*, recently has been documented in Southeast Asia to cause human infection and death, but the extent of its transmission to humans is yet to be established. Of the species mentioned above, *P. falciparum* causes the most severe disease. The vector is the female *Anopheles* mosquito.

From 1997 to 2006, nearly 11,000 cases of malaria among U.S. residents were reported to the CDC. Of these, more than half (59.3%) were acquired in sub-Saharan Africa. In order of magnitude, the other cases were acquired in Asia (13.9%), the Caribbean and Central and South America (13.3%), and Oceania (0.03%). During this same period, there were 54 fatal malaria infections. Almost all (85.2%) were caused by *P. falciparum*, and over a third (71.1%) were acquired in sub-Saharan Africa.

Travelers at the greatest risk include young children, pregnant women and non-immune travelers. Individuals raised in *endemic* countries – but now living in *non-endemic* countries – lose their acquired immunity very quickly, and are at the same risk as non-immune travelers when going to endemic regions. Recommendations for prophylaxis are guided by these concerns and can vary from avoidance measures to chemoprophylaxis. Please consult the CDC and WHO websites for in-depth information on recommendations and resistance patterns.

Treatment/Prevention

- **Seek medical attention as soon as possible.**
- **Take mosquito-avoidance measures.**
  - Because of the nocturnal feeding habits of the Anopheles mosquito, transmission occurs primarily between dusk and dawn.
  - Reduce contact by remaining in areas with screens over the windows; using mosquito bed nets (preferably insecticide-treated); using a pyrethoid-containing flying insect spray; and covering up as much exposed skin as possible, especially at night.
  - The most effective repellant is **DEET**.
- **Chemoprophylaxis**
  - All current recommendations involve taking a medicine before, during, and after travel.
  - Commonly used medications include malarone (atovaquone/proguanil), chloroquine (aralen), hydroxychloroquine (plaquenil), doxycycline, mefloquine or primaquine.
  - See Table 1 below for recommended regimens.

Table 1. Commonly Used Drugs in Malaria Chemoprophylaxis

Drug	Usage	Adult Dose	Comments
Atovaquone/ proguanil (Malarone)	Prophylaxis in all areas	Adult tablets contain 250 mg atovaquone and 100 mg proguanil hydrochloride. 1 adult tablet orally, daily	Begin 1–2 days before travel to malarious areas. Take daily at the same time each day while in the malarious area, and for 7 days after leaving. Contraindicated in persons with severe renal impairment (creatinine clearance <30mL/min). Atovaquone/proguanil should be taken with food or a milky drink. Not recommended as a prophylaxis for children <5 kg, pregnant women, and women breastfeeding infants weighing <5 kg. Partial tablet dosages may need to be prepared by a pharmacist and dispensed in individual capsules, as described in the text.
Chloroquine phosphate (Aralen and generic)	Prophylaxis only in areas with chloroquine-sensitive malaria	300 mg base (500 mg salt) orally, once/ week	Begin 1–2 weeks before travel to malarious areas. Take weekly on the same day of the week while in the malarious area, and for 4 weeks after leaving. May exacerbate psoriasis.
Doxycycline (many brand names and generic)	Prophylaxis in all areas	100 mg orally, daily	Begin 1–2 days before travel to malarious areas. Take daily at the same time each day while in the malarious area, and for 4 weeks after leaving. Contraindicated in children <8 years of age and pregnant women.
Hydroxychloroquine sulfate (Plaquenil)	An alternative to chloroquine for prophylaxis only in areas with chloroquine-sensitive malaria	310 mg base (400 mg salt) orally, once/ week	Begin 1–2 weeks before travel to malarious areas. Take weekly on the same day of the week while in the malarious area, and for 4 weeks after leaving.
Mefloquine	Prophylaxis in areas with mefloquine-sensitive malaria	228 mg base (250 mg salt) orally, once/ week	Begin 1–2 weeks before travel to malarious areas. Take weekly on the same day of the week while in the malarious area and for 4 weeks after leaving. Contraindicated in persons allergic to mefloquine or related compounds (e.g., quinine, quinidine) and in persons with active depression, a recent history of depression, generalized anxiety disorder, psychosis, schizophrenia, other major psychiatric disorders, or seizures. Use with caution in persons with psychiatric disturbances or a previous history of depression. Not recommended for persons with cardiac conduction abnormalities.
Primaquine	Prophylaxis for short-duration travel to areas with principally ***P. vivax***	30 mg base (52.6 mg salt) orally, daily	Begin 1–2 days before travel to malarious areas. Take daily at the same time each day while in the malarious area, and for 7 days after leaving.
Primaquine	Used for pre-sumptive antirelapse therapy (terminal prophylaxis) to decrease the risk for relapses of ***P. vivax*** and ***P. ovale***	30 mg base (52.6 mg salt) orally, once/ day for 14 days after departure from the malarious area	Indicated for persons who have had prolonged exposure to *P. vivax*, *P. ovale*, or both. Contraindicated in persons with G6PD1 deficiency. Also contraindicated during pregnancy and lactation, unless the infant being breastfed has a documented normal G6PD level.

All persons who take primaquine should have a documented normal G6PD level before starting.

Medication Side Effects

Malarone is very well-tolerated and rarely causes side effects, the most common of which are abdominal pain, nausea, vomiting and headache. It should be used cautiously in patients taking warfarin.

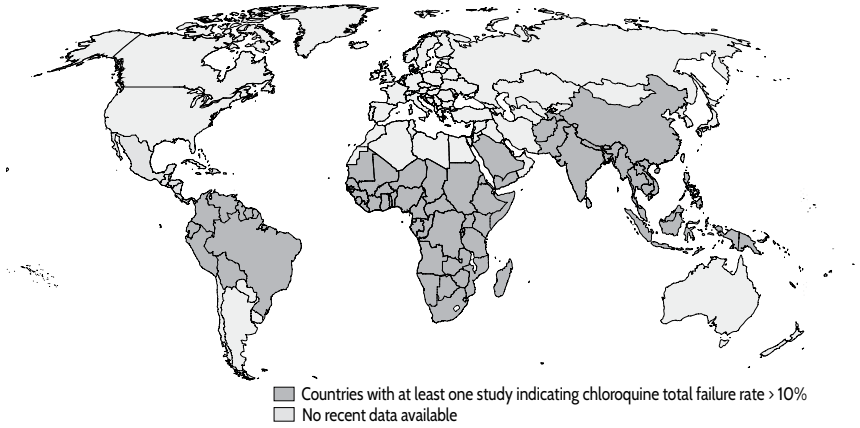
Aralen and *plaquenil* may cause gastrointestinal upset, headache, dizziness, blurred vision, insomnia and pruritis. These medications also can exacerbate psoriasis; high doses can cause retinopathy. *Doxycycline* can cause photosensitivity, usually manifested as an exaggerated sunburn. Doxycycline may also increase the frequency of yeast infections and can cause nausea, vomiting and esophagitis.

Mefloquine has been associated with psychoses and seizures. It may also cause nausea, vomiting, headache, insomnia, abnormal dreams, headaches, depression, visual disturbances, anxiety and dizziness. Paresthesias, ataxia and tremor, as well as a variety of neuropsychiatric side effects, including forgetfulness, panic attacks, mood changes, confusion, hallucinations, aggression and encephalopathy also have been associated with mefloquine use.

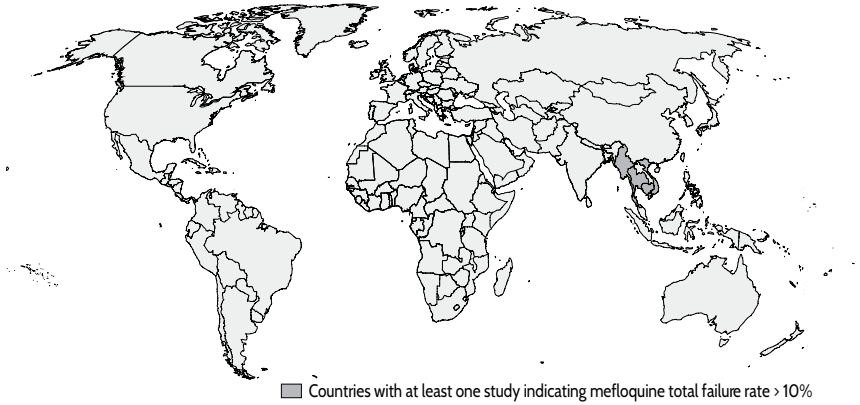
Primaquine can cause gastrointestinal upset in people with normal Glucose-6-phosphate dehydrogenase (G6PD); in patients with abnormal G6PD, the drug can cause a fatal hemolysis. G6PD deficiency *must* be ruled out prior to initiation of primaquine therapy.

Anti-malaria drug resistance with *P. falciparum* is of major concern.

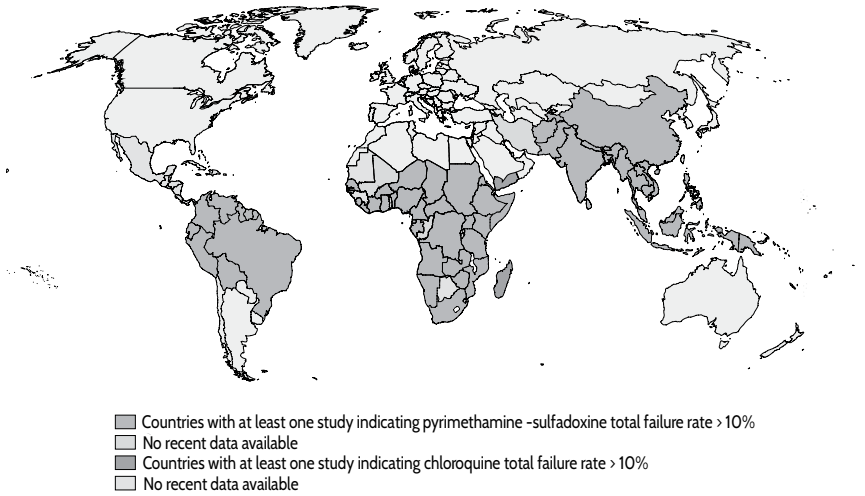
Distribution of chloroquine resistance in *Plasmodium falciparum*



Distribution of mefloquine resistance in *Plasmodium falciparum*



Distribution of sulfadoxine-pyrimethamine resistance in *Plasmodium falciparum*



Adapted from the World Health Organization.

Post-Exposure Prophylaxis (HIV, HBV)

Exposure

Contact between non-intact skin (abrasion or percutaneous injury) or mucous membrane with potentially infected body fluid including: blood, semen, and vaginal secretions; and cerebrospinal, synovial, pleural, peritoneal, pericardial, and amniotic fluids.

Gathering History for Risk Stratification

When obtaining a patient's history, determine the following:

- **Source of infection:** Individual's name, concomitant infections (HIV, Hepatitis B [HBV], Hepatitis C [HCV], syphilis), CD4 count, viral load
- **Exposed patient:** Individual's name, immunization status (tetanus and diphtheria [Td], HBV), infectious state (HIV, HBV, HCV), underlying medical conditions (i.e., diabetes, heart conditions, pregnancy), current medications
- **Type of exposure:** There is an increased risk with the use of hollow-bore needles, and when there is a presence of visible source and exposed patient blood. When discussing the sexual encounter, determine vaginal, anal or oral route, and the absence or presence of a condom. Intercourse with an intact condom is considered safe.

Testing

- Source (when possible): HIV, hepatitis B surface antigen (HBsAg), anti-HCV, hepatitis C virus ribonucleic acid (HCV RNA), alanine aminotransferase (ALT)
- Exposed: HIV, HBsAg, HCV RNA, ALT (No testing is required to initiate post-exposure prophylaxis [PEP], although HIV testing is strongly recommended.)

Medication

Indicated for HIV with confirmed positive-source patient; regimen depends on relative risk of patient. In cases of unknown source-patient status, the decision depends on local epidemiology.

- Low risk: solid needle, superficial exposure, patient with low viral load
- High risk: hollow-bore needle, blood exposure, anal intercourse
- Initiate PEP as soon as possible after exposure (not more than 72 hours post-exposure).
- Recommended duration: four weeks
- **Health care workers traveling and working abroad should strongly consider carrying PEP with them in case of exposure.**
- Indicated for HBV-positive exposure (+HBsAG) with unvaccinated, exposed patient

HIV	Low risk/low chance of resistance: Administer two drugs (zidovudine and lamivudine are preferred).
	High risk/high chance of resistance: Administer three drugs (zidovudine and lamivudine **PLUS** lopinavir with a ritonavir boost).
HBV	Give HBIG and initiate vaccination series.
HCV	There is no current widespread treatment option or medication regimen.

Monitoring

- Repeat testing for at least six months.
- Monitor for drug toxicity for those starting PEP (liver function tests [LFTs], glucose) and side effects (pancreatitis, lactic acidosis).

Special Considerations

- **Pregnancy:** Studies suggest PEP is safe for the developing fetus; above regimens are acceptable. Avoid efavirenz and combination didanosine and stavudine. Consider the overall risk benefit to both mother and fetus.
- **Children:** Should receive PEP when necessary.

Personal Protective Equipment

Personal protective equipment (PPE) is extremely important when working in resource-poor settings. HIV prevalence in sub-Saharan Africa ranges from <0.1% to over 25%. There also is the risk of contact with other undiagnosed bloodborne pathogens such as hepatitis B or C. Tuberculosis (TB) often is ubiquitous; some countries in sub-Saharan Africa and Southeast Asia had new TB case rates of >300 per 100,000 in 2008. Given the lack of availability of standard screening procedures and health records in these medically underserved areas, personal protective equipment is vital.

Health care-associated infections can be transmitted via direct or indirect contact (e.g., herpes simplex virus (HSV) or *S. aureus*), through droplets (e.g., influenza, *N. meningitidis* or *B. pertussis*), or via airborne routes (e.g., *M. tuberculosis, Aspergillus spp,* varicella or measles). When possible, try to keep infected patients in a single room or maintain more than three feet of space between them.

Always take standard precautions, including good hand hygiene. Use gloves, gowns, masks, and procedures to avoid contact with blood and bodily fluids. Regularly disinfect surfaces likely to be contaminated, including bed rails and medical equipment, and *never* recap needles.

Mode of Transmission	Protection
Direct or Indirect Transmission: HSV, ***S. aureus***	Potential transmission occurs during blood draws, examination or with repeated use of medical equipment. • Put on gloves and gowns before entry and discard after leaving room upon completion of each encounter.
Droplet Transmission: Influenzae, ***N. meningitides, B. pertussis***	Contamination occurs with sneezing, coughing, or during suctioning. These pathogens cannot travel over long distances and do not require special ventilation or air handling. • Draw curtains between patients, if single occupancy is not possible. Wear a mask (not a respirator).
Airborne Transmission: Chicken pox, measles, ***M. tuberculosis, Aspergillus spp***	These pathogens can infect over time and distance, and usually require special air handling and ventilation that is not available in resource-poor settings. • Mask the patient and provide care in a private room with a closed door, if possible. Minimize patient contact with non-immune staff for chicken pox and measles. Wear a fit-tested N95 mask, if possible.

Travelers' Diarrhea

Background

Travelers' diarrhea (TD) is the most common travel-related illness, affecting 30-70% of travelers. Poor hygiene associated with local food sources likely is the largest contributor to the risk for TD.

Epidemiology

- Risks and etiologies depend on the destination:
  - *Low-risk areas* include: the U.S., Canada, Australia, New Zealand, Japan, and northern and western Europe.
  - *Intermediate-risk areas* include: eastern Europe, South Africa, and the Caribbean islands.
  - *High-risk areas* include: Asia, Middle East, Africa, Mexico, Central and South America.

Common infectious agents include: bacteria (80-90%), viruses (5-8%), and protozoa, or other.

- *Bacterial*: *Enterotoxigenic Escherichia coli* is most common, followed by *Campylobacter jejuni, Shigella sp.*, and *Salmonella sp.* Enteroadherent and other *E. coli spp.* also are common in bacterial diarrhea.
- *Viral*: *Norovirus, rotavirus, astrovirus.*
- *Protozoal*: Giardia is most common; also consider *Entamoeba histolytica* and *Cryptosporidum*.

Signs/Symptoms

Common symptoms include abdominal cramping, diarrhea (+/- blood), vomiting, and fever.

Diagnosis

A clinical exam usually is sufficient, but testing the stool for ova and parasites also may be beneficial. Additional cultures (multiple specimens spaced out over time) may be required to make an accurate diagnosis.

Prevention

- *Food/beverage selection:* Avoid raw meats and unpeeled fruits and vegetables. Drink bottled or treated water. **As a general rule, don't eat it unless you cook it, peel it, or boil it yourself.**
- *Nonantimicrobial drugs for prophylaxis:* Bismuth subsalicylate (BSS; active ingredient in Pepto-Bismol); reduces incidence of TD from 40% to 14%.
- *Prophylactic antibiotics:* Fluoroquinolones reduce the incidence of TD from 40% to 4%. While they are not routinely recommended, they can be considered for immunocompromised patients.

Treatment

- *Antibiotics* are the main therapy for TD. Consider if patient has had three or more loose stools in an eight-hour period, especially if diarrhea is associated with nausea, vomiting, abdominal cramping, fever, or bloody stools.
  - Bacterial: Fluoroquinolones are the first-line treatment; single-dose or one-day treatment is recommended. Alternatively, azithromycin 500 mg PO daily for 1-2 days also can be used.
  - Protozoal: metronidazole, tinidazole, nitazoxanide
- *Antimotility agents*: loperamide, diphenoxylate, paragoric
  - Contraindications include bloody diarrhea, fevers, and abdominal pain without diarrhea.
  - Adverse reactions include toxic megacolon, sepsis, and disseminated intravascular coagulation (DIC).
- *Oral Rehydration Therapy (ORT)*

Patients who are dehydrated and cannot tolerate, or do not improve with, oral rehydration need to be referred to a higher level of care for IV hydration.

Fever in the Returned Traveler

Important Historical Elements

- Determine the time period and season of travel.
- Pinpoint location and endemic infections in area of travel. (Don't forget, even short layovers count!)
- Assess potential exposures (food intake, mosquito bites, drinking water, sexual contacts, animal contact, needle and blood exposures).
- Determine the extent of immunization *prior* to travel and prophylaxis *during* travel.

Clinical Presentation

Often falls within five major syndromes:

1. Systemic febrile illness without localized findings
2. Acute diarrhea
3. Dermatologic disorders
4. Chronic diarrhea
5. Non-diarrheal gastrointestinal disorders

Pay special attention to skin exam, lymphadenopathy, retinal or conjunctival changes, enlargement of liver or spleen, genital lesions, and neurologic findings.

Incubation Period

Consider these infectious agents:

- **Short (7 to 10 days):** arboviruses, dengue, gonococcal, influenza, malaria, typhoid, anthrax, brucellosis, Chikungunya virus, diptheria, ehrlichiosis, hantavirus, histoplasmosis, acute HIV, Japanese encephalitis, hemorrhagic fever, Legionnaire's disease, leptospirosis, Lyme disease, measles, melioidosis, menigococcus, plague, psittacosis, Q fever, rabies, relapsing fever, rickettsial infections, tickborne encephalitis, trichinosis, tularemia
- **Intermediate (10 days to one month):** Epstein-Barr virus (EBV), hepatitis, leishmaniasis, schistosomiasis, toxoplasmosis, coccidiodomycosis, cytomegalovirus (CMV), rubella, amebic liver abscess, trypanosomiasis
- **Long (>3 months):** bartonellosis, filariasis, Lyme disease, syphilis, trypanosomiasis, pulmonary tuberculosis, HIV, malaria, rabies, meliodosis

Evaluation

Include the following lab tests: Complete blood count (CBC), LFTs, blood culture, urine analysis (UA), stool culture, fecal leukocytes, ova and parasites exam, chest x-ray, cerebrospinal fluid (CSF), urine antigens for Legionella; and blood smears for malaria, Babesia, Borrelia, and filarial.

Biopsy of skin lesions, lymph nodes, and other masses should be considered.

Other Travel-Related Illnesses

- Pulmonary embolism (PE), deep venous thrombosis (DVT)
- Fever from prophylactic or other medications

Don't forget common causes of fever that are unrelated to travel; keep a broad differential diagnosis. Infections that affect travelers are different than those infecting local populations.

Ethical Considerations

Enthusiasm among students and residents for international medical endeavors across disciplines increased dramatically in the first decade of the 21st century. Ethical challenges pervade the provision of care in many of these settings. A careful consideration of these potential issues and challenges prior to arrival, as well as a knowledge of the basic concepts that underpin modern medical ethics, may assist in preparing a provider for practicing more effectively once on the ground.

Ethics in International Medicine

Improving a population's quality of life is the primary goal of both health care workers and the medical establishment, but that role sometimes conflicts with other societal forces. Several international organizations have developed ethical principles designed to help health care personnel adhere to the mission of improving life for the population with which they are working, even when confronted with conflicting external pressures.

Bioethics may be divided into domains:

- **Medical ethics**: Interaction between practitioner and patient
- **Public health ethics**: Interaction between practitioner/agency or community/ministry of health (MOH)
- **Operational ethics:** Resource/service allocation decisions
- **Research ethics**: Study of ethics relating to research and the scientific advancement of medical care

Basic Tenants of Medical Ethics

- **Beneficence:** The purpose of action is the betterment of the patient's health.
- **Autonomy:** Betterment should be defined by the patient's own wishes.
- **Non-malfeasance:** Do no harm.
- **Consent:** Informed and voluntary acceptance of interventions should be obtained.
- **Confidentiality:** Protection of patient's privacy and anonymity are paramount.

Specific Areas for Consideration

Support for Local Health Infrastructure

- Avoid developing projects that compete with existing infrastructure, including human, administrative and material resources.
- Obtain pre-deployment status verification with local health care contacts, including ministry and licensing officials. Avoid the pitfall of trying to function independently from the local infrastructure.
- Difficulties can ensue in nations at war, or if there is no clear leader or governing body. Efforts should be made to inform governing bodies of the practitioner's intent to practice.

Avoid contributing to internal, nonemigration *"brain drain,"* in which local medical personnel are drawn inadvertently away from local facilities by the allure of working for an international organization. (Offering part-time positions to multiple personnel is one way to avoid depleting local resources.)

Parity

- Parity is defined as the aim to provide care that adheres to the same professional ethical principles as in the practitioner's country of origin, with minimal exception given to resource deficiency. In practice it is – at a minimum – to provide care at the highest level possible given local conditions, and to not provide care that cannot be sustained following departure of the visiting medical team.
- Comply with internationally accepted health care practices.
- Pay attention to professional conduct and competency. For example, do not allow medical students and residents on international rotations to perform procedures that they are not authorized to perform in their countries of origin.

Sustainability

Issues of sustainability are particularly important for public health measures. Generally, efforts to improve local capacity through training decrease the risk of beginning interventions that are not optimally followed through. Programs that depend on materials or infrastructure that are neither available nor locally sustainable should not be developed. Efforts must be made to provide referrals to local infrastructure for the follow-up of acute interventions. Visitors providing medical care must verify appropriate follow-up to ensure that their interventions follow the primary tenant of "do no harm."

Conflicts of Interest

Who are you working through/with? What is the mission statement of your sponsoring agency/organization and how does it manifest in your clinical interactions? Volunteers must recognize that aid organizations have their own sets of mission and operational agendas. Volunteers should explore these to avoid conflicts of interest. The primary aim of any international health activity must be the health of the target population.

Different classes of organizations have various characteristics that may both *improve* their ability to deliver health care support to a population and *conflict* with such a mission. Volunteers should assess the various pros and cons of organizations in the particular setting in which they intend to volunteer.

- **Faith-based/religious organizations:**
  - PRO: Often benefit from additional resources and faster mobilization of these resources.
  - CON: Potential deterrence for local populations or governments; risk of confusing service with evangelism.
- **Private non-governmental organizations (NGOs):**
  - PRO: Breadth of experience, lack of political coercion; local NGOs can have valuable trust capital and local alliances, in addition to keeping funds in the local economy.
  - CON: The expectations of donors and the need for self-perpetuation potentially can trump the needs of the patients; administrative expenses may impair operational activities.
- **Political parties (usually in partnership with NGOs):**
  - PRO: Often consist of local community leaders who speak the native language and understand certain cultural norms; more adept at navigating local terrain and negotiating mobilization of local resources (which can improve the local economy and further enhance humanitarian assistance).
  - CON: Subject to local power dynamics and potential for coercive practices.
- **Military operations (alone or in cooperation with NGOs):**
  - PRO: Ready to act quickly, ample resources, able to access hard-to-reach environments (natural disasters/politically unstable/difficult terrain), highly trained practitioners. Can provide security support in unstable regions.
  - CON: Issues of sovereignty, issues of trust; risk to noncombatant health personnel to be viewed as allied with a particular military power.

Establishing an Ethics Committee

- Regardless of the size of the operation or organization, each project should have an established *ethics review protocol* in place.
- There should be both organizational and local on-the-ground *ethics committees*. The on-the-ground committee not only should assist with pre-project planning, but also with the ongoing review and resolution of issues. The on-the-ground committee should have local, target-population representation by both leaders and, ideally, nonleadership community members.
- Reviews should necessarily include *local perspectives* of the care proposed and the visiting clinicians' practice patterns. Input from committee members from the patient population should be respected and integrated into the ethical analysis and corrective measures.
- Along with a strong ideological commitment, there must be an equally great *financial* commitment to the ethical review of practices, which must be a permanent component of an organization's infrastructure.
- Within the operational budget of such a body there must also be a commitment for renewed and up-to-date *ethics training*.

Ethics of International Medical Research

Ethical standards for research do not differ from one setting to another; however, the operationalization of these standards is likely to vary greatly among different cultural settings. The following are some of the core principles for any research; while they were largely developed around interventional medication research projects, they incorporate the basis for an ethical analysis of any research project involving human subjects.

Benefit from Research

The research must contribute to the good of society in a way that is clearly described. This benefit must be neither arbitrary nor unnecessary, nor be solely for the benefit of the party conducting the research. In addition, the research should present a clear benefit to the individual subject volunteering for participation.

This issue has garnered quite a bit of debate, particularly in the realm of international global health. Some have argued that research for medication development conducted in resource-poor areas has not served the participating communities. Often the eventual market cost of medications restricts study participants' access to treatments derived from studies for which they were the subjects.

Informed Consent

Participation as a study subject must be entirely voluntary, and must be in the context of full disclosure and understanding of all related risks and benefits.

In addition to barriers of understanding presented by differences in education levels and languages, the concept of voluntary participation is a precarious one in international research. A few of the recognized pitfalls include:

- **Lack of access**: It has been argued that, in areas with no basic health care, it is impossible to have *true* voluntary participation in clinical studies. When the only access to care is through participation in a study, implicit coercion becomes an inevitable issue.
- **Authority:** Similarly, it is often difficult to explain to subjects living in cultures where professionals and physicians are seen as authority figures that their health care will not be jeopardized if they refuse participation in research efforts.
- **Therapeutic misunderstanding**: In certain environments it is difficult to explain adequately that not *all* clinical interventions are therapeutic; concepts like placebo or randomization might not be fully understood. Studies have shown that participants often believe that they are receiving therapy in every situation.
- **Implications of compensation**: Seemingly token compensation (bars of soap, salt, etc.) for participation in a research study may, in the cultural context, have a value that can either distort the research results or lead participants to accept risks they would not otherwise.

Standard of Care

Whether the highly subjective "optimum" level of care should be judged by global standards, regional standards, or by the standards of the sponsoring organization has led to debate – without a clear consensus – between the World Medical Association and other ethics-assessing organizations. The World Medical Association, in a revision of the Declaration of Helsinki, proposed adhering to the best *global* standard. Other authors have argued that such a standard is impossible to meet in certain local contexts. The United States National Bioethics Committee recommends using the concept of "treatment that is routinely available" as the basis for decisions regarding the level of minimal care for the control groups in clinical trials.

Ethical issues in medical research extend beyond the domain of clinical medication and trials. Epidemiologic and ethnographic studies also involve ethical issues, particularly those involving patient privacy. Serious questions have arisen about the risks of identifying individuals or societal cohorts that may suffer adverse consequences by being named as study subjects in the setting of the local culture. For example, attempting to gather data about spousal abuse through emergency department interviews in a culture that officially denies such behavior may risk worsening the plight of abused individuals.

A significant, if not primary, role in any international research should be given to local researchers. While the cadre of trained and experienced academic researchers may be limited in many settings around the globe, there is no lack of concerned individuals. Many of the the most pressing questions about improving local health can be answered by trained researchers willing and able to reformat them into robust studies.

Codes and Guidelines for International Medical Research

- **The Nuremburg Code:** A research ethics directive established in 1949 after the infamous Nuremburg trials, which centered on war crimes, including human experimentation by Nazis during WWII. The code includes ten tenants mandating purpose and conduct of research involving human subjects. (http://www.hhs.gov/ohrp/references/nurcode.htm)
- **The Declaration of Helsinki:** Developed by the World Medical Association in 1964 and since updated, this declaration is a statement of bioethical principles developed to guide physicians and others directing medical research involving human subjects and human tissues. (http://www.wma.net/en/30publications/10policies/b3/index.html)
- **Ethical and Policy Issues in International Research Clinical Trials in Developing Countries:** A 2001 Commission report for the U.S. National Bioethics Advisory Committee in response to a debate about the treatment options chosen in studies about maternal-fetal HIV transmission. http://bioethics.georgetown.edu/pcbe/reports/past_commissions/nbac_international.pdf.
- **International Ethical Guidelines for Biomedical Research Involving Human Subjects:** Developed by The Council for International Organizations of Medical Sciences (CIOMS), an international non-governmental, non-profit organization established jointly by WHO and UNESCO in 1949. Guidelines concerning the vulnerability of subjects, issues of compensation for injuries incurred, informed consent, validity of research, obligation of research sponsors to provide basic care, and promotion of local/regional research and ethical review capabilities are included. Though not available directly from the CIOMS website, the document is available online.
- **International Ethical Guidelines for Epidemiological Studies:** Also developed by CIOMS, these guidelines address issues in epidemiological research that are different from those encountered in clinical trials of interventions. Though not available directly from the CIOMS website, the document is available online.
- **UNESCO International Bioethics Committee:** The Global Ethics Observatory (GEObs) of UNESCO is a portal to databases from around the world dealing with science and technology in general. (http://www.unesco.org/new/en/social-and-human-sciences/themes/global-ethics-observatory)

Performing Clinical Research While Abroad

- If you plan on conducting clinical research while you are abroad, keep in mind that, for publication, most journals require institutional review board (IRB) approval from both the researchers' home institution and the local ministry of health. Approval from international locations can take months, so it is important to plan ahead.

The Use of Interpreters

Given that the primary basis for medical diagnosis lies in the patient's history, accurate communication is imperative. Representing a known disease process is critical to developing an effective evaluation and treatment strategy, so it is important that the clinician be able to interpret the data. Effective communication becomes even more complicated when language barriers impede the accurate transmission of patient data to the decision-making care provider.

Effective interpreters do not simply speak each of the languages involved in the transaction; they are able to communicate the meaning and intent of communication in one language to equivalent concepts in the alternate language.

An ideal interpreter also will recognize personal and role limits and communicate them to those depending on the service. Very few interpreters have these skills without specific training.

General Considerations

- Interpreters should provide literal translation in the first person without omissions or commentary, except to explain certain cultural expressions.
- Any *ad hoc* interpreters should be screened for language and conceptual expression capabilities in both directions.
- Family and social contacts should not be used for any but the simplest interactions; social issues in the family unit may cloud the transfer of information. Familiarity and lack of training increase the risk of paraphrased communications, with potential misinterpretation or loss of critical elements.
- Facility staff and other *ad hoc* interpreters should not be used except as last resort, and then, only for simple exchanges.
- Children should only be used as a last resort.
- Particular attention should be paid to social issues in the use of persons of the opposite sex, even when the material being discussed is not of a sexual nature.
- Significant others should never be used in situations with any suspicion of abuse or sexually transmitted diseases.

The following additional general guidelines will improve the overall quality of the encounter and help avoid misunderstandings.

Pre-encounter

- Identify specific goals for the encounter. Ask the interpreter if he or she has worked a similar case and is familiar with terminology. Try to think of the interpreter as an extension of oneself in terms of facilitating the understanding of concepts and concerns pertinent to the situation.
- Verify whether the interpreter is otherwise acquainted with the patient.
- Verify whether there are cultural conflicts of interest (e.g., different dialects and/or potential social difficulties between interpreter and patient families/tribe/clan).

Encounter

- Expect the session to take more time than when conducted without an interpreter.
- Arrange a triangular positioning – clinician facing the patient with the interpreter to one side or slightly behind the clinician, so the patient will talk toward the clinician. Talk to the patient in first-person with direct eye contact.
- If there are questions about a particular meaning or lengthy interchanges between the patient and interpreter, ask for clarification.
- In the case of seemingly truncated interpretations (long patient responses for short interpreter statements), seek clarification.
- Use single questions and short phrasing.
- Be attentive to language used. Avoid expressions and words that may have two meanings; be as literal as possible. Sometimes the use of seemingly more complex or technical words is easier for interpreters, since the words may have root similarities in other languages (e.g., Latin-based medical terminology).
- Ask patients to repeat any instructions for home care or return visits.
- Verify that the patient and family understand written instructions provided through the interpreter.

Debriefing

- Exchange feedback with the interpreter.
- Ask questions regarding the interpretation or the situation, as long as those questions do not involve violating patient privacy.

Finally, in any new cultural situation a clinician encounters, learning the local language not only will improve the effect of a clinician's well-intentioned efforts, but also will lead to a much richer personal experience.

Intercultural Communication Issues

From providing humanitarian crisis relief missions to delivering conference lectures, all international medical ventures entail interactions between persons of two different societal cultures – and often multiple persons from multiple societies, all with different primary languages. Even in health care providers' home settings, miscommunications and misunderstandings occur; cultural differences only add to the risk of potential problems.

Failure to understand, appreciate and respond to cultural characteristics increases the risk of misdiagnosis by compromising historical and physical examination data-gathering; noncompliance or misunderstanding regarding care instructions; and patient dissatisfaction, which may lead to future avoidance of care in the "Western" biomedical system. Being aware of this risk and remaining attentive can decrease the likelihood of unintended consequences of even well-intentioned acts or speech.

Discussions in medical literature about communication issues between health care workers and patients have evolved. Once focused on the analyses of differences in the perception of illness and care received by various minority groups, the dialogue now centers on recommendations and licensing requirements for training in cross-cultural health care delivery.

Many of the concepts applied to training U.S. health care workers – including skills for optimizing delivery of cross-cultural medical care – are equally applicable to international health care delivery. Several of these core concepts are listed here, with brief descriptions and a few key references.

- **Explanatory model of disease:** The patient's or health care worker's view of the cause, severity, and prognosis of an illness; the expected treatment; and how the illness affects his or her life and position in his or her society. Explanatory models of illness are based on cultural backgrounds and social factors, such as socioeconomic status and education; these may be quite different between patient and health care worker.
- **Health care provider/patient negotiation:** For various reasons, including differences in the explanatory models of illness, patients and medical workers may have disparate ideas on how best to restore the patient to "healthiness." By understanding the concept of explanatory models, health care workers can more effectively follow the core principles of negotiation to reach a consensus. Relationship-building, agenda-setting, assessment, problem clarification, management, and closure may all play a part. One of the first steps in negotiation is to find a shared terminology – a way to describe the illness that both patient and provider can understand. The second phase of negotiation involves developing an effective and acceptable management plan.

- **Culture:** "Culture" has been subject to a variety of definitions based on sets of criteria, including beliefs, values, customs, language, behaviors and other factors shared by a group of people. Though such groups are often delineated by national, ethnic or racial identities, the construct applies equally well to professional and social groups composed of various national, racial and ethnic members. For example, in this model, physicians belong to a culture – and to subcultures, based on medical specialty – in addition to the various other cultural determinants that define them individually. Effectively, every person also can be seen as culturally unique based on their individual life experiences.

The movement to offer formal medical training in cross-cultural health care delivery was formalized following the release of an Institute of Medicine report, which indicated that the quality of medical care suffered dramatically when cultural and linguistic differences between health care workers and patients were present. In response, various U.S. credentialing agencies and organizations have adopted curricula and requirements for physician training in the field.

The ways in which all patients experience illness are culturally defined by numerous factors, including beliefs, perceptions and coping skills, and socioeconomic positioning. By supplementing medical knowledge with an understanding of culture-specific beliefs and values – particularly those related to health, life, and death – health care providers can better understand and more appropriately influence patients' decision-making processes.

Several models have been proposed for effectively communicating with patients across cultural lines. The following cross-cultural review of systems, based on questions developed by prominent medical anthropologist Arthur Kleinman, MD, covers some of the major points in information-gathering by exploring an explanatory model.

A Cross-Cultural "Review of Systems"

Step One: Identify relevant core cross-cultural issues

- **Styles of communication:** How does the patient interact with the health care worker?
  - Evaluate eye contact, physical contact, and personal space.
  - Is the patient deferential or confrontational?
  - Assess stoicism vs. expression of symptoms.
  - Determine patient preferences when relating "bad news."
- **Mistrust and prejudice:** Does the patient appear to trust the health care system?
  - Explore patient perception of and/or previous experiences with the health care system.
  - Explore how perceptions and experiences have influenced patient behavior (e.g., compliance with medical recommendations).
  - Keep "what's at stake" for the patient in perspective; show respect and address the patient's concerns.
- **Autonomy, authority, and family dynamics:** How does the patient make decisions?
  - Establish the role of the individual and significant others in decision-making and support.
  - Identify the role of any authority figure within a family or social group.
  - Identify the role of community or spiritual leaders in important decision-making.
- **Role of physician and biomedicine:** What does the patient expect of us? What is our role?
  - Identify **i**deas, **c**oncerns, and **e**xpectations (ICE) for the physician and biomedicine.
  - Consider the patient's perspective and his or her views on physicians, biomedicine and other health and healing practices.
- **Traditions, customs, and spirituality:** How do these factors influence the patient?
  - Assess if there are any cultural issues regarding medical procedures (e.g., drawing blood, blood transfusions, vaccinations).
  - Are there any rituals pertinent to the medical encounter?
  - Consider culture-specific therapies, including dietary preferences.
- **Sexual and gender issues:** How central are they to the patient's life?
  - Identify gender concordance/discordance; assess attitudes towards physical exam and gender of physician.
  - Be sensitive to embarrassment in the discussion of sexual issues.
  - Understand differences in sexual orientation and identity.

Step Two: Explore the Meaning of the Illness

Incorporating elements of the "explanatory model" – by probing into the patient's understanding of his or her ailment – improves insight into behaviors and can help minimize misunderstandings and conflicts between health care providers and patients.

Example Questions

- What do you think has caused your problem?
- What do you call it?
- Why do you think it started when it did?
- How does it affect your life?
- How severe is it?
- What worries you the most?
- What kind of treatment do you think would work?
- What kind of treatment do you think you should receive, and what are your expectations?

Step Three: Determine the Social Context

The "social context" is of equal importance and warrants exploration, given how heavily social factors are intertwined with cultural factors. The following areas should be considered:

- **General social environment**
  - Can you afford the medication?
  - Are you ever short of food or clothing?
  - Will you be able to follow up, as recommended?
- **Change in environment**
  - Have you recently left your home setting? Why, and how long ago?
  - How long have you been living in this area where we are meeting?
  - What was your previous experience with health care?
- **Social stressors and support network**
  - Do you have friends or relatives whom you can call on for help? Do they live close to you?
- **Literacy and language**
  - Do you have trouble reading your medication bottles or appointment slips?
  - What language do you speak at home?
  - Do you ever feel that you have difficulty communicating everything you want to say to the doctor or staff?

Summary

The questions and principles presented above may seem quite familiar to many readers. Communicating in multicultural situations is not very different from applying good communication skills in *any* setting.

Case Studies in International Medical Ethics

The following scenarios are based on real field experiences. They are presented to illustrate the tenants of medical ethics in various clinical scenarios to stimulate reflection and discussion. It is important to remember that many ethical principles are not universally agreed upon and are heavily influenced by cultural constructs of health, human rights and the rights of the community. Here we provide suggestions about how best to respond (or where to seek help) in each situation, and ultimately preserve the dignity and respect to the patient, the culture and the health care team.

Case 1

A medical resident with a personal history of asthma is in his first week of a rotation at a pediatric health post in the Volta region. He sees that most pediatric patients who present in respiratory distress are treated only with theophylline; this bothers him, because he is certain that the standard of care should be albuterol and steroid treatment. He also notices that most of the children are not receiving oxygen, and sees one patient who is working particularly hard to breathe. He remembers having packed several metered dose inhalers (MDIs) of albuterol for himself, and considers giving the child several puffs from the vial he is carrying.

This is a complicated case illustrating the principle of *beneficence*: committing an act or deed for the betterment of the patient's situation. In this case, the resident desires to better the health outcome of the child by providing an alternative treatment option that he believes to be superior. However, it is important to understand the context in which the resident is now working. (What is the local standard of care?) Most of the time, these standards are based on the resource availability and care that is culturally acceptable. Introducing new treatment modalities in an ad hoc manner, although seemingly beneficial, may lead to unexpected adverse outcomes – both medically and culturally. One way to address the resident's concern is to first learn what the standard of care is in that community, appreciate when it is appropriate to deviate from the standard, and understand what additional resources are available if a higher level of care is indicated. It would not be appropriate to provide medication that has not been pre-approved.

Case 2

You are volunteering at a regional medical center with scarce resources. There has been news of several patients suffering from deadly snake bites, and the medical director and drug supplier informs you that antivenom is on backorder and is no longer available in the region. You have been shown, however, how to access the stockpile of antivenom reserved only for staff. During your shift, a 14-year-old boy is rushed to the casualty ward by a mob after being bitten in the field by a snake. He is listless with diffuse swelling, purpura and bullae developing along his right arm. You notice that he is working harder to breathe.

As you scan the room for an oxygen tank, the nurse writes a prescription for anti-venon, steroids and antibiotics; she hands it to the mother and says,"You must purchase these drugs from the market before we will be able to treat him." You already know that the prescription cannot be filled, due to lack of supply.

The case presents the issue of *non-malfeasance*: to do no harm. Although there is no *direct* harm being imposed on the child, withholding lifesaving treatment could be argued as such. On the other hand, resource-rationing is not unique to the developing world; it is practiced pervasively across the globe. It is clear in the beginning that there is a systemic shortage of antivenom, although a specified amount has been set aside for health care workers. If this resource were used without the ability to be replenished, health care providers would be at risk – ultimately threatening the availability of medical care in the community. In a setting where providers are limited, preserving their viability is paramount. There is no easy solution in this scenario. Establishing an open line of communication between the health team members and creating a protocol for treating patients who do not have access to antivenom are essential to providing the best care in this situation. Additionally, it is critical for visiting practitioners to make themselves aware of such local rationing policies and to discuss them with host authorities in order to minimize the risk of being "caught in the middle" of local cultural issues.

Case 3

You are a third-year emergency medicine resident one month into your two-month international elective at a district hospital in Central America. You and two other local physicians are covering triage in an emergency ward with over 50 patients still waiting to be seen. You've been told that more foreign doctors are arriving today for a monthlong work assignment. The volume of patients has been a challenge, so you're relieved to hear that more help is on the way. On the other hand, you worry about the time it will take to acclimate the new physicians to the hospital. Just before you call the next patient, two shell-shocked medical students walk in; the senior doctor introduces them as the "doctors who have come from the U.S. to work."

This case considers a specific area of international health where supporting academic curiosity may be at odds with supporting local infrastructure and avoiding draining resources. International experiences for medical students who have little clinical and cultural exposure can easily burden an already strained health care system. Accepting that medical personnel be assigned to perform at levels for which they are not trained, simply because the local system is not rigorous in oversight, presents significant ethical considerations. In general, regardless of the local rigor regarding trainee supervision, visiting practitioners should adhere to their home country standards of supervision out of respect for the patients.

Case 4

You are pre-rounding on the patients who are in the medical ward when you come across a 15-year-old boy with diffuse macular rash, bullae and mucosa damage that you are confident is Stevens Johnson syndrome. You think it is an excellent case study to write up to educate others. You do not speak Swahili and cannot ask the boy directly for permission to discuss his illness. Neither staff nor family are present, so you decide to use your cellphone camera to take several pictures now and discuss your intentions with the family later.

The ethics of *informed consent* should be respected in the international setting, just as it is in the United States. Standards for attaining informed consent, based on a respect for privacy, dignity and individual self-determination, do not change with geographic or socio-economic setting. Practitioners visiting other cultures should be aware of the age of majority in the culture in which they are working. Additionally, prior to using any recording devices for sounds or images, visitors should make themselves aware of any local cultural injunctions on such. The patient or guardian should have the idea of being photographed explained to him, along with the concept of intended use; he also should be given the option to decline.

Summary

Tamara Thomas, MD, coined the term "ABCs of cultural awareness:" **A**sk for help, **B**alance your views with local cultural views, and show **C**ourtesy to others. As a visitor, your way may not be the most appropriate in the local setting; likely there are alternatives to management that reduce costs and take cultural values and norms into account. Treat colleagues as you would wish to be treated.

Public Health Basics

Population Health

Population health focuses not only on the health and well-being of an individual, but also on the care and prevention of disease within an entire population. While population health seeks to distribute resources over an entire community, with individual members often receiving very little, clinical care focuses solely on the individual, with an often extreme commitment of resources to a single patient. Despite these differences, clinical care and population health cannot function independently; population health informs the care of the individual patient, while seeking to identify root causes and preventive measures for the causes of morbidity and mortality. In addition, population health seeks to form a holistic impression of the well-being of a community by exploring economic, political, social cultural and medical contributors to disease.

Health Education

A central pillar of population health is *education*. As data is generated that improves the understanding of illness, it is imperative that this data be passed along not only to providers, but to decision-makers and the population-at-large. In order to accomplish any educational mission, it is vitally important to establish a relationship with the community in which one will be working. Involving local elders, elected leaders and health providers in health education interventions is critical to engendering a sense of community involvement and ownership of a particular program, leading to its eventual success.

One of the most valuable contributions that can be made when visiting a community is to teach the local providers skills and concepts that will help them to improve the care they provide. Below is a list of teaching workshops and lectures that we have found work well in international settings. In situations where there is a significant language barrier, hands-on skills workshops tend to be more beneficial for the people you are teaching. Keep cultural norms in mind when preparing for lectures and workshops (i.e., don't practice suturing on an animal that is sacred). Of note, this list is not comprehensive and is meant to help foster additional teaching ideas.

- **Department management**
  - Triage scenarios
  - Utilizing your staff
- **The critical patient**
  - ABCs – the basics of running a resusitation code
  - ECG interpretation
  - Early goal-directed therapy
  - Noninvasive airway management
  - Trauma resuscitation
- **The challenging patient**
  - Interesting case presentations
  - Visual diagnosis (classic radiograph findings, rashes, etc.)
  - Toxidromes
- **Procedures**
  - Chest tube placement
  - Central line placement
  - Intubation techniques
  - Peripheral IV placement
  - Splinting/orthopedic reductions
  - Suturing basics
  - Ultrasound basics
  - Vaginal delivery
  - Constructing an emergency or resusitation area/cart

Health Systems Structure

A typical health system involves multiple tiers of personnel and facilities, each with an ordered and designated role within the system. Many regional and national health systems have complex and formal hierarchies, which must be respected. When designing an intervention, it is critical to determine which level of the health system is most relevant. For example, community-based interventions – such as outreach and educational programs – should focus on training and enlisting the support of community health workers (CHWs); while interventions involving decreased maternal mortality should focus on nursing and provider education.

Health systems have multiple tiers. Community *health centers* (HCs) frequently occupy the lowest level of the health care system, although some systems utilize dispensaries staffed by CHWs for very basic interventions. Health centers typically are staffed by junior house officers or nursing staff.

The next level of the health care system is the *district hospital*, which typically has a limited referral capacity and is able to treat and care for more complex medical cases. District hospitals commonly are staffed by residency-trained physicians and house officers, and there may be specialty wards for pediatrics, as well as a limited surgical capacity.

Above the district hospital level of care is the *reference* or *referral hospital*, of which there are often very few. Reference hospitals typically are located in major cities; and, depending on the local population, there may only be one or two for each region – or even the entire nation.

While many interventions require targeting a particular level of the health care system, many other interventions require a multilayer approach that targets *every* level of the system. For example, to reduce morbidity and mortality associated with traumatic injury, one might focus on training CHWs in first aid and as ambulance drivers, while at the same time training nurses and physicians in international trauma life support (ITLS). One might also focus resources on the development of trauma centers of excellence, while enhancing intensive care capabilities at the reference hospital. While all systems are imperfect, health systems under stress or those responding to natural or man-made disasters may be deficient at one or multiple levels.

Designing Health Interventions

Designing and implementing a health intervention requires a step-wise approach; the identification and detailed assessment of community need, the identification of the resources and personnel required to address the need, and the enlistment of local stake holders and community leadership are vital to engendering a sense of community involvement and participation. The following steps provide basic guidelines for approaching program development.

1. **Identification of a possible need:** Outsiders may experience difficulty in identifying the health needs of a given community. A population may have its own values and a unique set of priorities when it comes to allotting limited health resources and personnel. As such, it is critical to visit the community in which the intervention is to take place to explore the opinions and experiences of individuals who have an intimate knowledge of the issues in question. Examining and reviewing any available epidemiologic data at the national or governmental level may assist in the identification of areas of need, as well. *(Please see following chapter topic on performing a needs assessment.)*
2. **Identification of stakeholders:** Multiple organizations and/or government bodies may be operating within a community, which may already have established programs or projects in the area of need. Coordination and cooperation with any such groups is important to avoiding duplicate efforts and potential conflicts. As a rule, collaboration with other groups is far superior to competitive and mutually exclusive parallel efforts. An early step is to identify the stakeholders involved in a particular area of perceived need, to attain a sense of the coverage of the health issues in question, and to identify gaps or areas requiring extra focus or effort.

3. **Research:** Prior to designing a population health intervention, it is necessary to develop both *qualitative* and *quantitative* impressions of the public health problems in question and the community within which the intervention will take place. Data may be collected via surveys, interviews, or focus groups, or through a review of national statistics. Important data to collect includes:
   - Demographic information regarding the population size; age distribution; geographic distribution; and the economic, cultural, and ethnic makeup of the community in question.
   - General health metrics of the population, including maternal mortality, infant mortality, literacy, incidence of sentinel diseases, etc.
   - Distribution and availability of resources, such as community health workers and dispensaries, as well as hurdles to their utilization.
   - Health practices of the community, as well as nutritional state, hygiene (water and sanitation), and common risk factors for disease.
   - Public perceptions regarding health care (including alternative sources of health care, such as traditional healers).

4. **Developing the intervention:** After collecting data, it will be critical to collate and assess the information to develop a plan for intervention. This step ideally should be undertaken with the involvement and assistance of local stakeholders. Assigning a priority score to identified needs will assist program developers in ranking interventions in terms of health needs. Prioritizing interventions may depend significantly on the perceptions and beliefs of the local population, although priorities should aim to address principal health needs first, such as epidemic control, water safety, and care for critical medical illness.

   Interventions should be planned with well-demarcated, attainable goals with identifiable metrics that facilitate the measurement and gauging of success. A common pitfall of initial health interventions is that they attempt to solve too many health problems – or those that are too large – with limited resources. A list of deliverables; a method for obtaining tangible, measureable results; and timelines should be set forth, so as to allow external audits of the intervention and assessments for areas of improvement.

   In addition, planners should consider any additional resources necessary to develop and implement the intervention. Consultants or new hires may be valuable in assisting in specific areas, such as social marketing or accounting.

5. **Program Implementation:** After developing a plan, including specifying data to be collected and the metrics in question, interventionists should identify specific personnel from each stakeholder to serve as liaisons and points of contact. Program leadership roles and responsibilities should be delineated and assigned, as well. Regular meetings should take place to assess progress and address problems as they arise. Communication between individuals and groups may be challenging; a concerted effort to ensure adequate coordination may be required.

6. **Monitoring and Evaluation:** A plan for monitoring and evaluating the program should be established in the initial planning documents and should be adhered to going forward. Key metrics identified in the intervention development stage should be tracked, and program success should be measured and reported.

Performing a Needs Assessment

There is no single universal model for needs assessment that is appropriate for every situation. The very idea of a needs assessment respects the fact that every situation is unique, with different populations, demands for different resources, and different priorities. Fortunately, there are a dozens of freely available frameworks for performing needs assessments in specific situations (i.e., from establishing substance abuse treatment programs to general templates for establishing prevention programs). The following is a reasonable and general approach to determining the needs of a particular geographic area/population.

1. **Estimate the scope of the needs assessment.**
   - How many different resources are required to inform and develop the planned project? In general, the larger your organization's dedicated resources and the broader the goals of the project, the more comprehensive your needs assessment should be.
   - What are your individual and organizational goals for the community?
   - What are the beliefs and perceptions of the community with regard to its priority needs?
2. **Decide who will conduct the needs assessment and what the personnel requirements will be?**
   - Staff
   - Volunteers from the community
   - Outside consultants
3. **Decide what type(s) of information will be collected.**
   - **Historical development:** Understand the history of the health needs within the community.
   - **Geographical/transportation information:** Required to help understand a community's growth patterns and population distributions.
   - **Political climate:** May help you decide the context for future strategies for change.
   - **Demographic data:** Determine age, population size, race, transience, ethnicities.
   - **Economic data:** Understanding the per capita GDP, major industries, unemployment rate, etc. helps you assess the economic foundation that drives a community, including the percent of average household budgets devoted to health care and presence of health insurance systems.
   - **Health data:** Assess infant mortality rate, fertility rates, major causes of mortality in different age groups, current/prior epidemics.

- **Education data:** Assess literacy rates, percentage of population with bachelor's, master's, and doctorate degrees; average length of schooling; and education disparities by gender and ethnicity.
- **Social/cultural/educational/recreational organizations:** Identifying such organizations can provide insights into the local community.
- **Community perspective**

4. **Which tools will be used to collect data?**
   - Interviews of "key informants" and/or random samples of community members
   - Surveys of "key informants" and/or random samples of community members; can be done by mail, phone, physical surveys, or online surveys
   - Reports (i.e.. from local ministries of health, non-governmental groups, WHO, etc.)
   - Public records
   - Literature (academic research, published books/novels, blogs)
5. **Collect data.**
   - Make sure that there is adequate time to collect necessary data.
   - Verify that all members of the assessment team understand the plan for data collection and the overall goals of the assessment.
   - Establish a regular meeting schedule to address problems as they arise and ensure adequate communication.
6. **Analyze your data.**
   - Survey response data often requires statistical analyses to quantify respondents' perceptions of community needs.
   - Interviews may be difficult to code and quantify for usable, interpretable results.
   - A standardized approach to identifying data and excluding or including responses is required.
   - List your conclusions and formulate a draft plan for implementing your program.
   - Decide upon the goals and deliverable metrics of your intervention.
   - Present the findings of your needs assessment to local stakeholders and community members and obtain feedback.
   - Collate the responses of the community, including stakeholders, and decide how these perceptions coincide (or conflict) with the needs identified in your assessment.

Injury Prevention

Background

About 5.8 million people die each year as a result of injuries. This accounts for 10 percent of the world's deaths – 32 percent more than the number of fatalities that result from malaria, tuberculosis, and HIV/AIDS combined. Public health interventions traditionally have been in response to infectious disease, as illnesses such as malaria, tuberculosis and AIDS have been prime drivers of morbidity and mortality on a population scale. However, as low- and middle-income countries begin the process of development and industrialization, they are experiencing an "epidemiologic transition" in which infectious disease mortality is declining, while injury and chronic illness are surging. Nearly one-third of the 5.8 million deaths from injuries are the result of violence – suicide, homicide and war – and nearly one-quarter are the result of road traffic crashes. Other leading causes of injury-related death are falls, drowning, burns and poisoning. Deaths from injuries are disproportionately high in low- and middle-income countries due to vehicle overcrowding, a lack of safety devices and regulations, and limited medical and preventive resources.

Prevention

Deaths related to injuries typically are not due to one specific problem, but are multifactorial. In order to be successful, injury prevention strategies must incorporate government, hospital systems, health care providers, media, public infrastructures, public works and financial systems. Most *injury prevention programs* focus on education, enforcement or engineering. *Education interventions* tend to focus on the people who are most likely to be injured – cyclists or pedestrians, for example. Educational efforts also have traditionally focused on emergency and trauma medical response and treatment facilities, both pre-hospital and hospital-based. Interventions that have been successful include the implementation of both basic pre-hospital care and brief interventions by providers at the time of care.

A major goal of injury prevention is to identify low-cost, high-yield interventions that are easily implemented at the point of care to reduce morbidity and mortality in injured patients. *Enforcement interventions* focus on policy change and working with local law enforcement to mandate changes. Examples of successful interventions include installing speed cameras and increasing the legal age for driving. *Engineering interventions* focus on maintenance and the creation of roads and vehicles that optimize safety. Cost-effective engineering interventions include vehicle inspections and the installation of seat belts, as well as improved helmet design and airbag deployment systems.

Many of the interventions that are effective in developed countries are prohibitively expensive or logistically difficult to implement in poorer regions. Unfortunately, there is a dearth of research examining injury prevention interventions in low- and middle-income countries; however, a number of recent publications have focused on interventions that are feasible for regions with limited resources. Much focus has been placed on the management of trauma in the pre-hospital setting, as well as sexual and gender-based violence; however, both remain significant problems in most low- and middle-income nations. A prevention strategy tends to be more cost-effective if there is a high incidence of injury in a particular country; therefore, it is important to have a good understanding of disease burden prior to implementation of an intervention.

Over the past 10 years there has been increased recognition of the significant role violence plays in causing approximately one-third of annual injury-related deaths. Due to this increased awareness, the World Health Organization recently made a plea to international development agencies to improve violence prevention efforts. Significant inequalities related to gender, race, education and economics can lead to increased violence. Violence, which also has been shown to negatively impact economic development, can be self-directed, interpersonal or collective. Successful violence prevention programs include laws that decrease access to guns, prosecute offenders and advocate for victims; support groups for victims of violence; and alcohol control programs. Additional research is needed, however, to determine which violence prevention strategies are most successful in low- and middle-income countries.

Nutrition and Malnutrition

Background

> *"Freedom from hunger and malnutrition is a basic human right and its alleviation is a fundamental prerequisite for human and national development." —WHO*

Nutrition: Substances required for health not generated by the body – a combination of proteins, fats, carbohydrates, vitamins, minerals, and water in the correct amounts.

Malnutrition: Insufficient intake or absorption, overconsumption – *acute* versus *chronic* – women, children, disabled, elderly and people living with HIV/AIDS are at increased risk.

Measurement of malnutrition: Anthropomorphic surveys – measure children ages six to 59 months as representative of the population, unless a certain group is known to be at increased risk.

Mid-upper arm circumference (MUAC) may be the best rapid tool for assessment, but has its own limitations.

Start food distribution, even if assessment and measurement isn't complete. *Don't wait.*

- Malnutrition disturbs growth and development in children and increases the risk and severity of infection and chronic disease.
- Adequate nutrition makes adults more productive.
- Traditionally, malnutrition has been synonymous with *deficiency*, but in the modern world, consider overconsumption as a different form –>obesity–> risk of CV disease, cancer, diabetes mellitus.
- Patients in developing countries may suffer from both under- and overconsumption. Two-thirds of those who are overweight and obese live in developing countries, emerging markets, or transition economies; for the first time ever, more obese individuals live in the *developing* world than in the *developed*.

Protein-Energy Malnutrition

Often a mixed picture of both marasmus and kwashiorkor.

Marasmus

- Decreased intake over months to years – chronic, gradual
- Severe fat and muscle wasting and protein catabolism
- Thin arms and legs, "baggy pants"
- Appear starved, but well-adapted because the condition is chronic. Treatment is complicated and requires care.

Kwashiorkor

- Acute process; normal calories but poor protein intake
- Edema, skin breakdown, poor wound healing

Sphere Handbook–Key Indicators or Nutritional Goals

The Sphere Handbook, one of the most widely known sets of common principles and universal minimum standards for humanitarian response, outlines the following nutritional goals and guidelines:

- Access to a range of foods: table cereal or tuber, pulses or animal products and fat sources that meet nutritional requirements
- Access to vitamin A, C and iron-rich or fortified foods or supplements
- Access to iodized salt for the majority of households
- Access to additional sources of niacin, if the stable is maize or sorghum
- Access to additional sources of thiamine, if the stable is polished rice
- Access to an adequate source of riboflavin when people have limited diets
- Levels of moderate and severe malnutrition are stable or at declining to acceptable levels
- No cases of scurvy, pellagra, beriberi or riboflavin deficiency
- Rates of xerophthalmia and iodine deficiency disorders are not of public health significance

Requirements (if entirely dependent on food aid) from Sphere Handbook

- 2,100 kcals per person per day
- 10-12% total energy as protein
- 17% total energy as fat
- Adequate levels of micronutrients
- Distribution of cooked and prepared foods is not recommended and should be avoided, if possible.
- Don't forget to provide people the ability to prepare food; for example, whole grains require individuals to have access to grinding facilities.
- Make sure the community is provided with food they know how to prepare and eat, and that which is culturally acceptable.

Nutrition in Children

- Breastfeeding: WHO recommends initiating within one hour of life; exclusively until six months; and on-demand until age two.
- Continue breastfeeding in emergencies or when there is risk of water contamination.
- There are extensive guidelines available for situations in when breastfeeding is not possible.
- Sick children require more energy.
- Conduct a surveillance of growth (BMI, weight, height, and growth charts).

Complementary feeding: Initiating family foods at six months, in addition to breastfeeding; therefore, six- to 24-month-olds are at risk of malnutrition.

Responsive feeding: The process of feeding older children, which requires interaction between child and parent, is an important part of a child's nutrition.

6-8 months	2-3× daily
9-11 months	3-4× daily
12-24 months	3-4× daily with 1-2 snacks

Micronutrients (vitamins and minerals): Only little amounts are required, but are necessary for hormones, enzymes and biochemical reactions.

- Most common deficiencies cause scurvy (vitamin C), pellagra (niacin), beriberi (thiamine), and riboflavin.
- Plant diets require supplementation – iron, zinc, calcium, vitamin B_{12}
- Vitamins A, D, E, and K deficiency are associated with fat malabsorption.

Clinical Effects of Micronutrients

Mineral/Vitamin	Source	Clinical Effects
Iron	Red meats, fish, poultry, lentils and beans	Infections exacerbate malaria, HIV, hookworm, muscle abnormalities, koilonychias, pica, anemia; decreased work performance; impaired cognitive development; and premature labor
Iodine	Saltwater fish, seaweed, grains; primary supplement in salt	Goiter; prevalent and preventable cause of brain damage; during pregnancy can lead to stillbirth, spontaneous abortion, congenital abnormalities, cretinism
Zinc	Meats, especially dark meats; peanuts, legumes	Growth retardation, decreased taste and smell, alopecia, dermatitis, diarrhea, immune dysfunction, FTT, gonad atrophy, congenital malformations
Calcium	Dairy products, small fish and lime-treated maize tortillas, soybeans, cabbage, carrots, squash, papaya, green leafy vegetables, guava, pumpkin	Reduced bone mass, osteoporosis
Folate	Legumes, green leafy vegetables, orange juice	Megaloblastic anemia, atrophic glossitis, depression, increased homocysteine
Thiamine B1 "Beriberi"	Yeast, organ meats, pork, legumes, beef, whole grains, nuts; deficiency in rice-based diets	Neuropathy, muscle weakness and wasting, cardiomegaly, edema, ophthalmoplegia, confabulation (Wernicke-Korsakoff)
Riboflavin B2	Liver, egg, dairy, green leafy vegetables, soybeans	Angular stomatitis, seborrhea, cheilosis
Niacin B3 "Pellagra"	Beans, milk, eggs, often enriched in flour; deficiency in corn-based diets: China, Africa, India	Dermatitis, pigmented rash of sun-exposed areas, diarrhea, dementia, apathy, memory loss, disorientation, bright red tongue
Pyridoxine B6	Meat, poultry, fish, banana, green leafy vegetables, potatoes and tubers, peanuts	Seborrhea, convulsions, neuropathy, depression, confusion, microcytic anemia
Cobalamin B12	Synthesized by micro-organisms, meat, fish and dairy; deficiency in gastric atrophy and strict vegetarianism	Megaloblastic anemia, dorsal column dysfunction (vibration, position sense, abnormal gait), dementia, impotence, loss of bowel and bladder function, increased homocysteine
Vitamin C "Scurvy"	Fruits, especially citrus; vegetables, especially broccoli; potatoes; tomatoes	Petechiae, ecchymosis, oiled hairs, inflamed and bleeding gums, joint effusion, poor wound healing, fatigue
Vitamin A	Dark-colored fruits and vegetables, red palm oil, liver, fish, and eggs; deficiency in fat malabsorption, infection, measles	Major cause of preventable blindness in children; increases the risk of morbidity and mortality with severe infections (diarrhea, measles); in pregnancy, night blindness (especially in third trimester); xerophthalmia; Bitot's spots; follicular hyperkeratosis; immune dysfunction

Mineral/Vitamin	Source	Clinical Effects
Vitamin D "Rickets" Made in skin	Sun exposure, fortified cereals, dairy, fish oils and egg yolks; deficiency in aging, lack of sun, or deeply pigmented skin	Skeletal deformation, rachitic rosary, bowed legs, osteomalacia
Vitamin E	Sunflower oil, safflower oil and wheat germ oil; meats; nuts; cereal grains; only seen in fat malabsorption	Peripheral neuropathy, spinocrebellar ataxia, skeletal muscle atrophy, retinopathy
Vitamin K	Green leafy vegetables, especially kale and spinach; margarine; and liver, olive, canola and soybean oils; deficiency seen in newborns	Bleeding, elevated prothrombin time

Adapted from The World Health Organization.

Management of Micronutrient Deficiencies

Vitamin A Deficiency

Treatment

- Oral vitamin A on days one and two, and in week three.
  Doses: 0-6 months: 50,000 IU
  6-12 months: 100,000 IU
  >1 yr: 200,000 IU
- Initially provide topical ophthalmic antibiotic for 10 days.
- Treat for corneal abrasion/ulceration/conjunctivitis, if present.
- Do not provide significant doses of vitamin A in pregnancy; 5,000 IU every other day PO for 4 weeks, followed by 200,000 maternal dose at delivery (transmission to infant via breast milk).

Prevention

- Supplementation in children is common (particularly in those infected with measles).
- Vitamin A is present in significant quantities in milk, meat, eggs, spinach, carrots, fish oils, liver, and sweet potatoes.

Iodine Deficiency

Treatment

- **Potassium iodide:** For a 0.15% solution, **ADD** 30 mg of potassium iodide to 20 mL of boiled water. Give 4-6 drops daily.
- **Iodized oil:** Repeat dosing after one year for oral form and after two years for IM.

Age	Oral dose of iodine	IM dose of iodine
Birth-1 yr	100 mg	240 mg
Children 1-5 yrs	200 mg	480 mg
Children 6-15 years	400 mg	480 mg
Pregnant Women	300-400 mg	480 mg
Non pregnant adults	400-1000 mg	480 mg

Adapted from Oxford Handbook of Tropical Medicine, 2006.

Prevention

- Iodized salt, treatment/prevention campaigns in endemic regions

Vitamin B_1 (Thiamine) Deficiency (Beriberi)

Signs/Symptoms

- **Dry beriberi**
  - Mixed sensory and motor peripheral neuropathy
  - Muscle wasting, with weakness progressing proximally
  - Ascending neuropathy and ataxia in progressive disease
- **Wet beriberi**
  - High output, right-sided heart failure
  - Valvular incompetence results due to dilated cardiomyopathy
- **Infantile beriberi**
  - Infants of breastfeeding B1-deficient mothers
  - Edema with progressive heart failure symptoms
  - May initially present as fussiness and difficulty with feeding

Treatment

- Severe: 50-100 mg thiamine IV TID, with 10 mg PO thereafter
- Non-severe cases may receive only ongoing PO therapy: 10 mg daily
- High-protein, low-salt diet
- Heart failure evaluation/treatment in wet beriberi

Niacin Deficiency (Pellagra)

Treatment

- Niacin 150-250 PO BID for 3-4 weeks or until complete recovery
- Dietary modification

Prevention

- Consider regional and population supplementation in affected areas.

For more information on managing severe malnutrition in pediatric patients, refer to the World Health Organization's Guidelines for the inpatient treatment of severely malnourished children, available at http://www.who.int/nutrition/publications/guide_inpatient_text.pdf

Infection Control

Adapted from Medicins Sans Frontieres Refugee Health: An Approach to Emergency Situations, unless otherwise noted.

Communicable diseases: Measles, diarrheal diseases, acute respiratory infections, malnutrtion and malaria (in endemic areas) are significant causes of morbidity and mortality, especially in refugees and displaced people.

- The primary goals are the prevention of health care-associated infections and the isolation of the infected.
- Hand hygiene is a simple, effective method of infection control for health care workers.
- WHO recommends alcohol-based hand rubs over washing, when possible.
- Appropriately immunize yourself prior to travel.

Public health surveillence: The process of data collection, analysis, and distribution; it is an important way to plan for and manage public health concerns.

Gather data on demographics, mortality, morbidity, and basic needs.

By gathering information, you can:

- Detect epidemics and respond rapidly and appropriately.
- Assess health problems in a specific population and follow trends.
- Plan for appropriate interventions and use of resources.
- Develop a program of intervention.
- Evaluate the effectiveness of the program developed.
- Develop a database of information.

Refugee populations are at risk for disease from a variety of sources:

- Disease contracted at home or while traveling
- Disease in their new environments for which they may lack immunity
- Disease in the camp secondary to overcrowding and sanitation limitations

Case definitions: Should be established to define and identify diseases.

Case definitions must be simple and clear; staff needs to be able to quickly and easily use clinical signs and symptoms to diagnose. Classify cases as *suspected*, *probable*, and *confirmed*. Keep a registry of recorded cases.

Illness	Definition
Measles (EPI definition)	Generalized rash lasting >3 days and temperature >38°C **PLUS** one of the following: cough, runny nose, red eyes
Dysentery (WHO)	Three or more liquid stools per day and presence of visible blood in stools
Common diarrhea	Three or more liquid watery stools per day
Acute respiratory infection (moderate to severe)	Fever, cough and rapid breathing (>50 or more per min.)
Malaria	Temperature >38.5°C and absence of other infection
Malnutrition	Weight for height index < -2 Z-Scores or kwashiorkor
Meningitis	Sudden onset of fever >38.9°C and neck stiffness or purpura

Adapted from MSF: *Refugee Health*

Epidemic: Unique to the disease, setting, and population; increased number of cases of a disease compared to previous experience.

Major strategies of epidemic control include:

Respond to the source. Diagnose/treat, isolate, and control animal resevoirs.
Protect those at risk. Assess immunizations, nutrition, and chemoprophylaxsis.
Stop the spread. Improve hygiene, health education, vector control, and disinfection/sterilization are key.

Keep in mind that specific outbreaks require specific strategies.

Diarrheal Diseases

- Poor water supply, sanitation, overcrowding, and malnutrition increase risk.
- Document whether bloody (dysentery – *Shigella, E. coli*) or nonbloody (cholera).
- Watch for adult deaths (>5 years), increased adult cases of diarrhea and dehydration, increased dysentery, and increasing fatalities.

Prevention involves

- Adequate and accessible clean water
- Adequate disposal of human waste
- Personal hygiene – soap, education
- Appropriate nutrition – encourage breastfeeding
- Food safety

Cholera treatment units

- Open when five new cases per day. Restrict interaction between infected patients and community. Control movement in and out of the unit. Utilize disinfection and human waste control.
- See *MSF Refugee Health Handbook* for guidelines.
- Corpses are concerning infectious sources – disinfect with chlorine. Control the transportation of corpses; although culturally challenging, prevent family contact.
- Mass chemoprophylaxsis does not limit the spread, but giving antibiotics to staff may be beneficial in calming provider anxiety and allowing treatment to continue.

Measles

- Very contagious; significant cause of mortality and morbidity in refugees and displaced persons.
- Mass immunization is very important! Patients six months to 12-15 years *must* be immunized.
- Vaccination is 85% effective at nine months, but only 50% at six months.
- Children immunized *before* nine months require repeat vaccinations *at* nine months.

- Vaccinate all individuals in age range (regardless of prior immunization status).
- Mass prophylaxis with vitamin A is important and should be given with immunization.
- Isolation is not effective; patients are contagious *before* they are symptomatic.

Malaria

- Individual (mosquito net) and community (insecticide) prevention is essential.
- Mass chemoprophylaxsis is not recomended; it is difficult and increases resistance.
- Location of settlement is key for vector control; avoid bodies of water.
- Prevent breeding; get rid of standing water and use larvicides if necessary.
- Periodically spray insecticide around settlements.
- Distribute insecticide-treated mosquito nets.

Tetanus

- Neonatal and wound-related tetanus problems are common in refugee settlements.
- Community medical practices (home deliveries, circumcisions) and war wounded increase risk. Prevent neonatal infections by training caregivers in clean delivery practices and immunizing women of child-bearing age. Prevent wound-related tetanus by debriding dead tissue, using antibiotics (penicillin) and anti-tetanus serum, and toxoid in high-risk wounds.

Meningococcal Meningitis

- 80% of infections occur in people >30 years.
- Routine vaccination during nonepidemic periods *is not* cost-effective.
- If there is a concern for developing outbreak, vaccinate as soon as you consider it.
- No mass chemoprophylaxis is available.

Family Planning

Background

Enabling couples to determine whether, when, and how often to have children is vital to safe motherhood and healthy families. Voluntary family planning has profound health, economic, and social benefits for families and communities.

Selecting a Method

Selection of a family planning method can vary significantly based on a number of factors, including how many children a woman wants, her religion, her access to health care, her access to clean running water, and her financial restraints. The table below outlines the effectiveness of each method for both typical and ideal users.

Table 1. Contraceptive Effectiveness
Rates of unintended pregnancies per 100 women

Family Planning Method	First-Year Pregnancy Rates (Trussell[a])		12-month Pregnancy Rates (Cleland & Ali[b])
	Consistent and correct use	As commonly used	As commonly used
Implants	0.05	0.05	
Vasectomy	0.1	0.15	
Levonorgestrel IUD	0.2	0.2	
Female sterilization	0.5	0.5	
Copper-bearing IUD	0.6	0.8	2
LAM (for 6 months)	0.9[c]	2[c]	
Monthly injectables	0.05	3	
Progestin-only injectables	0.3	3	2
Combined oral contraceptives	0.3	8	7
Progestin-only oral pills	0.3	8	
Combined patch	0.3	8	
Combined vaginal ring	0.3	8	
Male condoms	2	15	10
Ovulation method	3		
TwoDay method	4		
Standard days method	5		
Diaphragms with spermicide	6	16	
Female condoms	5	21	
Other fertility awareness methods		25	24
Withdrawal	4	27	21
Spermicides	18	29	
Cervical caps	26[d], 9[e]	32[d],16[e]	
No method	85	85	85

Key

0–0.9 Very effective
1–9 Effective
10–25 Moderately effective
26–32 Less effective

The decision whether to participate in family planning is a highly personal choice that must be made by each woman and her partner. When deciding which type of family planning method to use, a woman must determine which methods are available to her; some methods are not available in every country. *For additional information, please access the region-specific family planning information that is available on the WHO family planning website.*

There are myths that circulate about certain types of contraception. If you are in a position to discuss birth control with women in a community, attempt to determine local beliefs about contraception prior to starting such a conversation.

Birth Spacing

There is a large body of literature devoted to birth spacing, which has been shown to impact the survival of both children and their mothers. Short intervals between pregnancies can lead to low birth-weight babies, decreased milk supply and maternal malnutrition. A 2002 study by researchers at the Demographic

and Health Surveys (DHS) program found that children born three years or more after a previous birth are healthier at birth and more likely to survive at all stages of infancy and childhood through age five. This study used DHS data from 18 countries in four regions and assessed outcomes of more than 430,000 pregnancies.

HIV Testing Strategies

Despite considerable investments in HIV care, treatment and testing, it is estimated that only 10-15 percent of the world's HIV-positive population are aware of their status. As such, the CDC and WHO have recently underscored the importance of HIV testing as a means for identifying patients early in the course of disease, when they may benefit most from anti-retroviral therapy (ART) and when education and lifestyle modification may reduce the potential for transmission to others. HIV testing traditionally has been via voluntary counseling and testing (VCT), whereby patients present to health care facilities to receive testing, counseling and education.

The components of effective VCT are:

- **Pre-test counseling**
  - Share information regarding the test and testing process.
  - Conduct patient clinical risk assessment and patient self-risk assessment.
  - Employ HIV prevention education, risk reduction and counseling.
  - Assess an individual's coping strategies and psychosocial support system.
  - Assure the patient of confidentiality.
  - Discuss partner testing.
  - Facilitate the provision of informed consent by the client (informed consent is defined differently in different nations, and even differently within provinces and municipalities; be aware of local practices and laws).
- **Testing**
  - Ensure appropriate coding and record data, as is standard.
  - Perform test(s) per instructions and governmental/facility guidelines, including confirmatory testing.
- **Post-test counseling**

  HIV-negative patients
  - An explanation of the test result should be given, including information about the "window period."
  - Share basic advice on methods to prevent the transmission of HIV.
  - Provide condoms and guidance on their use.
  - Offer partner testing.

  HIV-positive patients
  - Focus on psychosocial support for the patient.
  - Inform the patient of the test result and allow time to consider it.
  - Ensure that the patient understands the result.
  - Allow the patient to ask questions.
  - Help patients cope with emotions arising from the results.
  - Discuss with the patient immediate concerns, and determine who may be best placed to help support the patient.
  - Describe follow-up support services.
  - Provide information on how to prevent the transmission of HIV.
  - Provide information on other relevant preventive health measures, such as good nutrition, as well as co-trimoxazole and malaria treatment and prevention.
  - Discuss disclosure of test results.
  - Encourage referral for testing of partner(s) and children.
  - Assess the risk of violence and suicide, and discuss steps and strategies to ensure the safety of the patient.
  - Describe available treatments and strategies; follow up for anti-retroviral (ARV) services (including a specific time and date for follow up appointments, as well as tuberculosis screening).

Prevention of Mother-to-Child Transmission of HIV (PMTCT)

Aside from VCT, HIV testing strategies also have focused on pregnant women. *All* pregnant women presenting for prenatal care should be tested for HIV. Counseling and testing should proceed similarly to that described above for VCT, however, pregnancy adds several points to consider:

- Discuss available strategies to prevent transmission from mother to child, in the event of a positive test.
- Discuss the availability of treatment resources for the mother and for the child, after delivery.
- Assess the possibility of intimate partner violence regarding testing or test result disclosure.

Opt-out approaches for testing have been employed in PMTCT and involve the provision of testing, unless the patient explicitly declines. While opt-out testing has been in use for more than a decade, different laws and regulations regarding the provision of informed consent exist; knowledge of local laws and customs is vital.

Provider-Initiated Testing and Counseling (PITC)

Despite substantial efforts in VCT and PMTCT, in 2004 the CDC and WHO both released recommendations regarding the expansion of testing efforts. This initiative was in response to data revealing that the majority of HIV-positive patients globally had not been tested for HIV, and that many individuals with significant risk were not presenting voluntarily for VCT services. It also was noted that many patients are being diagnosed with HIV when they present with clinical illness, typically from opportunistic infections. Most of these diagnoses are being made late in the course of illness, when immunologic and virologic response to ART may be sub-optimal. Furthermore, studies of HIV-positive individuals reveal that many patients presented for medical care multiple times in the months prior

to their eventual diagnosis, suggesting that opportunities to make the diagnosis of HIV are being missed in health care facilities.

As such, WHO and CDC released recommendations regarding the testing of patients in acute health care facilities, termed PITC. WHO guidelines regarding the provision of HIV testing in health care facilities recommend testing of *all* individuals presenting for medical care, regardless of the nature of their complaints, in regions experiencing epidemic HIV (seroprevalence >1%). In other areas, providers should make HIV counseling a part of their practices and provide testing to those individuals at risk for possible infection. All patients with signs and symptoms consistent with HIV or immune compromise should be offered testing. The philosophy of PITC is to make the offer of HIV testing "routine," such that stigma is reduced and patients come to view HIV testing as part of routine health care. Opt-out approaches to testing are utilized in PITC.

While these efforts, in general, have been well-received and broad implementation is occurring in several sub-Saharan states, there have been concerns regarding the uniform provision of HIV testing in health care facilities. Concerns regarding truly obtaining informed consent while limiting coercion have been voiced by both patients and providers. Providers working in busy casualty wards and outpatient departments may not have time to adequately address all of the factors involved in counseling. Furthermore, there have been concerns that, as patients become aware of routine testing, they will avoid health care altogether.

There also have been concerns regarding intimate partner violence and discrimination regarding HIV testing and the disclosure of test results. In addition, there are functional concerns regarding PITC, as casualty wards and outpatient departments are frequently busy, understaffed, and overwhelmed with excessive patient volumes. Adding quality counseling and testing services to these facilities may be difficult without significant investments in staffing and physical rehabilitation.

HIV testing in groups with impaired abilities to provide informed consent – such as children, soldiers and inmates, for example – should be given special consideration to ensure that coercion on the part of health care providers or other agents is not impairing or affecting decision-making.

Community-Based Testing (CBT)

A final approach to increasing the numbers of individuals tested for HIV is community-based testing (CBT). In CBT, HIV testing personnel leave the health care facility and set up HIV testing and counseling in the community. This effort may be centered around specific events such as health fairs, or there may be requests for testing from local elders or municipal leaders. While CBT largely involves a VCT approach to testing, efforts should be undertaken to ensure the adequacy of informed consent. Given that CBT occurs in the community, it is also necessary to take extra precautions to ensure the confidentiality of counseling and testing.

Appendix: References and Addenda

Resources for International Travel

Passport and Visa

www.travel.state.gov	Print passport application forms and find visa requirements for U.S. citizens traveling abroad.
www.travelregistration.state.gov www.embassyworld.com	Smart Traveler Enrollment Program (STEP) Register travel plans with U.S. embassies Websites and addresses for embassies and consulates
www.traveldocs.com, www.passportexpress.com	Examples of companies selling services to expedite passport and visa applications

Health, Safety, and Insurance

www.cdc.gov/travel	Learn about vaccination requirements and download ***Health Information for International Travel***, the "Yellow Book."
www.unops.org/security	Take UNOPS online security course; allow two hours.
www.fco.gov.uk/travel	The UK's Foreign and Commonwealth Office offers country-specific travel advice and security.
http://www.who.int	The World Health Organization provides comprehensive national health statistics.
www.iamat.org	The International Association for Medical Assistance to Travelers is free to join and offers a directory of pre-screened, English-speaking local physicians.
www.cia.gov	Detailed country profiles; ***Factbook***
www.internationalsos.com	Reliable international medical insurance company
www.international.worldaccess.com/bcbsa	Find participating overseas doctors and hospitals for your BlueCross/BlueShield insurance; print international claim forms.
www.insuremytrip.com	Compare quotes from travel insurers.

Money, Weather, Electricity, Communication

www.xe.com/ucc	Currency conversion for your expense report
www.wunderground.com	Real-time weather, including unusual destinations
www.skype.com	Make calls over the Internet for free.
www.cybercafe.com	Find Internet cafes and connection rates worldwide.
www.walkabouttravelgear.com	Retailer for electrical and phone adapters
www.gsmworld.com/roaming/gsminfo	Country-specific GSM coverage maps and bandwidths for local mobile phone companies enable you to choose the best SIM card.
www.usa.att.com/traveler	Find your destination's AT&T USADirect access number.
https://holdmail.usps.com	Put your mail service on hold.

Travel Gear

www.rei.com, www.ems.com, www.campmor.com, www.mec.ca	General travel and camping gear
www.magellans.com, www.travelsmith.com, www.christinecolumbus.com	Specialty travel clothes, bags, adapters, and knickknacks
www.safariquip.co.uk	Wide selection of mosquito nets
www.travelstore.ricksteves.com	Good prices on travel accessories and a nice money belt

Air Tickets

www.travelocity.com, www.expedia.com, www.orbitz.com	Search multiple airlines to compare prices and itineraries.
www.onetravel.com, www.kayak.com www.vayama.com	Comprehensive source for international travel
www.airtreks.com	The best for around-the-world tickets
www.seatguru.com	Detailed advice to help you choose the best seats on the plane

Travel Information and Advice

www.lonelyplanet.com	For general information on your destination
www.onebag.com	Advice for traveling light

Funding

www.iefa.org	International education financial aid
www.internationalscholarships.com	Scholarships for those wishing to study abroad
www.fic.nih.gov	Fogarty International Center for study in health sciences
www.rotary.org/foundations	The Rotary Foundation
www.tgci.com/intl	The Grantsmanship Center
www.nyam.org/grants/rogers	The New York Academy of Medicine

(Adapted from Harvard Humanitarian Studies Initiative for Residents)

International Resources

The following pages contain resources that provide guidance for pre-trip planning and useful information in cases of emergency.

WHO

The **World Health Organization (WHO)** is the United Nations' body addressing health matters. WHO offers leadership in global health and research and assists countries in examining health trends and disseminating evidence-based policy and treatment options.

http://www.who.int/en

For country-specific information: http://www.who.int/countries/en

UNICEF

The **United Nations Children's Fund (UNICEF)** initially was created to provide emergency health care and feeding programs in countries affected by WWII. The organization continues to offer support to mothers and children in developing nations through developmental and humanitarian assistance.

http://www.unicef.org

For country-specific information: http://www.unicef.org/infobycountry/index.html

UNAIDS

The **Joint United Nations Programme on HIV/AIDS** aims to achieve universal access to HIV prevention, treatment, care and support.

http://www.unaids.org/en/default.asp

For country-specific information: http://www.unaids.org/en/Regionscountries/Countries

CDC

The **Centers for Disease Control and Prevention (CDC)** is a federal agency under the U.S. Department of Health and Human Services. The CDC works with the U.S. and its international partners to develop the capacity for maintaining and preserving health. The CDC mission statement includes action to identify health concerns, to develop and promote public health policies and prevention methods, to encourage healthful environments, and to offer education and guidance. The CDC also is the home of the Travelers' Health website (http://wwwnc.cdc.gov/travel); the site includes access to the popular *Yellow Book*, which features travel-planning recommendations, including vaccinations, disease-specific and region-specific considerations, and matters pertinent to recent immigrants to the United States. The CDC also maintains an international travelers' hotline at 1-877-FYI-TRIP (1-877-394-8747); or, by fax at 1-888-CDC-FAXX (1-888-232-3299).

http://www.cdc.gov

United States Department of State

The **United States Department of State** (often referred to as the **State Department**), is the federal executive department responsible for U.S. international relations; it is equivalent to the foreign ministry departments of other countries and was the first executive department established in the U.S. The mission of the department is to "build and sustain a more democratic, secure, and prosperous world" by addressing international issues, such as the international collaboration to decrease poverty and to improve health.

http://www.state.gov

Country profiles: http://travel.state.gov/travel
Travel tips: http://travel.state.gov/travel
U.S. embassies, consulates and diplomatic missions:
http://www.usembassy.gov
Register your travel plans with the State Department:
https://travelregistration.state.gov
Foreign country safety information:
http://travel.state.gov/travel

For passport services and crisis management: (202) 647-5225
24-hour assistance with emergencies: 1-888-407-4747, if calling from the U.S. or Canada; or 202-501-4444, if calling from overseas.

CIA

The **Central Intelligence Agency (CIA)** is an independent U.S. government agency charged with collecting data related to national security and advising policymakers on intelligence matters. The CIA offers the country-specific *World Factbook*, which provides highly useful information about the history, people, government, economy, geography, communications, transportation and military for virtually every region of the world.

https://www.cia.gov/library/publications/the-world-factbook/index.html

AHA

The **American Heart Association (AHA)** produces medical and scientific statements on topics involving cardiovascular disease and stroke, including clinical practice guidelines, data review, and the overall AHA position statements on matters regarding all types of cardiac and stroke care. The AHA also organizes training courses for both laypersons and health care professionals. Included are authoritative courses on basic life support, advanced cardiovascular life support, ECG and pharmacology, airway management, stroke pre-hospital care, pediatric advanced life support, pediatric emergency assessment, recognition and stabilization, pediatric intraosseous access, pediatric status epilepticus, catastrophic illnesses in children, coping with the death of a child, CPR, AED operation, and first aid.

http://www.americanheart.org

ITLS

International Trauma Life Support (TLS) is a worldwide organization for "preventing death and disability through education and emergency trauma care." ITLS developed from Basic Trauma Life Support (BLTS) courses for EMS professionals to a worldwide collection of training programs now regarded as the international standard of care for pre-hospital trauma care. Courses include *ITLS Basic* and *Advanced, ITLS Access, ITLS Pediatric* and *ITLS Military*. The basic and advanced courses focus on stabilization and management in a step-wise fashion; the access course focuses on care for trapped patients; and the pediatric and military courses focus on scenarios and issues that are specific to those populations.

http://www.itrauma.org

Pediatric Growth Charts

Overview

- Growth charts allow the health care provider to compare growth in infants, children, and adolescents with a representative pool of children across all ages and ethnicities. Age- and gender-specific, they address a child's weight, height, stature and head circumference. When used over a period of time, charts allow the clinician to monitor and identify potential problems with growth, including malnutrition or abnormal growth patterns.
- Growth patterns are dependent on multiple factors:
  - Nutrition
  - Genetics
  - Birth weight
  - Gestational age

Use of the Chart

- **Obtain accurate weights and measurements of your patients.**
  - Infant height should be measured on a recumbent measuring board, while older children and adolescents can be measured on an upright stadiometer. Stadiometers should be standardized monthly with a standard length rod.
  - Beam balances or digital scales are appropriate for weighing infants. A digital scale or an adult beam balance with a step-on platform and sliding weights is appropriate for weighing older children and adolescents. Scales should be zeroed daily and standardized monthly.
- **Select the appropriate growth chart.**
  - The following charts are appropriate for children under 36 months who are measured in the recumbent position:
    - Length-for-age, weight-for-age, head circumference-for-age, weight-for-length

- The following charts are appropriate for children 2-20 years of age:
  - ♦ Weight-for-age, stature-for-age, BMI-for-age

■ **Record data.**
- Patient's name and record number
- Stature of mother and father
- Gestational age in weeks
- Birth data (for children under age two): date of birth; birth length, weight, head circumference; notable comments such as breastfeeding
- Today's date
- Child's age (years, months, days)
- Current weight, stature, head circumference

■ **Calculate BMI.**
- Weight (kg)/stature (cm)/stature (cm)× 10,000
- Weight (lb)/stature (in)/stature (in)× 703
- Enter BMI to one place after the decimal point.

■ **Plot measurements.**
- Find child's age on horizontal axis. (When plotting weight-for-length, find weight on horizontal axis.) Draw vertical line up from that point.
- Find the appropriate measurement on the vertical axis; draw a horizontal line until it intersects the vertical line.
- Make a small dot where the two lines intersect.

■ **Interpret the results.**
- Determine the child's percentile rank. The curved lines on the chart indicate the percentiles of the child's measurements. If the dot is plotted at the 95th percentile of BMI for age, it means only 5% of children of the same age and gender in the study population have a higher BMI.
- Assess whether the nutritional rank indicates that the patient is at risk, based on the percentiles provided.
- Compare the current percentile to percentiles of previous visits to identify any changes in the child's growth patterns.

http://www.cdc.gov/nccdphp/dnpa/growthcharts/resources/growthchart.pdf
http://www.ihs.gov/medicalprograms/anthropometrics/Study_Anthropometric_Protocols.pdf

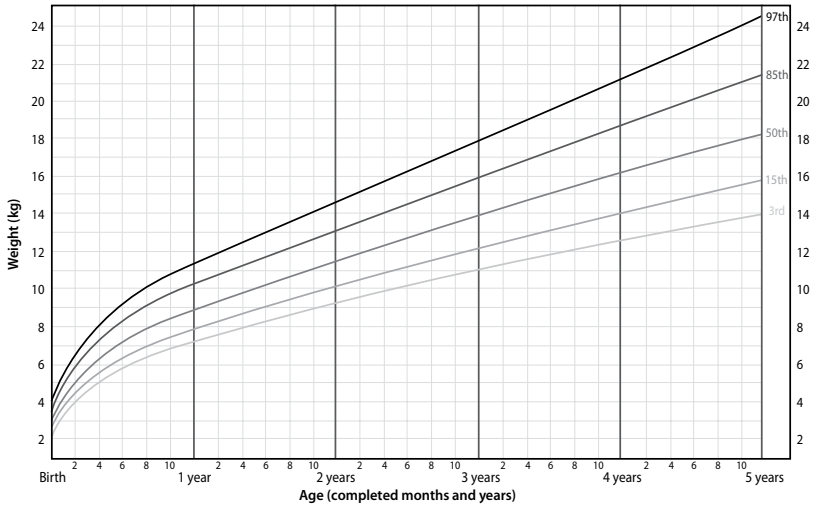
Pediatric Normal Vital Signs Chart

Age	Weight, kg (lb)	Respirations	Pulse	Systolic Blood Pressure
Newborn	3-4 kg (6-9 lbs)	30-	120-	60-80
6 mo-1 yr	8-10 kg (16-22 lbs)	30-	120-	70-80
2-4 yrs	12-16 kg (24-34 lbs)	20-	100-	80-95
5-8 yrs	18-26 kg (36-55 lbs)	14-	90-100	90-100
8-12 yrs	26-50 kg (55-110 lbs)	12-20	80-100	100-110
> 12 yrs	> 50 kg (110 lbs)	12	60-90	100-120

Charts (WHO Child Growth Standards)

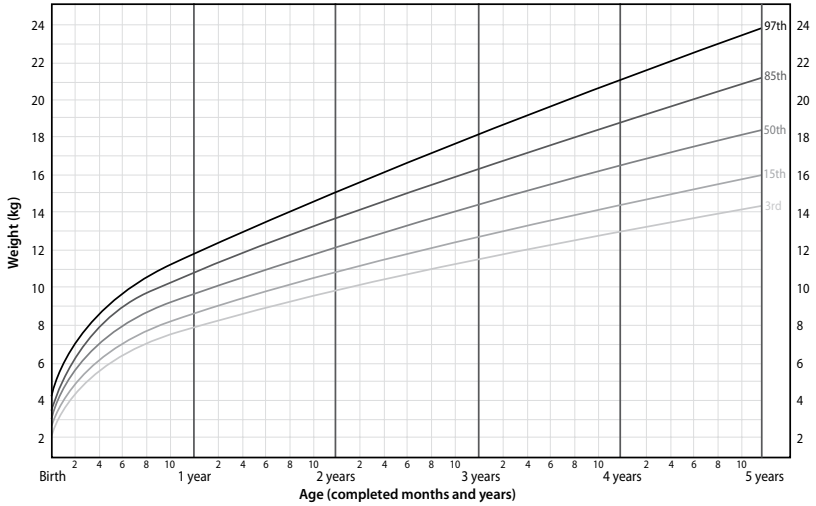
Weight-for-age GIRLS

Birth to 5 years (percentiles)



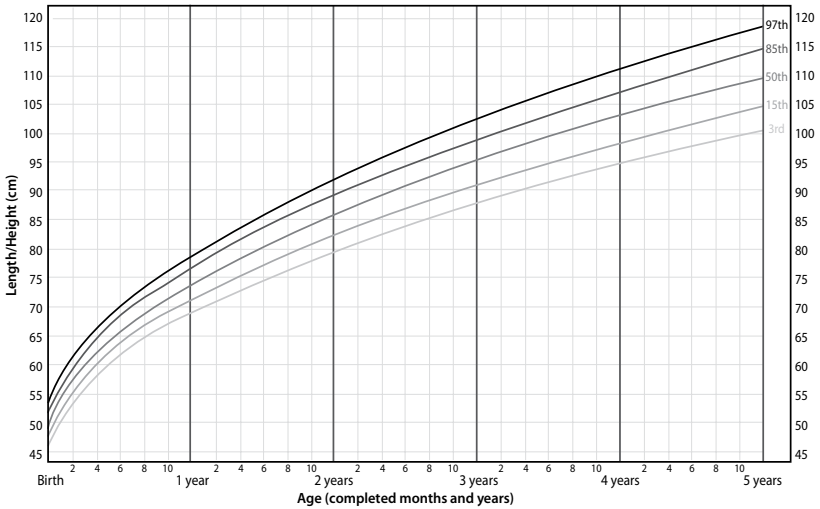
Weight-for-age BOYS

Birth to 5 years (percentiles)



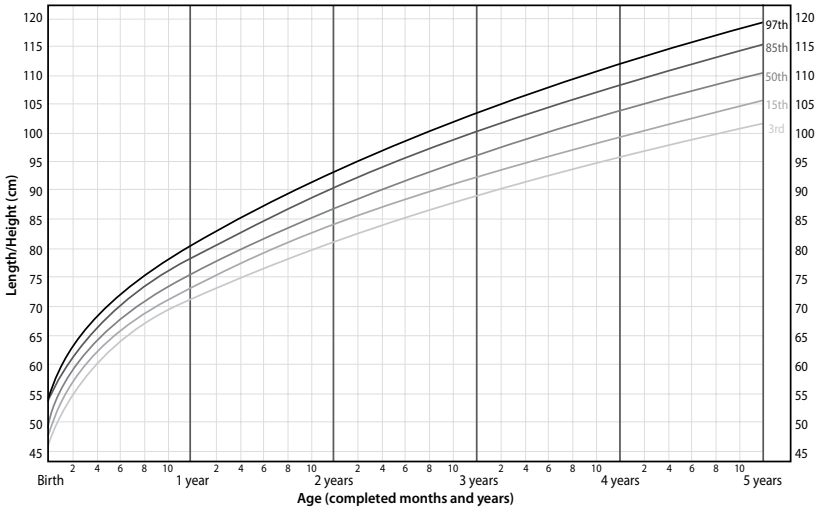
Length/height-for-age GIRLS

Birth to 5 years (percentiles)



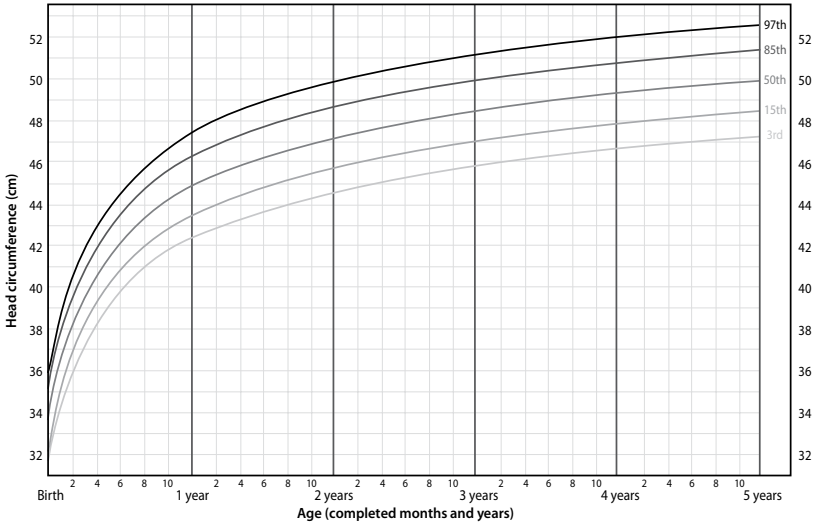
Length/height-for-age GIRLS

Birth to 5 years (percentiles)



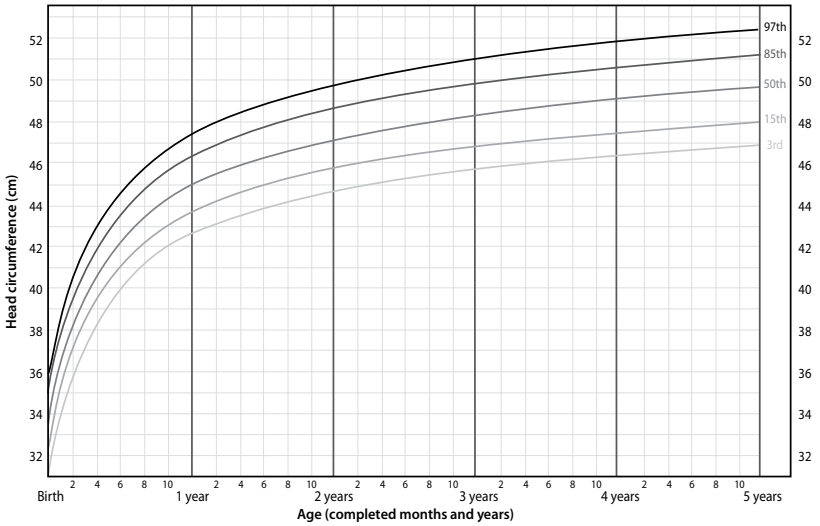
Head circumference-for-age GIRLS

Birth to 5 years (percentiles)



Head circumference-for-age BOYS

Birth to 5 years (percentiles)



Essential Medications

1.0 ANTIDOTES/ANTICONVULSANTS/ANTIVENOM 1.1 Nonspecific antidotes		
Activated charcoal	1 g/kg PO	May use with sorbital
Ipecac	*Induce emesis:* 10-30 cc PO	Syrup containing 0.14% ipecacuanha alkaloids
1.2 Specific antidotes		
Acetylcysteine	*Paracetamol overdose:* 150 mg/kg	Injection: 200 mg/ml in 10-ml ampule
Atropine	0.4 -0.6 mg IV, IM, SC	Injection: 1 mg in 1-ml amp
Calcium gluconate	500 mg – 2 g IV	Administer slowly
Deferoxamine	*Iron toxicity:* 1.0 g IM, **THEN** 500 mg q4 hrs (max 6.0 g/day)	
Dimercaprol	*Arsenic, gold or lead poisoning:* 2.5-5 mg BID to QID IV	Injection in oil, 50 mg/ml in 2-ml ampule
Methylthioninium chloride (methylene blue)	0.1-0.2 ml/kg	Inject via IV slowly over several minutes; 10 mg/ml in 10-ml ampule
Naloxone	*Opioid overdose:* 0.4 -0.2 mg IV (max 10 mg)	Repeat 2-3 min
Sodium thiosulfate	12.5 gm IV given over 10 min	Injection: 250 mg/ml in 5-ml ampule
1.3 Antivenom		
Snake antivenon immunoglobulin	Local effects include pain, swelling, bruising and tender enlargement of regional lymph nodes. Wounds should be cleaned and pain may be relieved by analgesics. If significant amounts of toxin are absorbed after a snake bite, this may result in early anaphylactoid symptoms such as transient hypotension, angioedema, abdominal colic, diarrhea and vomiting, followed by persistent or recurrent hypotension and ECG abnormalities. Spontaneous systemic bleeding, coagulopathy, adult respiratory distress syndrome and acute renal failure may occur. Early anaphylactoid symptoms may be treated with epinephrine (adrenaline).	**Snake antivenom immunoglobulins** are the only specific treatment available. They generally are used only if there is a clear indication of systemic involvement or in regions where supplies are not limited. There are many antivenom immunoglobulins, each containing specific venom-neutralizing globulins. It is important that the specific antivenom immunoglobulin suitable for the species causing the envenomation is administered.
1.4 Antiepileptic/anticonvulsants		
Diazepam	See details in previous section.	
Carbamezapine	200 mg oral dose BID	Age 12-5 (1000 mg max/day) Age >15 (1200 mg)
Lorazepam	*Status epilepticus:* 4 mg IV/2 min; repeat in 10-15 min *Anxiety:* 0.5-1 mg PO BID-TID	2 mg/ml in 1 ml-amp
Magnesium sulfate	IM: 4-5 g of a 50% solution q4 hrs	500 mg/ml in 10-ml ampule; use in pre-eclampsia/eclampsia
Phenobarbital	60-200 mg PO daily	Injection: 200 mg/ml Liquid: 15 mg/ml Tab: 15 mg to 100 mg
Phenytoin	100 mg PO TID; loading dose 10-15 mg/kg; maintenance 100 mg PO or IV q6-8 hrs	
Valproic Acid	Initial 15 mg/kg/d TID (max 60 mg/kg/d)	Liquid: 200 mg/5ml Tab: 100 mg Tab(ec): 200 mg, 500 mg

2.0 ANTI-INFECTIVE DRUGS 2.1 Antihelmintics		
Albendazole	<60 kg: 15 mg/kg/d PO BID (max 800 mg/d) >60 kg: 400 mg BID PO with meals	Tab: 400 mg
Levamisole	50 mg PO q8 hrs x 3 days; maintenance 50 mg PO q8 hrs for 3 days	Tab: 50 mg, 150 mg
Mebendazole	*Pinword:* 100 mg/d PO *Ringworm, whipworm, hookworm:* 100 mg BID x 3 days	Tab: 100 mg, 500 mg
Praziquantel	See details in section 4.3	
Pyrantel	5 mg/lb (max 1 g) single dose PO	Tab: 250 mg; oral susp: 50 mg
2.2 Antifilarials		
Ivermectin	*Strongloidiasis:* 15-24 kg: 3 mg; 25-35 kg: 6 mg; 36-50 kg: 9 mg; increase 3 mg for every 15 kg	Tab: 3 mg, 6 mg
Diethylcarbamazine	*Lymphatic filariasis:* **Adult and child over 10 yrs:** 1 mg/kg single dose on 1st day; increase gradually to 6 mg/kg daily over 3 days. Treatment for 12 days. See complete reference for treatment of children under 10 yrs and other intended regimens.	Tab: 50 mg, 100 mg Contraindicated in pregnancy; delay treatment until delivery. Caution: renal impairment S/E: headache, dizziness, GI symptoms, transient lymphangitis, immune reaction to first dose
2.3 Antischistosomiasis		
Oxamniquine	*Intestinal schistosomiasis due to S. mansoni (W. Africa, S. America, Caribbean islands):* **Adult:** 12-15 mg/kg as a single dose PO with food **Child under 30 kg:** 20 mg/kg in 2 divided doses *Intestinal schistosomiasis due to s.mansoni (Egypt and South Africa):* Adult and children: 60 mg/kg in divided doses over 2-3 days	Tab: 250 mg Liquid: 250 mg/5 ml Caution: May precipitate seizures in persons with epilepsy. S/E: GI symptoms, Loeffler syndrome, urticaria, hallucinations, increase transaminases
Praziquantel	*Taenia saginata, T. solium:* **Adult and child (> 4 yrs):** 5-10 mg/kg as a single dose *Hypenolepis nana:* **Adult and child (> 4 yrs):** 15-25 mg/kg as a single dose *Diphyllobothrium latum:* **Adult and child:** 10-25 mg/kg single dose. *Cysticercosis:* **Adult and child:** 50 mg/g daily divided in 3 doses for 14 days with prednisone given 3 days before treatment and throughout; 20 mg/kg doses PO TID x 1 day	Tab: 150 mg, 600 mg Contra: ocular cysticercosis Caution: risk of neurocystercosis, pregnancy or breastfeeding should be avoided within 72 hrs of treatment. S/E: GI discomfort, eosinophilia, malaise, fever, hypersensitivity reaction, intracranial hypertension (in response to dying parasites)

Triclabendazole	*Fascioliasis:* **Adult and child over 4 yrs:** 10 mg/kg single dose. *Paragonimiasis:* **Adult and child over 4 yrs:** 20 mg/kg given in 2 divided doses	Tab: 250 mg S/E: biliary colic; GI discomfort
2.4 Antibacterial (Beta lactams)		
Amoxicillin (Amoxil, Clamoxyl)	*ENT, respiratory, h.pylori, cystitis, leptospirosis:* **Child:** 50 mg/k/d PO BID or TID; **Adult:** 1.5 g/d TID **OR** 2 g/day BID *Respiratory tract:* 500 mg q8 hrs PO **OR** 875 mg q12 hrs PO *Gonorrheal infection:* 3 g (+1g of probenacid) single dose	Powder: 125 mg/5ml Tab: 250 mg, 500 mg Caution: Avoid if penicillin allergic; reduce dose if renally impaired.
Amoxicillin + Clavulanic acid	*Infections due to beta-lactamase producing bacteria resistant to amoxicillin alone:* dose based on amoxicillin needs. **Adult and Child:** 250 mg q8 hrs, doubling dose based on severity	Liquid: 125 mg/31.25 mg per 5 ml Tab: 500 mg + 125 mg Contra: hypersenitvity to penicillin S/E: GI symptoms, urticaria, angioedema, serum sickness-type reaction, haemolytic anaemia, interstitial nephritis, coagulation disorders, superficial staining of teeth with suspension
Ampicillin	*Resp infection:* <40 kg 25-50 mg/kg/d; >40 kg 500 mg q6 hrs IM or IV *GU infection:* 50 mg/kg/d q6-8 hrs IM or IV *Bacterial meningitis:* 150-200 mg/kg/d q4 hrs *Septicemia:* 150-200 mg/kg/d q4 hrs	Powder: 500 mg; 1 g Contra: hypersensitivity to penicillin S/E: GI symptoms, urticaria, angioedema, haemolytic anaemia, coagulation disorders
Benzathine benzylpenicillin	*Strep URI:* 1,200,00 U IM x 1 *Syphilis (primary and secondary):* 2,400,000 U IM *Syphilis (late/tertiary/neuro):* 2,400,000 U IM TID x 7 days	Powder injection: 1.44 g BPCN, in 5-ml vial
Penicillin V potassium	*Group A strep:* 2,400,000 U *Pneumococcal:* 600,000 in children; 1,200,000 U adults	
Cefalexin (Keflex) (1st gen)	*PNA, bone, GU infections:* **Adult:** 250-500 mg QID w/ max dose 4 g daily **Child:** 25-50 mg/kg/d in divided doses with max dose 100 mg/kg/d; can give BID for pharyngitis x 10 days Other 1st gen: G+ coverage including *S. aureus* with basic G- coverage; cefadroxil (duricef) and cefazolin (ancef)	Tab: 250 mg Liquid: 125 mg/5ml, 250 mg/5 ml
2nd Generation cephalosporins	Cefoxitin, cefaclor, cefuroxime were not included in the March 2010 WHO recommended *Essential Medicine* list.	

Ceftriaxone (Rocephin) (3rd gen)	*Severe pna, meningitis, h.influ, osteomyelitis, surgical prophylaxis, gonococccal conjunctivitis, endocarditis, PID* **Adult:** 1 g daily, severe infections 2-4 g daily **Child < 50 kg:** 20-50 mg/kg daily with max dose 80 mg/kg for severe infections; IV infusion over 60 min Other 3rd gen: cefdinir (Omnicef), cefixime, cefotaxime, cefpodoxime, ceftazidime	Injection: 250 mg, 1-g vial Caution: Do not administer with calcium; avoid in infants with hyperbilirubinemia. S/E: GI symptoms, urticaria, angioedema, haemolytic anaemia, coagulation disorders
Cefixime (3rd gen)	*Gonorrhea*: **Adult:** 400 mg as a single dose	Tab: 400 mg
4th Generation cephalosporins	Cefepime was not included in the March 2010 WHO recommended *Essential Medicine* list. Adviced to have good pseudomonas coverage.	
Imipenem + cilastatin	*Respiratory, skin and gyn (IM):* 500 mg **OR** 700 mg *Intrabdominal infection (IM):* 750 mg q12 hrs IM	Indicated in multi-drug-resistant cases (hospital-acquired illnesses)
2.5 Atypical antibacterials		
Azithromycin	*Genital infections, including C. trichomatis and trachoma:* **Adult:** 1 g **Child:** 20 mg/kg for single treatment dose	Tab: 250 mg or 500 mg Contra: hepatic impaired
Erythromycin	*Severe infections:* 250-500 mg every 6 hrs up to 4 g in 24 hrs	Liquid: 125 mg/5 ml Alternative for pencillin-allergic patients
Gentamicin	*Infection:* **Adult:** 3-5 mg/kg daily divided q8 hrs **Child:** 2 mg/kg q8 hrs (2 wks – 12 yrs)	Injection: 10 mg, 40 mg/ml in 2-ml vial Treatment of septicemia, pneumonia, PID, post-op infections, pseudomonas infections S/E: ototoxicity, muscular weakness and renal impairment with prolonged use
Metronidazole	*Anaerobic infections/colitis:* **Adult:** 800 mg initially, **THEN** 400-500 mg every 8 hrs **Child:** 7.5 mg/kg every 8 hrs; IV infusion over 20 min *BV:* 2 g single dose **OR** 500 mg BID x 5-7 days *PID:* 500 mg BID for 14 days *Leg/pressure ulcers:* 400 mg q8 hrs x 7 days *Acute ulcerative gingivitis:* 200-250 mg q8 x 3 days	Tab: 200 mg, 500 mg Liquid: 200 mg/5 ml Supplement: 500 mg – 1 g Caution: Disulfram-like reaction to alcohol, hepatic impairment, pregnancy and breastfeeding for > 10-day course.
Nitrofurantoin	*Uncomplicated UTI:* **Adult:** 100 mg q12 hrs x 7 days with food **Child:** 3 mg/g daily in 4 divided doses *Prophylaxis:* **Adult:** 50-100 mg at night	Tab: 100 mg Recommended for the of treatment UTI in pregnancy. Contra: in G6PD deficiency and porphyria

Chloramphenicol	*Life-threatening H. influenza, typhoid fever, cerebral abscess, mastoiditis, rickettsia, relapsing fever, plague, granuloma inguinalae, tularaemia, septicemia:* 50 mg/kg/d in 4 divided doses; may increase to 100 mg/kg/d for resistant organisms	250-mg tab; 150 mg/5 ml oral liquid; 1-g vial; 0.5 g/ml in 2-ml amp oil suspension Oily suspension used for treatment of epidemic meningitis in child > 2 yrs Contra: pregnancy and porphyria S/E: aplastic anemia, angioedema
Ciprofloxacin	*Prostatitis:* 1 g/d BID x 28 days *Pyelonephritis:* 1 – 1.5 g/d TID x 7 days *Shigellosis:* **Adult:** 1 g/d BID x 3 days **Child:** >1 mo 30 mg/kg/d x 3 days *Typhoid fever:* **Adult:** 1 g BID x 7-10 days **Child:** >1 mo 30 mg/kg/d 7-10 days *Uncomplicated cystitis:* Adult: 500 mg/d BID	Caution: Avoid in persons with history of tendonitis or G6PD deficiency; no contraindication with breastfeeding.
Doxycycline	100 mg orally BID x 14 days	Caution: Do not use in children less than 8 yrs of age, unless no other alternative exists.
Sulfamethoxazole + trimethoprim	*UTI, URI, bronchitis:* **Adult:** 800 mg/160 mg q12 hrs increased to 1.2 g/240 mg for severe infections **Child:** 30 mg/kg daily; see complete reference for more specific pediatric dosing by years.	Liq: 80 mg +16 mg/ml in 5-ml injection Tab: 100 mg +20 mg or 400 mg + 80 mg Contra: hypersensitivity to sulfa, G6PD deficiency
Clindamycin	*Staph and anaerobic coverage, staph bone and joint infections, osteomyelitis, necrotizing fasciitis, endocarditis, peritonitis:* **Adult:** 150-300 mg q6 hrs, 450 mg q6 hrs for severe infections **Child:** 3-6 mg q6 hrs; single-dose 600 mg IV infusion, not to exceed 1.2 g *PID:* 900 mg q8 hrs	Tab: 150 mg Injection: 150 mg/ml Liquid: 75 mg/ml S/E: severe diarrhea, c.diff colitis
Vancomycin	*MRSA, infections related to indwelling cath or instruments:* **Adult:** 500 mg-1 g IV over 60 min **Child:** 10 mg/kg if over 1 mo **Elderly:** 500 mg q12 hrs *Antibiotic assoc colitis:* 125-500 mg q6 hrs x 7-10 days	Injection: 250 mg (as HCL) vial Caution: Avoid rapid infusion/ anaphylactoid response, redman syndrome, renal function.
2.6 Antileprosy (Should be used in combination to avoid drug-resistance; contact WHO for available blister packs.)		
Clofazimine	*Multibacilliary leprosy regimen:* **Adult:** 50 mg/d and 300 mg once a mo as part of combo treatment **Child (10-14 yrs):** 50 mg on alternate days and 150 mg once a mo	Tab: 50 mg, 100 mg Caution: May discolor soft contact lenses; cause reversible discoloration of skin, hair, cornea; GI bleed; submucosal edema.
Dapsone	*Paucibacillary and Mutlibacillary leprosy:* **Adult:** 100 mg daily **Child:** 10-14 yrs 50 mg daily x 6 mos in combination with rifampicin	Tab: 25, 50, 100 mg Contra: hypersensitivity to sulfones, severe anemia, G6PD deficiency S/E: hemolysis, methhemoglobinemia, allergic dermatitis
Rifampicin	*Treatment of pauci and multibacillary leprosy:* **Adult:** 600 mg once a mo **Child 10-14 yrs:** 450 mg once a mo x 6 mos; multibacillary treatment for 12 mos *Tuberculosis:* **Adult or child:** 10 mg/kg daily or 3 x a wk; max dose 600 mg daily	Tab: 150 mg and 300 mg Caution: hepatic impairment, immunological reactions S/E: thrombocytopenia
2.7 Antituberculosis		
Ethambutol	*Combo drug for TB:* **Adult:** 15 mg/kg daily **Child:** 20 mg/kg daily	Tab: 100 mg to 400 mg Contra: optic neuritis; caution, visual disturbances; reduced visual acquity and red/green color blindnesss; peripheral neuritis in lower extremities
Eth + isonaizid +pyrazinamide + rifampicin	*Combo therapy for TB:* **Adult:** rifampicin 10 mg/kg, isonaizid 5 mg/kg, pyrazinamide 25 mg/kg, ethambutol 15 mg/kg	Tab: 275 mg +75 mg+ 400 mg+ 150 mg pyridoxime given with isonaizid to decrease S/E from peripheral neuritis Contra: severe hepatic impairment; S/E hepatotoxicity, including fever, anorexia, organomegly
Streptomycin	*Combo drug for TB:* **Adult and child:** 15 mg/kg daily or 3 x a week by deep intramuscular injection	1 g in vial S/E: auditory impairment, hypersensitivity, hypomagnesemia with long therapy
Amikacin	*Multi-drug resistant TB:* Visit WHO online formularly for details.	100 mg, 500 mg, and 1-g vials for injection Used for drug-resistant TB
Cycloserine	*Second-line medication for multidrug-resistant TB:* Visit WHO online formulary for details.	Used for drug-resistant TB
2.8 Antifungal		
Clotrimazole cream	*Anogenital candidosis:* 1% cream to anogenital area 2-3 x daily *Vaginal candidosis:* **Adult:** 100 mg at night x 6 days **OR** 500 mg single dose	Cream: 1%, 10% cream Tab: 100 mg, 500 mg
Fluconazole	*Systemic candidosis:* **Adult:** 400 mg initial dose with 200 mg daily x 4 wks *Eosophageal candidosis:* **Adult:** 200 mg initial dose, **THEN** 100 mg daily until symptoms resolve	Tab: 50 mg Liquid: 50 mg/5 ml

Griseofulvin	*Superficial fungal infections:* **Adult and child:** 10 mg/kg daily with food in single or divided doses	Liquid: 125 mg/5 ml Treatment duration depends on location. 4 wks for skin and hair; 6 wks for scalp ringworm; and up to 3 mos for severe infections. 6 mos for fingernails; 12 mos for toenails.
Nystatin	*Oral, esophageal, intestinal, vaginal and cutaneous candidiasis:* 100,000 IU 4x daily x 7 days	Tab: 100,000 IU, 500,000 IU Liquid: 50 mg/5 ml oral S/E: nausea, vomiting, diarrhea, oral irritation
Flucytosine	*Adjunct treatment for Cryptococcus meningitis:* **Adult and child:** 200 mg/kg daily in 4 divided doses x 7 days	Tab: 250 mg Liquid: 2.5 g/250 ml Altered LFTs, hallucinations, convulsions, vomiting, diarrhea, thrombocytopenia, aplastic anemia
Amphotericin B	*Life-threatening fungal infections, including histoplasmosis, coccidioidomycosis, paracoccidiodiomycosis, blastomycosis, aspergillosis, sporotrichosis, leishmaniasis:* Initial dose 1 mg IV over 20-30 min, **THEN** 250 mcg/kg daily; 1.5 mg/kg daily for severe infections	Injection: 50-mg vial Caution: Anaphylactic response to Amp B; a test dose is advisable before first infusion.

3.0 HIV MEDICINES

The following is a list of medications included in the essential drug list to be used in combinations for treatment and prevention of HIV (prevention of mother-to-child transmission and post-exposure prophylaxis). See complete reference for full details on dosing and side effect profiles.

Antiretrovirals	Protease Inhibitors
Abacavir (ABC)	Atazanavir
Didanosine (ddI)	Indinavir
Emtricitabine (FTC)	Lopinavir + ritonavir (LPV/r)
Lamivudine (3TC)	Saquinavir (SQV)
Stavudine (d4T)	Combo: efavirenz + emtricitabine + tenofovir
Tenoovir disoproxil fumarate (TDF)	Combo: lamivudine + nevirapine + stavudine
Zidovudine (ZDV or AZT)	Combo: lamivudine + zidovudine
Efavirenz (EFZ)	
Nevirapine (NVP)	

3.1 Other antivirals

Acyclovir (Viratop, Zovirax)	*Oral herpes in immune compromised:* 400 mg 5x daily x 7 days *Genital herpes:* 400 mg TID x 7 days *Herpetic kerato-uveitis:* 400 mg 5x day x 7 days *Zoster:* 5 mg/kg q8 hrs x 7 daily *Herpes encephalopathy in immunecompromised persons:* **Adult and child:** > 12 yrs 10 mg/kg q8 hrs for 10-21 days	Tab: 200 mg Injection: 250-mg vial injection Use within 24-48 hrs after appearance of lesions. Drink with lots of water. S/E: headache, skin sensitivity, raised transaminases, tremors, psychosis

Ribavirin (Tribavirin)	*Viral hemorrhagic fever, Lassa fever, Argentine hemorrhagic fever, Crimean-Congo fever, hemorrhagic fever with renal involvement:* **Adult:** 2 g initially, 1 g q6 hrs for 4 days; 500 mg q6 hrs for 6 days **Child:** 30 mg/kg **THEN** 15 mg/kg every 6 hrs x 4 days, **THEN** 7 mg/kg q6 hrs for 6 days	Tab: 200 mg, 400 mg, 600 mg Injection: 800 mg and 1 g in 10-ml phosphate butter solution; contraindicated in pregnancy (teratogenic), renal toxic
4.0 Antiamoebic/antigiardiasis/antileishmaniasis		
Diloxanide	*Amoebiasis:* **Adult:** 500 mg TID x 10 days **Child:** 20 mg/kg if over 25 kg; course may be repeated if necessary.	Tab: 500 mg Not to be used in first trimester pregnancy S/E: flatulence, vomiting, pruritus and urticaria
Metronidazole	*10-day course for amoebic liver abscess* **Adult:** 800 mg q8 hrs x 10 days **Child 1-3 yr:** 100-200 mg q8 hrs **Child 4-10 yr:** 200-400 mg q8 hrs	See section 4.5
Paromomycin	*Visceral leishmaniasis:* **Adult and child over 5 kg:** 11 mg/kg daily x 21 days	Base: 750 mg of paromomycin base Paromomycin base 11 mg is approx equivalent to paromomycin sulfate 15 mg. Not approved in pregnancy. S/E: elevated transaminase, ototoxicity, respiratory problems
Sodium stibogluconate	*Leishmaniasis:* **Adult and child:** 20 mg/kg daily x 28 days. If relapse; re-treat immediately. *Cutaneous lesishmaniasis:* **Adult and child:** 1-3 ml into base of lesion; if no apparent response, may repeat 1-2 times for up to 2 days.	Liquid: 100 mg/ml, Injection: 30-ml vial **OR** 30%, equivalent to approx 8.1% antimony Don't treat cutaneous lesions close to eyes, three lesions or more, lesions >3 cm, lesions on joints, and super-infections.
5.0 Antimalarial medicines		
Amodiaquine AQ (Camoquin)	*Used alone for treatment of p.vivax, p.ovale and p.malariae:* 10 mg/kg/d x 3 days	Tab: 153 mg or 200 mg Safe in 2nd and 3rd trimester; not contraindicated in breastfeeding. Avoid use if taking efavirenz. Contra: hepatic impairment S/E: pruritis, GI disturbances, leucopenia, agranulocytosis, visual disturbances, neuromyopathy

Artesunate + amodiaquine (Coarsucam)	*Uncomplicated malaria by P. falciparum:* **Adult and child > 5 mos**: 4 mg/kg daily x 3 days PO. Injectable dose for adults initially 2.4 mg/kg q12 hrs for 2 doses, **THEN** daily	Injection: 60 mg anhydrous artesunic acid with 5% sodium HCO3 solution Tab: 50 mg preformulated for combo therapy; do not separate. Caution: Risk in 1st trimester pregnancy; use if only treatment available. S/E: headache, GI disturbances, ECG abnormalities, suppressed reticulocyte response, blackwater fever
Artemeter + lumefantrine	*Uncomplicated malaria by P.falciparum alone or in areas of significant drug resistance:* **Adult and child:** >35 kg = intial 4 tabs, followed by 4 tabs each at 8, 24, 36,48 and 60 hrs (total 24 tabs over 60 hrs) **Child 5-14 kg:** initial 1 tab, **THEN** 5 doses of 1 tab as outlined previously **Child 15-24 kg:** initial 2 tabs, followed by 5 doses of 2 tabs as outlined previously **Child 25-34 kg:** initial 3 tabs, followed by 5 doses of 3 tabs as outlined previously	Tab: 20 mg + 120 mg Contra: breastfeeding, history of arrhythmia, CHF, or QTc prolongation Caution: 1st trimester pregnancy S/E: headache, GI disturbances, ECG abnormalities, asthma-like symptoms
Chloroquine	*Rheumatoid arthritis and malaria:* **Adult and child:** 10 mg/kg followed by 5 mg/kg 6-8 hrs later, **THEN** 5 mg/kg daily x 2 days (total 25 mg/kg over 3 days) *Malaria prophylaxis:* **Adult:** 300 mg once a wk **Child:** 5 mg/kg once a wk *Treatment of malaria IV infusion:* **Adult and child:** 10 mg/kg over 8 hrs followed by 2 infusions of 5 mg/kg at 8-hr intervals; convert to PO as soon as tolerable	Tab: 100 mg, 150 mg Contra: psoriatic arthritis Caution: G6PD deficiency S/E: GI disturbance, headache, skin reaction, anemia, alopecia, mental status changes, arrhythmia and convulsions Prophylactic use for malaria
Doxycycline	See section 4.5 *Supplemental treatment for multidrug-resistant malaria:* **Adult and child >8 yrs:** 100 mg BID x 7-10 days	See section 4.5
Mefloquine	*Treatment of multidrug-resistant P. falciparum:* **Adult and child:** 25 mg/kg given over 3 days *Prophylaxis:* **Adult:** 250 mg once a week **Child:** 5 mg/kg once a week if over 5 kg Prophylaxis started 1-3 wks prior to departure and last for 4 wks after last exposure.	Tab: 250 mg Contra: history of neuropsychiatric disorders Avoid in pregnancy and 3 mos post-use. S/E: GI disturbance, headache, skin reaction, anemia, alopecia, mental status changes, arrhythmia and convulsions

Primaquine	*Curative treatment of P.vivax and P.ovale after failed standard chloroquine therapy:* **Adult:** 250 mcg/kg daily (or 15 mg daily) for 14 days **Child:** 250 mcg/kg daily for 14 days *G6PD deficiency*: **Adult:** 750 mcg/kg once a week for 8 wks **Child:** 500-750 mcg/kg once a wk for 8 wks *Gametocytocidal treatment of P. falciparum (after blood schizontocide therapy)*: **Adult and child:** 500-750 mcg/kg as a single dose	Tab: 7.5 mg, 15 mg Contra: pregnancy Caution: methhemaglobinemia, G6PD deficiency S/E: GI disturbance, headache, skin reaction, anemia, alopecia, mental status changes, agranulocytosis
Quinine	*Multidrug-resistant P. falciparum:* Quinine (anhydrous base) 100 mg = quinine bisulfate; 169 mg = quinine dihydrochloride; 122 mg = quinine sulfate 121 mg. Quinine bisulfate 300 mg tab provides less quinine than 300 mg of the sulfate or dihydrochloride. **Adult:** 600 mg (quinine sulfate) every 8 hrs for 3, 7, or 10 days **Child:** 10 mg/kg (quinine sulfate) every 8 hrs for 3, 7, or 10 days; duration of treatment depends on local susceptibility and cotreatment.	Injection: 300 mg in 2 ml HCL Tab: 300 mg quinine sulfate **OR** 300 mg quinine bisulfate Contra: hemoglobinuria, optic neuritis, tinnitus, myasthenia gravis Caution: cardiotoxicity S/E: cinchonism (tinnitus, headache, blurred vision, temporary blindness, altered hearing, nausea, diarrhea, flushed skin, confusion), renal impairment, blood disorders; cardiovascular, gastrointestinal and CNS effects. Monitor levels closely.
Sulfadoxine +pyrimethamine	*Malaria due to susceptible P. falciparum:* **Adult:** sulfadoxine 1.5 g with pyrimethamine 75 mg (3 tabs) as a single dose **Child 5-10 kg:** half tablet; 11-20 kg; 1 tablet; 21-30 kg: 1½ tablets; 31-45 kg: 2 tabs, as a single dose	Tab: 500 mg + 25 mg Contra: hypersensitivity to sulfa or pyrimethamine S/E: pruritus, alopecia; erythema multiforme, GI disturbances, stomatitis, leukopenia, thrombocytopenia, megaloblastic anaemia, pulmonary infiltrates such as eosinophilic or allergic alveolitis

6.0 African trypanosomiasis		
Pentamidine	*Pneumocystis carinii: slow IV infusion or IM:* **Adult and child:** 4 mg/kg daily for at least 14 days *Prophylaxis of P. carinii (P. jiroveci) pneumonia:* **Adult and child:** 4 mg/kg once every 4 weeks or *by inhaled nebulizer* **Adult:** 300 mg as a single dose once every 4 wks **Child:** 4 mg/kg as a single dose once every 4 wks	Tab: 200 mg, 300 mg Contra: renal impairment S/E: nephrotoxic, hypoglycemia
Eflornithine	*Treatment of meningoencephalitic T. b. gambiense:* **Adult:** 100 mg/kg over 45 mins, every 6 hrs for 14 days **Child:** Higher dose is required. **Child < 35 kg:** 150 mg/kg over 45 min every 6 hrs for 14 days has been used and has provided an adequate response. Dose is based on clinical experience and limited evidence.	Injection: 200 mg in 100-ml bottle Contra: pregnancy, breastfeeding
Nifurtimox	*Combo therapy for t. brucei gambiense* *Acute American trypanosomiasis (Chagas disease):* **Adult:** 8-10 mg/kg daily in 3 divided doses for 90 days **Child:** 15-20 mg/kg daily in 4 divided doses for 90 days	Tab: 120 mg (as part of combo treatment), 30 mg, 250 mg. Contra: early pregnancy
Benznidazole and melarsoprol are two additional medications recommended by the WHO for the treatment of American trypanosomiasis. Refer to complete reference for details and dosing.		
7.0 Antiparkinsonism		
Biperiden	*Drug-induced extrapyramidal symptoms, except tardive dyskinesias:* **Adult:** Initial 1 mg BID, increased gradually to 2 mg TID; maintenance dose 3-12 mg daily in divided doses	Injection: 5 mg/1 ml Tab: 2 mg Contra: acute angle-closure glaucoma S/E: drowsiness, dry mouth, constipation, blurred vision, excitement, aggitation
Levodopa + carbidopa	*Parkinsonism:* **Adult:** Expressed in terms of levodopa, initially 100 mg PO (with carbidopa 10 mg) BID, increased by 100 mg PO (with carbidopa 10 mg) every few days as necessary to a maximum of levodopa 1.5 g	Tab: 100 mg + 10 mg, 250 mg + 25 mg Contra: MOA inhibitors, angle-closure glaucoma 70-100 mg daily dose of carbidopa required for efficacy

8.0 Hemolytic diseases		
8.1 Sickle cell treatment		
Folic acid: **Adult:** 5 mg/d; **Child:** 2.5-5 mg/d; **Infant:** <2.5 mg/d		
Pethidine (for severe pain): **Adult:** 25-100 mg IM q4 hrs; **Child:** 0.5-2 mg IM q4 hrs		
Paracetamol (for general pain relief): **Adult:** 500mg -1 g q6 hrs; **Child 1-5 yrs:** 120-250 mg q6 hrs; **Child 6-12 yrs**: 250-500 mg q6 hrs		
8.2 Additional antianemic medications		
Hydroxycobalamin	*Megaloblastic anemia due to B12 deficiency:* **Adult and child:** initially 1 mg 3 x a wk for 2 wks, **THEN** 1 mg every 3 mos *Megaloblastic anaemia with neurological involvement:* **Adult and child:** initially 1 mg on alternate days until no further improvement occurs, **THEN** 1 mg every 2 mos *Prophylaxis of macrocytic anaemias:* **Adult and child:** 1 mg every 2–3 mos	Injection: 1 mg/1 ml Caution: arrhythmia secondary to hypokalemia in early therapy
Ferrous salt with folic acid	*Severe anemia:* **Adult:** elemental iron 120 mg daily with folic acid 400 mcg daily for 3 mos **Child < 2 yr:** elemental iron 25 mg daily with folic acid 100-400 mcg daily for 3 mos **Child 2-12 yrs:** elemental iron 60 mg daily with folic acid 400 mcg daily for 3 mos *Prevention of iron and folic acid deficiencies in pregnancy:* 100 mg elemental iron with 350-400 mcg folic acid daily throughout pregnancy	Tab: 60 mg Fe + 400 mcg folic acid
Ferrous salt	See above	Contra: hemochromatosis, hemosiderosis, recurrent blood transfusions S/E: constipation, diarrhea, dark stools, nausea, gastrointestinal irritation
Ferric ammonia citrate	*For anemia associated with sickle cell disease:* **Child 1-4 yrs:** 10 ml/d **Child 5-7 yrs:** 12.5 ml/d	

8.3 Coagulation therapy		
Heparin sodium	*Treatment of DVT and PE:* **Adult:** 10,000 IU in severe pulmonary embolism followed *by* of 15-25 IU/kg/hr IV **OR** by subcutaneous injection of 15,000 IU every 12 hrs; dose adjusted based on coagulation studies **Child:** Lower loading dose, **THEN** 15-25 IU/kg/hour **OR** by subcutaneous injection, 250 IU/kg every 12 hrs *Prophylaxis for DVT and PE:* **Adult:** 5000 units 2 hrs before surgery, **THEN** every 8-12 hrs for 7 days **OR** until patient is ambulant (monitoring not needed)	Injection: 1000 IU/ml; 5000 IU/ml Caution: haemophilia and other haemorrhagic disorders, thrombocytopenia, peptic ulcer, recent cerebral bleed, severe hypertension, severe liver or renal disease Safe in pregnancy
Phytomenadione	*Warfarin antagonist: minor bleed* 500 mcg, 5 mg in moderate hemorrhage, and 10-20 mg in severe hemorrhage	Tab: 10 mg Injection: 10 mg/ml in 5-ml ampule
Protamine sulfate	*Reversal for Heparin:* IV dose over 10 min; 1 mg neutralizes 80-100 units heparin when given within 15 mins; if longer time, less protamine needed as heparin is rapidly excreted	10 mg/ml in 5-ml ampule
Warfarin	*Prophylaxis for embolization in rheumatic HD and Afib, prosthetic heart valve, DVT and PE:* **Adult:** Initial 10 mg daily for 2 days, adjusted based on PT, maintenance dose is 3-9 mg taken at the same time each day	1 mg, 2 mg or 5 mg

9.0 Antiarrhythmic and antihypertensive (The following are a list of WHO recommended essential drugs for the treatment of cardiovascular disease). Refer to complete reference for details and dosing.				
β-blockers	***Ca-channel blockers***	***Other anti-arrhythmics***	***Diuretics***	***ACE-inhibitors/statins***
Atenolol Digoxin	Amilodipine Nifedipine Verapamil	Amiodarone Epinephrine Lidocaine Procainamide	Amiloride Furosemide Hydrochlorothiazide Mannitol Spironolactone	Captopril Enalopril Simvastatin

9.1 Other antihypertensive drugs		
Glycerol trinitrate	0.5-1 mg; repeat as required.	Tab: 500 mcg S/E: throbbing headache; flushing; dizziness, postural hypotension; tachycardia
Hydralazine	*Hypertension associated with pregnancy, hypertensive crisis:* 25 mg BID, increase to 50 mg max BID. IV dose 5-10 mg, repeated after 20-30 min **Hypertensive crisis:** 200-300 mcg/min with maintenance at 50-150 mcg/min IV drip **Hypertensive crisis during pregnancy:** 12.5 mg q2 hrs as needed	Tab: 25 mg, 50 mg Injection: 20 mg/amp Contra: SLE, high output cardiac failure, core pulmonale, S/E: tachycardia, palpitations, postural hypotension
Methyldopa	**Hypertension in pregnancy:** 250 mg 2-3 times daily, max 3 g daily	Tab: 250 mg
Magnesium sulfate	*Prevention of recurrent seizures in eclampsia:* **Adult:** Initally 4 g over 15 min followed by IV 1 g/hr for 24 hrs if seizure occurs; additional dose 2 g IV	Injection: 500 mg/ml in 2 ml
10.0 GI medicines		
Antacids/antiulcer **Aluminium hydroxide**	*Gastritis*: **Adult:** 3-6 tabs or 1 tab with painful attack **Child:** 5 ml up to TID	Tab: 500 mg Liquid: 320 mg/5 ml Decreases intestinal absorption of tetracylcine, iron salts, isoniazid, ethambutol, chloroquine, fluoroquinolones; administer 2 hrs apart.
Metoclopramide	*Nausea and vomiting, gastro-esophageal reflux, gastroparesis:* **Adult:** 10 mg 3 x daily **Child:** 1 mg BID, 10-14 kg; 1 mg 2-3 x daily, 15-19 kg; 2 mg 2-3 x daily, 20-29 kg; 2.5 mg 3 times daily, >30 kg; 5 mg 3 x daily Max 500 mcg/kg daily, particularly for children and young adults	Tab: 10 mg Injection: 5 mg/ml in 2-ml ampule
Odansentron (Zofran)	*Anti-emetic:* Refer to complete reference for dosing based on need.	Tab: 4 mg, 8 mg, 24 mg base Injection: 2 mg/ml in 2-ml ampule

10.1 Anti-inflammatory (IBD)	14.3 Anti-spasmotic	14.4 Laxative
Hydrocortisone **Sulfasalazine**	**Atropine:** *Premedication to control secretions*: **Adult:** 300-600 mcg IV *before induction of anaesthesia* **Child:** 20 mcg/kg IV *intraoperative bradycardia* **Adult:** 300-600 mcg (larger doses in emergencies) **Child 1-12 yrs:** 10-20 mcg/kg *Control of muscarinic side-effects of neostigmine*: **Adult:** 0.6-1.2 mg	Senna: 7.5 mg tabs, 2-4 tabs increase as needed; acts in 8-12 hrs S/E: abdominal discomfort, hypokalemia Zinc sulfate: 10 mg/unit dose in tab or liquid; adjunct to oral rehydration therapy in acute diarrhea

Oral rehydration salts: Refer to complete reference for WHO guidelines for oral rehydration. *Glucose salt solution*	
Sodium chloride	2.6 g/litre of clean water
Sodium citrate [dihydrate]	2.9 g/litre of clean water
Potassium chloride	1.5 g/litre of clean water
Glucose (anhydrous)	13.5 g/litre of clean water
When glucose and sodium citrate are not available, they may be replaced by sucrose (common sugar)	
Sucrose (common sugar)	27 g/litre of clean water
Sodium bicarbonate	2.5 g/litre of clean water

10.2 H. pylori treatment: Recommendation includes omeprazole plus combination of two antibiotics.
Omeprazole 20 mg PO BID; amoxicillin 1g BID **OR** 500 mg TID; metronidazole 400 mg BID; clarithromycin 500 mg BID

11.0 Hepatic encepholapathy: Class C evidence for combination therapy		
Lactulose 30-50 ml TID; metronidazole 400 mg q8 hrs; magnesium sulfate 15 ml TID		
Vitamin K 10 mg/d IV TID	Evid: A	INR reversal

Promethazine	*Premedication:* **Adult:** 25 mg IV **Child:** 0.5-1 mg/kg	Liquid: 5 mg 5-ml S/E: drowsiness, paradoxical stimulation in children), anticholinergic effects such as dry mouth, blurred vision, urinary retention
12.0 Oral contraceptives		
Ethinylestradiol + levonorgestrel	*Oral contraceptives:* 1 *active* tablet daily started on day 1 of the cycle, subsequent courses repeated without interval; withdrawal bleeding occurs when ***inactive*** tablets are being taken.	Tab: 30 mcg + 150 mcg
Estradiol cypionate +medroxyprogesterone acetate	*Contraception single dose*: (medroxyprogesterone acetate 25 mg with 5 mg estradiol cipionate 5 mg) within first 7 days of cycle, repeated monthly	Injection: 5 mg + 25 mg S/E: dizziness, abdominal pain, alopecia, menstrual irregularities, breast tenderness

Medroxyprogesterone acetate	*Mild to moderate endometriosis*: 10 mg 3 times daily for 90 days, beginning on day 1 of cycle *DUB:* 2.5-10 mg daily for 5 to 10 days beginning on day 16 to 21 of cycle for 2 cycles *Secondary amenorrhea:* 2.5-10 mg daily for 5-10 days beginning on day 16 to 21 of cycle for 3 cycles	Tab: 5 mg S/E: acne, urticaria, fluid retention, weight gain, GI discomfort, changes in libido, breast discomfort
Copper-containing IUD	*Long-term contraception:* The device can be inserted at any time between day 4 and day 12 after the start of menstrual bleeding. *Emergency contraception:* The device may be inserted up to 5 days after unprotected intercourse.	Implanted device Contra: severe anemia; 48 hrs 4 weeks postpartum; postseptic abortion; cervical or endometrial cancer; PID
13.0 Insulin/antidiabetic medications		
Metformin	*Diabetes mellitus(DM):* **Adult and child >10 yrs:** 500 mg with breakfast for at least 1 week; **THEN** 500 mg BID for least 1 wk; **THEN** 500 mg with breakfast, lunch and evening meal **OR** 850 mg every 12 hrs with or after food; usual maximum 2 g daily in divided doses	Tab: 500 mg Contra: renal impairment S/E: GI discomfort, metallic taste; lactic acidosis (vitamin B12 absorption, erythema, pruritus and urticaria
Glibenclamide	*DM:* 5 mg once daily with or immediately after breakfast, adjusted as needed (max 15 mg daily)	Tab: 2.5 mg, 5 mg Caution: renal impairment, pregnancy
Insulin injection/ intermediate-acting insulin	Dose according to individual requirements.	SC or IV dosing 40 IU/ml in 1-ml vial; 100 IU/ml in 10-ml vial
14.0 Thyroid disease		
Levothyroxine	*Hypothyroidism:* **Adult:** 50-100 mcg; increased 25-50 mcg every 3-4 wks	50 mcg, 100 mcg S/E: anginal pain, arrhythmia, palpitations, tachycardia, vomiting, tremor
Potassium iodide	*Uses: Thyroidtoxicosis, subcutaneous phycomycosis, sporotrichosis*	Refer to full reference for dosing details.
Propylthiouracil	*Hyperthyroidism:* **Adult:** 300-600 mg daily until euthyroid; maintenance dose 50-150 mg daily	50 mg S/E: sore throat, ulcers, bruising, headache
Lugol's solution	See complete reference for further details.	130 mg iodine/ml

15.0 Opthamological treatments: Refer to complete reference for details and side-effect profile.		
Anti-bacterial agents	***Miotic and anti-glaucoma agents***	***Mydratic agent***
Acyclovir	Acetazolamide	Atropine
Gentamicin	Pilocarpine	
Tetracycline	Timolol	
Prednisolone		

16.0 Obstetrical treatments: Refer to complete reference for details and side-effect profile.		
Oxytocics	***Tocolytic***	
Ergometrine Oxytocin Mioprostol Mifepristone-misoprostol	Nefidipine	
17.0 Psychotherapeutic treatments **17.1 Antipsychotics**		
Chlorpromazine	*Schizophrenia and other psychoses, mania, psychomotor agitation, violent behavior:* 25 mg 3 x daily adjusted according to maintenance dose of 75-300 mg daily (but up to 1 g daily may be required)	Tab: 100 mg Injection: 25 mg/ml in 2-ml ampules S/E: tardive dyskinesias, hypothermia, drowsiness, apathy, pallor, nightmares
Fluphenazine	*Schizophrenia and other psychoses*: Test dose of 12.5 mg (6.25 mg in elderly), **THEN** after 4-7 days 12.5-100 mg repeated at intervals of 2-5 weeks, adjusted as needed.	Inj: 25 mg/1 ml
Haloperidol	*Schizophrenia and other psychoses, mania, violent behavior:* .5-3 mg 2-3 times daily **OR** 3-5 mg 2-3 times daily in severely affected or resistant patients (up to 30 mg daily in resistant schizophrenia)	Tab: 2 mg, 5 mg Injection: 5 mg/1ml S/E: acute dystonia and akathisia (especially in thyrotoxic patients), hypoglycaemia, SIADH
17.2 Antidepressants		
Amitriptyline (Elavil, Laroxyl, Triptyzol)	*Depression:* 25-150 mg/d in single (before bedtime) or divided doses; make dose changes slowly *Neuropathic pain:* 75 mg/d in single (before bedtime) dose; *Maintenance dose:* 150-300 mg/d in single or divided doses	Don't combine with MAOI. Orthostatic hypotension, cutaneous rxns, weight gain, urinary retention. Reduce dose by half in elderly.
Fluoxetine	*Moderate to severe depression:* 20 mg daily; increase up to 80 mg after 3 wks and reassess symptoms. Dizziness, nausea, anxiety, paraesthesia, fatigue, agitation, and sweating may occur if withdrawn abruptly.	Tab: 20 mg Contra: manic phase
Carbamazepine	See section 3.4 for treatment of tonic-clonic and partial seizures. *Trigeminal neuralgia:* 100 mg 1-2 times daily; increase as needed	Tab: 100 mg, 200 mg Liquid: 100 mg/5 ml S/E: dizziness, drowsiness, headache, ataxia, blurred vision, diplopia, GI intolerance

17.3 Bipolar disorder	19.4 Anxiety/compulsive	19.5 Substance abuse
Carbamezepine (see section 3.4) **Lithium carbonate** **Valproic acid (see section 3.4)**	Clomipramine Diazepam (see section 3.4)	Nicotine replacement therapy (NRT) Methadone
18.0 Respiratory treatments		
Beclometasone	*Chronic asthma:* **Adult:** standard dose 200 mcg BID (high dose up to 600-800 mcg for severe cases) **Child:** 500 mcg BID (high dose up to QID)	50 mcg, 100 mcg per dose S/E: oropharyngeal candidosis, cough, dyspohonia, adrenal suppression, glaucoma and cataract
Budesonide	*Antiasmathatic, COPD*	100 mcg/dose, 200 mcg/dose
Epinephrine	*Rescue therapy in acute asthma:* 1 mg/ml	See section 1.0.
Ipratropium bromide	*Chronic asthma/COPD:* **Adult:** 20-40 mcg QID **Child:** 20 mcg TID up to 40 mcg based on necessity *Acute bronchiospasm nebulizer:* **Adult:** 500 mcg; repeat as needed. **Child:** 125-250 mcg up to 1 g max daily	20 mcg/md S/E: dry mouth, urinary retention, constipation, tachycardia, arrhythmia
Salbutamol	*Chronic asthmatic:* **Adult:** 2-4 mg TID or QID, max 8 mg QID **Child under 2 yrs:** 100 mcg/kg QID; **Child 2-6 yrs:** 1-2 mg TID; **Child 6-12** yrs: 2 mg TID. Severe acute bronchospasm, chronic asthmatic aerosol dose: A and C-100-200 mcg (1-2 puff) inhaler	Tab: 2 mg, 4 mg Liquid: 5 mg/5 ml Aerosol: 100 mcg per dose; 5 mg/ml nebulizer S/E: hypokalemia, arrhythmias, tachycardia
19.0 ENT treatment		
Demoboro (acetic acid + aluminum acetate)	*Otitis Externa:* **Adult:** 4-6 drops in affected ear every 3-4 hrs **Child:** 2-3 drops	Topical: 2%
Budesonide	See section 20.1.	
(Ciprofloxacin+ dexamethasone)	*Otitis externa:* 4 drops in infected ear BID x 7 days *Otitis media w/tympanostomy tubes:* **Child:** 4 drops in infected ear x 7 days	
Xylometazoline	*Nasal decongestant similar to Afrin, Vicks Sinex, topical decongestants*	S/E: Overdose can lead to adrenergic effects.

20.0 Neonatal care		
Caffeine citrate	*Neonatal apnea:* 20 mg/kg loading dose, **THEN** 5 mg/kg daily x 4-5 days (caffeine citrate 2 mg = caffeine base 1 mg)	Injection: 20 mg/ml Liquid: 20 mg/ml S/E: Lethargy, irritability, excessive CNS stimulation, tachycardia hyper/hypoglycemia
Prostaglandin E	*Treatment of congenital cardiac disease; maintains PDA*	PDGE1: 0.5 mg/ml PDGE2: 1 mg/ml
Phototherapy	To be used in term babies with serum bilirubin less than 340 micromol/L	
Surfactant	*Neonatal respiratory distress syndrome*	Suspension: 25 mg/ml or 80 mg/ml
21.0 Vitamins and minerals (the following is a list of vitamins and recommended daily intake by the WHO. Refer to complete reference for details.)		
Ascorbic acid **Cholecalciferol** **iodine**	*Prophylaxis of scurvy:* **Adult and child:** 25-75 mg daily; treatment dose is > 250 mg divided doses. 400 IU/ml (Ergocalciferol is an equivalent alternative.) *Iodine deficiency IM:* **Infant up to 1 yr:** 190 mg **Adult (except during pregnancy) and child above 6 yrs:** 400 mg once a yr **Adult during pregnancy:** single dose of 200 mg	

The preceding table is an abridged version of the Essential Medicine List published by the World Health Organization in March 2010. You can find the complete reference along with more detailed pharmaceutical information, child-specific dosing and updates by visiting: http://www.who.int/selection_medicines. *Essential medication formulary and health care kits also can be ordered through WHO.*

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5. *International Covenant on Economic, Social and Cultural Rights*, 1966.
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