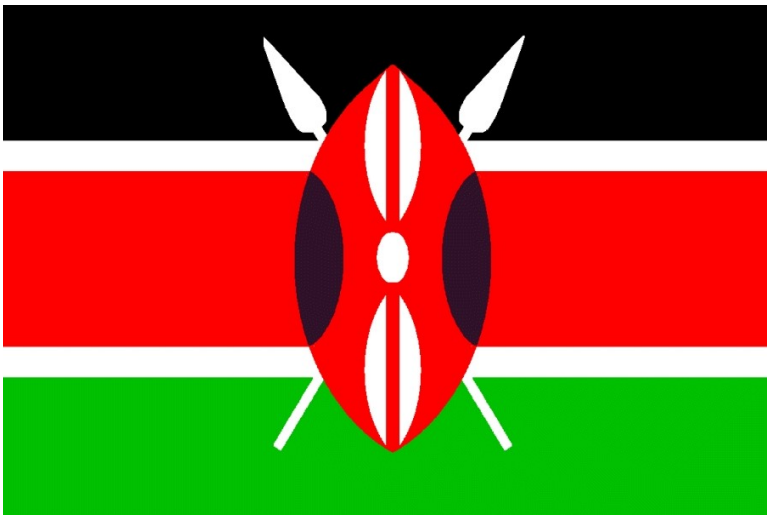
University of Washington
DEPARTMENT OF GLOBAL HEALTH

GHCE

Global Health Clinical Elective



KENYA

Site Guide 2015-2016

This booklet is provided as a service to UW students going to Kenya, based on feedback from previous students. The Global Health Resource Center is not responsible for any inaccuracies or errors in the booklet's contents. Students should use their own common sense and good judgment when traveling, and obtain information from a variety of reliable sources.

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Welcome to your Global Health Clinical Elective in Naivasha, Kenya!

The following is a brief manual that will provide answers to frequently asked questions. Please feel free to contact your mentor for more information.

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Insurance	On Call International		call 1.855.464.8971 or collect +1.603.328.1358	http://student.uwsearchlightportal.com studentclaims@oncallinternational.com
Hall Health Travel Clinic	Anne Terry, MN, ARNP	315 E. Stevens Circle Box 354410 Seattle, WA 98195	+1-206-543-8915 +1-206-685-1011	travel@uw.edu
Post-Exposure Prophylaxis	Harborview Madison Clinic	325 Ninth Ave Box 359930 Seattle, WA 98104	1-888-448-4911 (CDC hotline) +1-206-744-5100 (clinic)	http://depts.washington.edu/madclin/providers/guidelines/pep_occ.html

THE BASICS

ROTATION BASICS: You will do most of your work at Naivasha District Hospital during your rotation. The work week is Monday-Friday. Your typical day will be from around 8:30am-5pm. It is about a 30-minute walk from the house to the hospital. You will be able to take part in inpatient rounds, outpatient clinic, and outreach clinics. There will be medical officers (MO) and clinical officers (CO) interns on all the specialties that can help with translation. Students will work with the current chief resident to put together a weekly schedule based on their interests and the availability of opportunities.

Clinical rotations are usually 4-6 weeks, although can be longer. You may wish to consider adding some of your personal vacation onto the end of your scheduled international trip, although if you do this you should make sure that your insurance will cover you for the additional time.

FLIGHT ARRANGEMENTS: Flights to Nairobi are expensive from the United States. Expect to pay anywhere from $1300 to $1800 for your round trip ticket. Remember to try different resources when purchasing your ticket, such as consulting a travel agent while also checking online fares. Several major airlines serve Nairobi from Seattle, including British Airways and KLM/Delta with stops in either London or Amsterdam.

If your flight lands in the evening, you will spend the night in a hotel in Nairobi before taking a taxi to Naivasha the next day. The program covers the cost of the taxi (both from the airport to the hotel and from the hotel to Naivasha) and hotel. A taxi driver will meet you at the airport upon arrival and take you to a prearranged hotel/guest house in Nairobi for the night. The next morning, a driver will pick you up at the hotel and bring you to Naivasha. Drivers usually pick up around 10am (unless Sunday, then it will be later in the afternoon) and you will arrive in Naivasha by early afternoon. The UW Chief Resident will meet you in Naivasha and go through a brief orientation.

VISA: Most people purchase a tourist visa upon arrival to Kenya. The cost is $50 for a single entry tourist/business visa that is valid until 3 months after the date of issue. You will need to have $50 in cash upon arrival (in your carry-on) in order to purchase a visa. You may also choose to secure one in advance. The Kenya Embassy in Washington, DC processes visa applications and there is an application form that can be printed out, completed, and then mailed to them. Go to www.kenyaembassy.com and look for the visa application section.

MONEY: The currency in Kenya is the Kenyan shilling (KES). The exchange rate as of 12/5/15 is approximately KSh 102 to $1.00 USD. Bring your ATM card as it is the easiest and safest way to get shillings. There are ATM machines in the Nairobi airport, both before and after going through immigration. Your bank may provide foreign currency services; check with your bank directly. (AAA also provides this service for an added fee). US cash can be exchanged at the airport upon arrival, or at any number of foreign exchange bureaus in Nairobi. Some Forex bureaus and banks do not except US bills older than year 2000, because older bills are harder to resell and have a lower exchange rate. Although many establishments accept credit cards, you should be aware that more credit card fraud has been occurring in Kenya over the last few years. Thus, it is advised to withdraw cash from ATM machines and use this as much as possible. If you do use your credit card, check your activity online every so often. Travelers are cautioned against doing any financial transactions via the web from internet cafes. Remember to call your banks before you arrive to tell them to expect international transactions. Also, bring your US checkbook. If

you are unable to get shillings, you may be able to write a check to one of the other UW staff who can then withdraw shillings from their bank accounts. Traveler's checks are more difficult to cash.

HOUSING:
You will live in a house with other UW residents who are doing electives in Naivasha. The house is gated and has security guards 24 hours/day. It is completely furnished and bedding, mosquito nets, and towels are provided. Bring flip-flops for indoor/shower shoes. The house is located in a safe area of town and is within a 30-minute walk to the hospital. The roads are rough so bring comfortable walking shoes.

There are multiple grocery stores in Naivasha, the largest one being an easy walk from the hospital. Most food is cheaper than in the US, with the exception of "western" items like cereal and cheese. There are local markets close to the hospital where you can get very inexpensive fruits and vegetables. It is not currently safe to drink the tap water in Kenya so all water must be bottled. Some students/residents bring their favorite granola/power bars with them from home as these are not available in Naivasha. You can do your own laundry or pay to have your clothes washed (500 Ksh per load shared by all residents). Laundry soap and clotheslines are provided.

TRANSPORTATION: Buses and matatus (shared mini-bus) run along major routes throughout the country, and are cheap (KSh 20-250 per ride. You can ask around at the matatu stage to find out which matatus are going to your destination. There are rarely scheduled departure times; intead, matatu drivers wait for the van to fill before leaving. Ask about the price before you get on since people may overcharge you just for being non-Kenyan. Taxis are also easily available. Nothing is metered so agree on the fare before you get into the taxi.

A few safety tips:
--Don't board an empty matatu or bus. Wait for the next one.
--After nightfall, avoid public transportation and use taxicabs instead.

Driving in Kenya is chaotic, intimidating and possibly dangerous. That said, under certain circumstances it may make sense to rent a car for a weekend, since it is a good way to explore. There are no formal rental agencies in Naivasha, but several of the taxi drivers are happy to rent you a car. Talk to your chief for more details.

COMMUNICATION: You will be provided with a cell phone. Phones can be purchased inexpensively if you prefer to have your own. Once you have a phone you will need a SIM card, which will provide you with a phone number, and then phone cards which give you credit. Placing calls costs money, but receiving calls is free. Many people here favor text messages (SMS) since they are cheaper to send. Buying phone cards is easy since there are numerous phone card stands located throughout the city. You should also consider unlocking your personal phone for use abroad. The 3G network is quite good and allows for use of medical applications without much difficulty.

International calls on your cell phone are usually fairly cheap, less than $0.10 per minute. You may be able to call at dramatically reduced prices on Safaricom by dialing in a prefix allowing VOIP calling directly from your mobile phone. Skype is also a good option for reducing overseas communication costs, as long as you have internet access. FaceTime and iMessage are also free of charge (over wifi) to other iphone users. You can also consider buying an international SIM card to use in any unlocked phone from home for free calls from the US.

You will have access to internet via USB 3G connect modems which will be shared among the residents. If you use the modem, you will have to pay for data by using scratch cards the same way that you buy phone credit. If you top up with a larger amount, you can get bonus airtime. There is a large resort about a 10 minute walk from the house which has Wi-Fi.

Telephone Instructions

Kenya Country Code: +254

Dialing Instructions:

To US from Kenya: From a cell phone: +1, area code, number

Within Kenya: area code, number. Can also include +254, but remove '0'.

Example: 0729 048 847 is the same as +254 729 048 847

Time Zone: East Africa Time (EAT)

Time Difference to Seattle: 10 or 11 hours (depending on Daylight Savings Time)

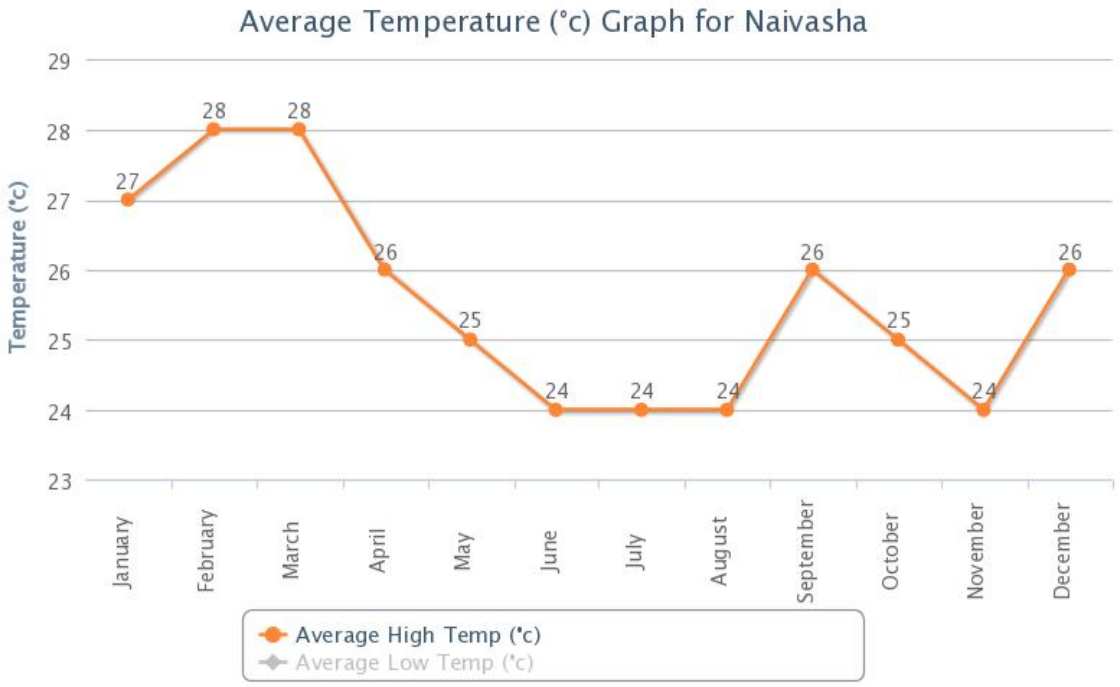
March-November: 10 hour difference (12:00 noon in Seattle = 10:00pm in Nairobi)

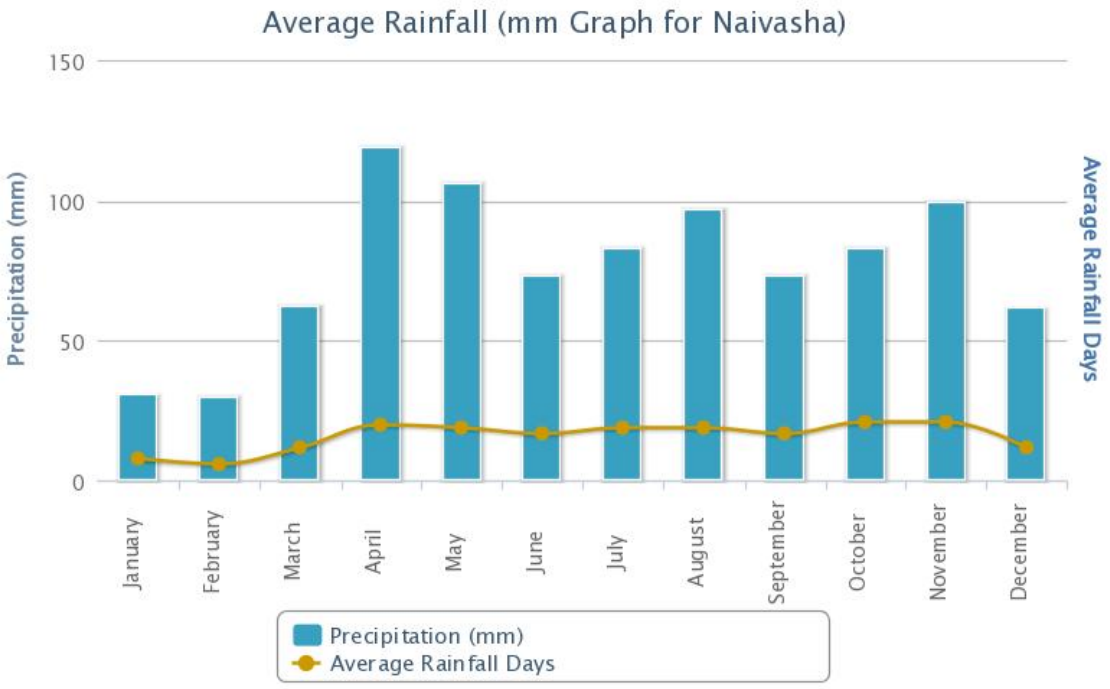
November-March: 11 hour difference (12:00 noon in Seattle = 11:00pm in Nairobi)

PRICES AND TIPPING: Prices in Kenya can range anywhere from significantly cheaper than the US to significantly more expensive. For taxis, prices are roughly similar to what they would be for equivalent trips in the US. Always agree on the price before embarking. Once a price is agreed upon, there should be no additional charges. Do not pay for gas or a tip. A taxi ride from the airport to central places in Nairobi (ACK

guest house, Ngong road) should be around KES 1500. For a 10-15 minute ride, KES 500 is reasonable. For a 30 minute ride, KES 1000 is reasonable. At upscale, touristy or expat-centered restaurants tipping is expected, and a 10% tip is adequate. For more local, cheap spots tipping is not expected.

WEATHER: Naivasha typically experiences two seasons: Dry and Rainy. There are two distinct rainy seasons, with one being more significant than the other. Temperatures are generally warm but not hot, and much cooler at night.





WHAT TO BRING:

CLOTHING: You should bring clothing that can be layered. Know that certain clothing is discouraged in most professional settings in Kenya. This includes sleeveless tops or short skirts. The dress code in hospitals and clinics is dressy casual. Men should wear button down shirts with slacks (ties are optional), and women can wear a nice top with pants or skirts that are at least knee-length. Nairobi and Naivasha can be cool in the early mornings and late evenings; even though you are next to the equator you will need warm layers—bring a sweater or fleece pullover. January through March are hot, you'll want lightweight clothes and shorts/skirts. March through May is the main rainy season, although it can rain any time during the year. Bring a raincoat.

Travel Items:

- Passport, valid for 6 months
- Travel itinerary, receipts, copy of tickets
- Credit and debit cards, including the one you used the purchase your airplane ticket
- Yellow fever vaccine card, copies of all your prescriptions

Personal Items:

- Extra contact lenses, solution, back-up pair of glasses if needed
- Plenty of sunscreen and mosquito repellant (DEET)
- Medications: can buy almost everything here, but may be convenient to have your own supply of medications you use frequently. Benadryl is not sold in Kenya, so if you use this regularly, bring your own.
- Headlamp (power outages are common)
- Scrubs (several pairs available at house, bring more if you plan to use them often)
- Raincoat
- Warm clothes for cold nights
- Athletic shoes for weekend trips, everyday walking shoes, work shoes (Note: don't bring Dansko clogs. You will put your ankles in great danger while walking on the pot-holed roads and rough sidewalks).
- Digital camera with extra memory
- Flash Drive
- Power adapters (British 3 prong outlets—can buy these cheaply here, house has universal power strips that accept US plugs).
- Fun reading books (no large bookstores in Naivasha)
- Snacks you can't live without (granola bars sometimes hard to find here)
- Camping/fishing gear may come in handy

Hospital/Work Items:

- This booklet
- Pocketbooks/references: see reading list at end of this guide
- N-95 masks in your size
- Pocket hand sanitizer
- White coat, stethoscope, and anything you regularly use on the wards (reflex hammer, pen light, pulse oximeter, blood pressure cuff, nitrazine paper, tape measure, etc)

BACKGROUND

HISTORY: Kenya's early prehistory was characterized by large migrations of various nomadic people, including the Cushitic and the Bantu, who arrived around 1000 AD. Additionally, Islam arrived along Kenya's coast in around 1000 AD, creating the Swahili civilization. *Swahili* refers both to the language that is still shared along the East African region from Tanzania to Somalia, and to the Islamic culture that became established there in the first century AD. Europeans first arrived in East Africa in 1498, followed by Arabic explorers in the early 18th century. As the slave trade grew prominent along the Tanzanian coast, British colonials took increasing interest in the region, eventually establishing Kenya as their colony in 1890. The colonial state continued until the mid-1950s, when the Mau Mau rebellion began an organized anti-colonial movement coordinated between multiple different Kenyan ethnic groups. Pressure against colonization continued, and Jomo Kenyatta emerged as a leader of the new Kenyan African Movement. Independence was won in 1963, and Kenyatta (now of the Kenya African National Union, or KANU) was elected president. Upon Kenyatta's death in 1978, Vice President Daniel Moi assumed the Presidency. His 24-year tenure in the position was fraught with corruption and he effectively established an autocracy by banning opposition parties and arresting both opposition leaders and journalists. In 2002 he voluntarily retired power, and Mwai Kibaki (National Rainbow Coalition, or NARC) was elected.

In 2007 a general election was held in which the primary candidates were Kibaki (for re-election) and Raila Odinga, the main opposition leader. Leading up to elections Odinga held the lead with public opinion polls showing a strong advantage. However, Kibaki was declared the winner, although multiple third-party observer groups revealed illegalities and malpractices in the election. The results of the elections incited riots throughout the Rift Valley, Western Highlands and Nyanza province. Violence was largely ethnic, with Kikuyus supporting Kibaki and Luos supporting Odinga (see below). Over 600 people died, with areas of violence in Eldoret, Nakuru and Naivasha.

In March 2013, presidential elections were again held. Kibaki was not allowed to run due to term limits. There was a wide field of candidates, but the two main players were Uhuru Kenyatta, son of Jomo Kenyatta, the first president, and Railia Odingo, who ran previously in 2007. Uhuru won by a slim margin, however, his victory was tainted by the fact that he and his running mate, Ruto, are currently on trail at The Hague on charges of inciting ethnic violence in the 2007 elections.

In an effort to decentralize power, a new constitution was enacted in 2007, which created 47 counties (similar to American states). As part of this "devoluiton," the counties are now assuming responsibility for their own health centers (previously theses were managed centrally by the Ministry of Health). This restructuring has far-reaching implications for district hospital operations, most visibly in availability of funds and supply chain interruptions.

CULTURE: Kenya is home to over 30 different ethnic groups, each of which comprises its own individual identity. Many Kenyans feel more drawn to their ethnic heritage than to their Kenyan nationality. The largest groups are the Kikuyu (17%), Luhya (17%), Kalenjin (13%), Luo (10%) and Kamba (10%). Non-Africans, including Arabs, Indians, and Europeans comprise a total of about 1% of the population.

The majority of the population is of various Christian denominations, while those along the coast are largely Muslim (around 30% of the population). There are several staple foods that you will find in most restaurants (and homes): *nyama choma*, or "barbecued meat," usually goat; *ugali*, or maize porridge, and *sukuma wiki*, or vegetable stew. Kenyans love soccer (called football), and you will find people playing everywhere you go. Music is also ubiquitous, and there are numerous Kenyan artists whose styles range from traditional African folk to modern hip-hop.

LANGUAGE: There are significantly more languages spoken in Kenya than there are distinct ethnic groups. Each group named above has its own language; in addition, national languages are Swahili and English, both of which are taught in school. Although English is a national language, people speak it with varying degrees of fluidity. As such, it is helpful to have a fundamental understanding of Swahili prior to arrival. It is a good idea to buy a Swahili-English dictionary and familiarize yourself with the basics.

HEALTH CARE: Medical education in Kenya follows the European system, which goes like this:

- Undergrad + Medical School: 6 years (Degree conferred is MBchB, or Bachelor's of Medicine and Surgery)
- Internship: 1 year
- Medical Officer: 2-5 years (typically)
- Specialty training: 3-4 years (Degree conferred is MMed, or Master of Medicine)

Most Kenyan doctors spend several years as a Medical Officer (MO), or general practitioner, after completing internship and before going to residency. As such, they have many more years of unspecialized training than in our system. MOs function similarly to residents at the Naivasha District hospital, directly supervising interns.

There are four medical schools in Kenya, two public and two private. The public schools are Moi University and University of Nairobi. Both accept students on government scholarship in addition to students paying full tuition, which is quite expensive. It is much more difficult for students to be accepted into the program on scholarship than it is for paying students, thus typically only wealthy families can send their children to medical school. The majority of physicians in Kenya have been trained at University of Nairobi. Two new private universities recently opened: Egerton University in Nakuru and Kenyatta University in Kahawa.

In addition to medical doctors with MBchB degrees, Clinical Officers and nurses assume a large portion of clinical responsibility in various facilities throughout the country. Clinical officers, or COs, are midlevel providers similar to our nurse practitioners or physicians' assistants. They have not attended formal medical school but are trained and authorized to prescribe standard medications.

Kenya's national health care system is a tiered referral structure organized by region. Dispensaries, or small clinics, are the first point of contact for many rural Kenyans and are staffed by registered nurses. Complicated cases are referred from there to Health Centres, which typically serve populations of about 80,000 and are staffed by clinical officers. District hospitals are the first referral level where patients are seen by medical doctors. These are also equipped with pharmacies, laboratories, social workers, and emergency medical services.

NAIVASHA DISTRICT HOSPITAL: Your rotation will take place at Naivasha District Hospital. NDH is a 200-bed level IV government hospital with a new maternity wing that opened in 2013. The hospital has 7 specialty-trained medical doctors: 2 surgeons, 1 internist, 1 radiologist, 1 obstetrician-gynecologist, 1 otolaryngologist, and 1 pediatrician. Much of the clinical work is performed by COs, MOs, and interns who are based there for 1 year. There is a pharmacy and a laboratory that offers basic tests. There are ultrasound machines and x-rays, but no CT or MRI. Patients pay a fee for each individual service provided to them (i.e. one liter of normal saline, laundry, etc.) and they often cannot afford more complicated, pricey procedures.

Naivasha is a town in the Nakuru County. Nakuru is about 45 miles north of Naivasha, which is about 60 miles north of Nairobi. Nakuru is home to the provincial hospital covering the Naivasha district, although referrals from Naivasha more commonly go to Nairobi, given its close proximity.

SAFETY AND HEALTH

SAFETY & SECURITY: There are a number of safety concerns that you should be aware of prior to travel to Kenya.

A. Petty crime: Pick-pocketing and other petty crimes are common. Take basic safety precautions, such as not carrying valuables in a visible or easily-accessible manner. If you are approached by a thief, just give them your wallet or whatever they ask. Do not resist.

B. Terrorism: There have been a number of terrorist attacks throughout Kenya in the past year, largely motivated by Kenya's recent military presence in Southern Somalia. The Westgate Terrorist attack in September 2013, claimed by al-Shabaab, was the worst terrorist attack in Kenya's history. In recent years, kidnappings have occurred along the coast and the Eastern border with Somalia. IED attacks continue to occur in Mombasa, and more recently in Nairobi. It is not advisable to take public transportation (especially buses, matatus are less risky) in these cities. Please visit the US State Department site for updated information: http://travel.state.gov/travel/cis_pa_tw/tw/tw_5745.html. Additionally, you are encouraged to register with them during your stay in Kenya, no matter how long or short the trip: https://travelregistration.state.gov.

C. Road safety: Roads in Kenya are in poor condition and traffic laws are not enforced, resulting in a high rate of morbidity and mortality related to road safety. There are several ways to avoid high-risk situations. First, traveling in private vehicles is safer than public vehicles. If you are traveling via matatu, avoid sitting in the front seats as they are the most dangerous. Avoid traveling at night. Do not drink and drive. Do not ride on motorcycles.

HEALTH: Please visit the UW travel clinic prior to departure. There is minimal risk of malaria in both Nairobi and Naivasha due to the altitude (6200 ft), but remember to bring prophylaxis if you are planning any trips outside of Nairobi or Naivasha (including safaris). The CDC recommends using atovaquone/proguanil (Malarone), doxycycline, or mefloquine (Lariam). Chloroquine is not an effective option. Bring insect repellant containing DEET with you, as well as sunscreen (especially if you are taking doxycycline). You will be provided with mosquito nets.

Note that yellow fever is a recommended vaccination but not required in order to come to Kenya, but you may need it when entering another country from Kenya, as Kenya is considered an endemic Yellow Fever area. See CDC's Traveler's Health page for more information: http://wwwnc.cdc.gov/travel/destinations/kenya.aspx.

The water in Kenya is not potable. Bottled water is inexpensive at the grocery store. This is recommended for drinking as fluoride and other pesticides are present and are not removed by boiling. Should you need to boil water to prevent microbial infection, remember that the water will boil quickly due to the high elevation. Let the water boil for a full 2 minutes. All fresh produce should be washed with clean water.

Even though many medications can be found cheaply at local pharmacies, bring whatever you anticipate you might need. Suggested items: pain reliever, oral re-dehydration salts, Pepto-Bismol, antibacterial ointment, and hydrocortisone cream. If purchasing medicine at a local pharmacy, use a reputable pharmacy.

Hand sanitizer is accessible in the larger grocery/drug stores, but you may consider bringing some with you. It is helpful to keep a bottle with you whenever you are in a clinic.

If you should become ill…
Please notify your UW chief. Travelers' Diarrhea is common and should resolve by itself within 24-48 hours, however if your symptoms also include fevers, sweats/chills, abdominal pains, bloody stool, or vomiting, notify your on-site mentor and consider visiting the doctor.

TRAVELERS' INSURANCE

Medical, Evacuation and Emergency Insurance:
This is required. On Call International is the University of Washington Student Abroad insurance provider.

On Call International
+1 603-328-1358, mail@oncallinternational.com

When calling in an emergency situation, be prepared to provide the following:
- Your name
- Number you are calling from
- Current location
- Name(s) of persons involved
- Description of emergency
- Actions taken
- Assistance needed

EMERGENCY INFORMATION:

In case of an emergency
Minor emergency (e.g., petty theft, minor accident):
Call +254-706-976-398 for Josh Lacsina, the Naivasha Chief Resident
Call +254-704-20-61-63, the on-call UW employee will refer you to local resources

Major emergency:
If a medical emergency and you are in Naivasha, go to Aga Khan Clinic
As soon as possible, Call On Call International: 1-855-464-8971 or collect +1-603-328-1358; they will tell you where you can go in the area to receive care.

If a medical emergency and you are in Nairobi, go to Nairobi Hospital or Aga Khan immediately
Call the Chief Resident, Jody Waldron: +254-715-156-952

Call local UW safety contact number: +254-704-20-61-63, on-call 24/7
Call the UW travel emergency line +1-206-632-0153

National emergency:
Call local UW safety contact number: +254-704-20-61-63 (on-call 24/7)
UW local staff will coordinate activities in the event of a national emergency

Other resources:
UW International Emergency Phone Line: +1-206-632-0153

US Embassy in Nairobi: 0203 636 622 non-emergency, 0203 636 451 emergency
0203 636 170 emergency off-hours
Email: Kenya_acs@state.gov
Website: http://nairobi.usembassy.gov/

U.S. Embassy/Consulate Services

When you are in a foreign country, you are subject to its laws. If you are arrested, immediately ask to speak to a consular officer at the nearest U.S. Embassy or Consulate. Under international agreements, the U.S. government has a right to provide consular assistance to you upon your request.

The U.S. Embassy/Consulate **can:**

- Provide a list of attorneys who speak English if your require legal assistance
- Assist in contacting your family in the U.S. if you wish it
- Help you obtain money from your family in the U.S.
- Monitor your health and welfare if you're in a hospital or in jail
- If you are a victim of a crime, the embassy/consulate can:
  - replace a stolen passport
  - contact family, friends, or employers
  - help you obtain appropriate medical care
  - provide information about the local criminal justice process and the case itself

The U.S. Embassy/Consulate **cannot:**

- Demand the immediate release of a U.S. citizen arrested abroad or cause the citizen to be released
- Represent a U.S. citizen at trial or give legal advice
- Pay legal fees and/or fines

Guidelines for the Management of Needlestick Injury and Body Fluid Exposure

When working in clinical environments, there exists the possibility for exposure to bloodborne pathogens, particularly in environments where universal precautions and sharps disposal practices may not be followed with the same rigor as in the US. Exposure to blood and other bodily fluids can transmit Hepatitis B, hepatitis C, and HIV, as well as other illnesses such as viral hemorrhagic fevers, including dengue. Transmission of malaria can also occur through needlestick, as can transmission of other parasitic diseases such as trypanosomiasis and visceral leischmaniasis.

Pre-departure advice:

PREVENTION: Obviously, the most important aspect of blood and body fluid exposure is prevention. Students should use gloves and other personal protective equipment if there exists the possibility of contact with a patient's blood. All students should bring with them a box of non-sterile gloves. You are also encouraged to bring some form of eye protection and face masks. If in a malarious area, tablets for malaria prophylaxis and attention to insect precautions can prevent this potentially fatal disease.

VACCINATION: Hepatitis B is highly transmissible through needlestick injuries (about 1 in 3 people exposed will seroconvert) - all students should have completed their hepatitis B vaccination series before leaving for their GHCE. You should be sure you are protected against measles, mumps, rubella, hepatitis A, tetanus, diphtheria, typhoid, and varicella, and polio. Depending on location, yellow fever and/or meningitis may be appropriate as well. Although there are as yet no efficacious vaccines for hepatitis C or HIV, in case of a needlestick it is helpful to know your baseline serostatus for these infections.

POST-EXPOSURE PROPHYLAXIS: You are required to purchase and bring with you two different HIV prophylactic medications. You should bring a 3-5 day supply of medication, which will allow you to get PEP started, then we can work with you to determine whether you should come home to complete treatment versus getting additional treatment and continuing in-country.

In the event of a needle-stick injury with a contaminated needle, or other significant exposure, you would generally begin taking treatment right away, while arranging for the patient to have HIV testing. If the patient is HIV positive, you should then need to complete a full 30 days of medications.

Specific prophylactic regimens should be discussed during your Travel Clinic visit, and you should ask for a prescription during your visit for a 1-5 day supply.

WHAT TO DO IN THE EVENT OF A BODY FLUID EXPOSURE:

1) **Don't Panic**.
The vast majority of exposures result in no harm. For example, the seroconversion rate of an untreated needlestick injury from an HIV positive patient is less than 0.3%, and from a mucosal exposure less than 0.09%. With prompt initiation of antiretroviral medications, this risk is further reduced 85% or more.

2) **Wash the exposed area**.
Remove all soiled clothing. Wash skin and wounds with soap and water. Irrigate wounds copiously with water. Flush eyes or mucous membranes with water or sterile saline.

3) **Let someone know**.
Inform your clinical supervisor that you had an exposure. Contact a medical provider with experience in post-exposure prophylaxis (CDC Post-Exposure Prophylaxis Hotline, Harborview Madison Clinic, Dr. McClelland, etc.)

4) **Decide if you need to start medications**.
This will depend on the severity of the exposure and the HIV status of the patient. If the patient is HIV positive or of unknown status in a high-prevalence area, *antiretroviral medications should be started as soon as possible* in the event of a needlestick injury, or if visibly bloody fluid is splashed into your eyes or mouth. (See the attached CDC algorithm for specifics). Do not wait for the source patient's blood testing to come back before starting meds. If the patient has suspicion for *P. falciparium*, consider taking a presumptive treatment of malaria if you are not on malaria prophylaxis.

5) **Arrange for testing**.
If possible, arrange for HIV testing of the source patient and a malaria smear (if in an endemic area). If serologies for hepatitis B surface antigen and hepatitis C antibody are readily available, send these too. If you do not know your own HIV, hepatitis C, or pregnancy status, these should be checked. It is helpful to get a CBC, chemistry panel, and hepatic panel if you are going to be starting medications. This will allow your physician to have baseline labs in the event you develop side effects from your antiretroviral medications.

6) **Decide if you need to come home**.
If the source patient tests **negative** for HIV, and you think it unlikely that the patient contracted HIV in the past few months, you can *stop treatment*. If the patient is HIV **positive**, cannot be tested, or is felt to be at high risk of HIV despite a negative test result, continue treatment. *It is generally recommended to arrange for medical evacuation back home* for proper evaluation and monitoring while on prophylaxis. However, many countries now have doctors and facilities that are expert in treating patients with antiretroviral medications. The decision to stay at your post or return home is a serious one that should be discussed with a qualified medical provider. The GHRC is happy to work with you on ways to deal with academic credit and financial aid issues in the event an evacuation is needed.

7) **Get support.**
Having a body fluid exposure is often a deeply unsettling experience. It is recommended that you talk it over with someone to help put things in perspective. Most people feel extremely frightened and vulnerable right after an exposure. The CDC's "PEPline" is an excellent resource. This is a national hotline that provides around-the-clock expert guidance in managing healthcare worker exposures to HIV and hepatitis B and C. Callers receive immediate post-exposure prophylaxis recommendations and counseling. The phone number is +1-888-448-4911. You may also call Dr. McClelland at +1-206-473-0392.

8) **Preferred HIV PEP Regimen:** Raltegravir (Isentress; RAL) 400 mg PO twice daily **PLUS** Truvada, 1 PO once daily (Tenofovir DF [Viread; TDF] 300 mg emtricitabine [Emtriva; FTC] 200 mg)

Also see [Kuhar et. al. JSTOR 2013; 37:875-93. This paper provides detailed information on the current US CDC guidelines for post-exposure prophylaxis. **(Appendix)**

FUN THINGS TO DO

This is in no way a complete or thorough guide! Check any guidebook or talk with locals for more information and suggestions.

NAIVASHA

- Boat safari/Crescent Island Walking Safari: Easy to arrange from any one of numerous local boat operators. Most residents use the public beach (make a right at the yellow "Boat Safari" sign on South Lake Rd, just past Karagita. Boats here are KSH 2000-3000 with captain and life vests, you can put up to 6 people in a boat.) Usually takes a few hours, including walk on Crescent Island ($8-20, depending on if you can get resident rates). Because there are no predators in Crescent Island, you can walk around amongst the animals. Takes about a half-day. Matatu ride from town is about KSH 50, taxi is KSH 500.
- Hell's Gate National Park: Excellent wildlife, scenery, and birding. Most people rent bikes (KSH 500, make sure you test it thoroughly first) at the front gate, bike in, and then hike the gorge with a guide (KWS guides cost KSH 1000-2000 and are hired at the ranger station at the gorge entry point). Tomb Raider 2 was filmed here, and the scenery of the Lion King is based upon its topography. Also takes about half a day. Think carefully before doing the Buffalo Circuit, which is a long, hot climb. Matatu ride to Hell's Gate from town is KSH 100, taxi is KSH 1000. Camping here costs roughly 25 dollars per night, and the views of some of the watering holes and sounds of hyenas at night make it well worth it.
- Longonot National Park: Mt. Longonot is an active volcano and excellent for hiking. It's about an hour to the top, then 2-3 hours to go around the crater ring (or you can just go back down). Bring lots of water and a jacket, rain and hail are common. Beautiful views on a clear day. Matatu ride here from town is KSH 100, taxi is KSH 1000. Entry around 2000/-.
- Crater Lake Sanctuary: Part of Lake Naivasha National Park. About 1 hr drive from town, past the end of the tarmac. Great day hike around crater—moderately strenuous, ~2-3 hours, with some nice views. Can also do a short game drive (entry KSH 1000-4000). Crater Lake lodge/resort has pleasant restaurant with view of lake/flamingos, but the food is overpriced and bland. Better to stop here for a beverage after your hike and eat elsewhere.
- Sanctuary Farm: Privately owned farm on the lake with camp ground. Popular for horseback riding (with zebras and giraffes, and in the shallows of lake), KSH 3000 for 1 hour, 5000 for 2 hours.
- Lake Nakuru: About one hour's drive north of Naivasha, this lake is famous for thousands of pink flamingoes on the lake, rhinos, lions, and beautiful landscape. Nice views from the baboon cliffs. Costs about $90 to enter. Residents have used the taxi driver Paul in the past, who will drive you the whole way, safari and all. Pack a lunch or, stop at Java House, near the park in Nakuru town.

EATING IN NAIVASHA

<u>In Town:</u>

- Grocery stores: 3 major ones in town (2 branches of Naivas and 1 Jaama). All carry most things you will need while here. For alcohol, check Jaama or Best Choice, which is next to big Naivas. There are also some wine shops in town.
- Panorama Park: Large resort near CEPI house with wifi, swimming pool, restaurant, but no alcohol. Popular with wealthy Nairobians on weekends, western prices.
- Mother's Kitchen: Busy, noisy, popular restaurant with excellent Kenyan food. About a 10-15 min walk from hospital.
- Silver View Hotel: Pink building, just down Kenyatta from the hospital, towards the old highway. Excellent food, more menu options that many other places, with prices comparable to mothers.

- "Café": Blue-painted café across from the main gate of the hospital. Decent, quick, and very cheap. Popular with hospital staff.
- Golden Café: Good Kenyan food, cheap. Very close to hospital (across the street from the morgue.)
- Grapes Café: Across from Naivas, 10 min walk from hospital. Cheap, passable Kenyan food. Caters the morning CMEs at the hospital. Run by Eunice.
- Back to Eden: Juice and fruit bar on the same street as big Naivas.
- Blue Sky: Nyoma choma (Kenyan BBQ) with quiet, off-street courtyard. Across from big Naivas.
- African Safari Dishes: Excellent Kenyan dishes, not as crowded or popular as Mother's, but very good, especially for chicken stew and githeri. A bit more expensive than most other cafes, but cheaper than Mother's

<u>Farther Afield:</u>

- Carnelly's: Popular expat restaurant/campground on South Lake road, just past Hell's Gate. Excellent food and drinks, laid-back ambiance with couches and lounge chairs. Western prices.
- Fisherman's: Similar to Carnelly's, but bigger and closer to water, and more of a hippie/rasta vibe. Nice big comfy deck for eating on. Food is not quite as good as Carnelly's. Western prices.
- Enashipai: Posh resort just across from Karagita (large slum on South Lake Rd.). Has coffee shop with wifi, nice pool, well-equipped gym, and opportunities for hippo watching. Very expensive.
- Delamere Nyoma Choma: Classic Kenyan Nyoma Choma joint with outdoor seating (in gazebos), huge grill and plenty of alcohol. Frequented by Marabou storks and Vervet monkeys, who are happy to eat your leftovers. Best visited before dark. A bit expensive, but you get a ton of meat.
- Rush Indian Restaurant: Very good Indian restaurant in the Delamere shopping center. Vegetarian entrees available. Western prices, but still pretty cheap. Wide alcohol selection.

<u>Souvenir Shopping:</u>

- Minalyn's Shop: Minalyn is the wife of a British family doc (Dr. Nicklin) who serves Naivasha's poor (charges no fees to his patients). Minalyn works with the women's prison and other groups for marginalized people, and runs a small shop full of crafts, jewelry, shoes, etc that she teaches these people to make by hand. A bit more expensive than buying stuff from street vendors, and not as quintessentially "African," (ie no carved giraffes) but high quality, beautiful items.
- Naivasha Children Shelter: Has a gift shop that sells beaded animals and jewelry made by the street boys who live here. Is a little off the beaten path (behind Flower Business Park/Panda Flowers, Northeast of town), but very nice items for a good cause.
- Bird's Souvenir Shop: Just south of town, on the old highway, across from the entrance to South Lake Road. Way overpriced. Haggle prices down by a factor of 5 to10.
- Elementitia Weavers: Small, relatively expensive shop on South Lake Road. High quality, nice stuff.
- Basket makers along South Lake Road: Large baskets and rugs/animal skins. Location varies. Haggle.
- A western-style shopping mall, "Buffalo Mall," is scheduled to open in Naivasha in fall 2014. It will be located on the northeast edge of town, near both highways. When completed, it will supposedly be the biggest mall in Kenya.
- Nairobi has lots of shopping options, the most famous of which is the huge Maasai Market, which is in a different spot in the city each day, and is full of all manner of everything. Again, haggle.

PARKS/SAFARIS

- Maasai Mara: considered the best animal park in Kenya. Crowded in July or August, when thousands of wildebeest migrate from Tanzania. However, any time is a good time to visit. Residents have used DK Grand Safaris in the past (info@dkgrandsafaris.com, www.dkgrandsafaris.com). Cost is ~$800 + park fees for a 3 day luxury tent camp, food and transport to/from Naivasha included. Another excellent option is Shiques Africa Safaris Limited (contact: Cleo Gichuki, cleopatra@shiquesafrica.com, 0720 644 873, around ~$750 for 3 day trip in luxury lodge (not tents). If you have your own transport or are renting a car, the Aruba Mara Camp (0723 997 524) is a great deal—the luxury tent (~$150/night) includes all your meals and game drives. If you bring your student ID, park fees are around $40 instead of $80 per day.
- Mount Kenya (climbing Mt. Kenya is relatively inexpensive and takes about 3-6 days. Not a "technical climb" (porters can carry your gear) although you should probably be in relatively decent shape. Residents have used Mt. Kenya Guides and Porters Safari Club (mtkguidesp@wananchi.com, www.mtkenyaguides.com , +254 (0)20 3524 393). Popular 5-day Sirimon-Chogoria traverse is around $700 including food and park fees, not including transport to/from Naivasha. 4-day treks also available.
- Aberdares: Close to Naivasha (take the Kinangop road, just south of where Kenyatta Ave meets the new highway). Beautiful mountains and waterfalls, lots of wildlife, including elephants, bongos and jaguars. Fun to stay in the Fishing Lodge or Tusk Camp Bandas, but call early as these book up well in advance. Requires a 4x4, roads not passable in rainy season. There is some decent flyfishing for brown trout.
- Amboseli: famous for elephants and beautiful views of Mt. Kilimanjaro. In the high season, elephants are everywhere but in the low season they are difficult to spot. Can be very dusty if there is a drought.
- Nakuru, see "Fun Things To Do" above.

SAFARI TIPS

- Understand that for a large proportion of your safari time, you will be sitting in a safari van. There is very little ambulatory activity. For this reason, you may decide on a shorter safari (i.e. less than one week). There is a lot of downtime during a safari. Bring a book to read, or just enjoy gazing at the landscape. A good pair of binoculars is highly recommended.
- Safaris are relatively easy to arrange on short notice, with the exception of going to the Maasai Mara in August, when many camps/resorts may be full. Several local taxi drivers can help you arrange transport and even lodging.
- Camping safaris are obviously cheaper, but you might need to bring along your own gear (although some companies will provide it). It also might not be comfortable in the rainy season. Lodge safaris, on the other hand, include three hot meals a day (usually all-you-can-eat feasts) in nice hotels but do not provide an actual African bush experience. Tented camps are a nice alternative, and can range from quite basic to luxurious.

KENYAN COAST

- Lamu: Currently NOT advised due to recent violence and curfew. A beautiful old Swahili town with rich history. Famous for great beaches, tasty seafood, no vehicles (just donkeys). Many people stay in Shela, which is calmer than Lamu town. 90-minute flight from Nairobi, usually around $350. Camille and family stayed at Diamond Beach Village, a little pricey (~$150/night for dbl) but highly recommended.
- Malindi: Beautiful costal town, usually very quiet, with white sand beaches and turquoise water. Flights are ~$300 round trip. Residents have stayed at White Elephant Sea Lodge (~$100/night for double), which is rustic-luxe, and right on the beach.
- Mombasa: Currently not recommended for travel. Kenya's second largest city and the largest port town. Watamu to the north of Mombasa and Diani to the south have some of the most unspoiled beaches in Kenya.
- Near Diani: Mbuyu cottages has thatched bandas near the beach and is simple and well run for about 55 dollars per night

NAIROBI

- National Museums of Kenya, Nairobi Museum: varied natural history and art collections in a recently renovated building on Museum Hill. Extensive collection of Kenya's bird life (stuffed) and includes famous fossils unearthed by the Leakey family and other anthropologists in Kenya.
- Nairobi National Park: a huge game park right on the edge of town. All of the big five can be viewed except for elephants. There are locations for picnics, including one on a hill overlooking the Athi Plains. Animals are more plentiful at dawn and just before dusk. Adjacent to the national park is a small animal orphanage requiring a separate entry fee where you can pet cheetahs.
- Giraffe Center: a nice place to spend an hour or so. This is a rehabilitation center for the endangered Rothschild's giraffes. The center allows you to pet and feed the giraffes and also has a small exhibit explaining their mission.
- Elephant Orphanage - located in Karen, alongside the Nairobi National Park, and only open between 11 am and noon each day. Officially called the "David Sheldrick Wildlife Trust."
- Markets: there are many curio markets in the city. The biggest one is called the Maasai Market, which moves around the city depending on the day (Fridays at Village Market, Sundays at Yaya Center, etc). You are expected to haggle at these markets. A good starting point for haggling is half (or even a quarter) of that amount.

READING LIST

Reference:

- *Oxford Guide to Tropical Medicine* (very useful, updated in 2014)
- *Hospital Care for Children*, WHO
- *Evidenced-Based Physical Diagnosis,* Steven McGee
- Any pocket reference books you regularly use

Global Health:

- *Reimagining Global Health,* Paul Farmer, Arthur Kleinman, Jim Yong Kim, Matthew Basilico, 2013. The first book of its kind to attempt to address the discipline of Global Health in its entirety, from the history and roots of international medicine through discussions of aid, failed strategies and successful programs, and a look into the future of global health. Can be a bit Harvard/PIH-centric, but an excellent introduction to the field.
- *Walking Together, Walking Far*, Fran Quigley, 2009. Describes the partnership between Indiana University and Moi University (in Eldoret) that built one of the most comprehensive and successful programs in the world to control HIV/AIDS, AMPATH, which has been nominated for a Nobel Peace Prize.
- *A Heart for the Work,* Claire Wendland, 2010. Wedland, and obstetrician and physician-anthropologist, explores the realities of medical training in Malawi in what is the first ethnography of medical training in the global south. The resulting book is compelling and extremely relevant to CEPI and global medical education.

Books on Kenya:

- *Unbowed: A Memoir,* Wangari Maathai, 2006. Maathai discusses her life from childhood until she was awarded the Nobel Peace Prize in 2004, against the backdrop of colonialism, independence, and struggle for democracy. Maathai stresses the connection between environmental conservation and good governance.
- *I Laugh So I Won't Cry: Kenya's Women Tell The Story Of Their Lives*, Helena Halperin, 2005. Covers marriage, childrearing, work and getting by when there is no work, women's self-help groups, genital cutting, ethnic tensions, and the new government that has promised huge reforms. *I Laugh* shows the full panorama of women's struggles in sub-Saharan Africa. Subsistence farmers, herders, beggars, sex workers, office workers, hawkers, business executives and a few friends who stopped an ethnic war all speak in *I Laugh So I Won't Cry*.
- *Petals of Blood,* Ngugi wa Thiong'o, 1977. Tells the story of an investigation of a spectacular triple murder in upcountry Kenya. As the intertwined stories of the four suspects unfold, a devastating picture emerges of a modern third-world nation whose frustrated people feel their leaders have failed them time after time. Thiong'o was imprisoned without charges by the Kenyan government when the novel was first published in 1977.
- *Nine Faces of Kenya,* Elspeth Huxley, 1992. Drawing on her knowledge of Kenya and its literature, Huxley presents a portrait of a nation, its peoples and wildlife, history and landscape, and the men and women who made their mark upon it. Isak Dinesen, Ernest Hemingway, the Leakeys, Beryl Markham, Winston Churchill, Evelyn Waugh, and Theodore Roosevelt are among the many writers in this anthology.
- *Imperial Reckoning: The Untold Story of Britain's Gulag in Kenya,* Caroline Elkins, 2005. Winner of the 2006 Pulitzer Prize for General Non-fiction, this book relates the gruesome, little-known story of the mass internment and murder of thousands of Kenyans at the hands of the British in the last years of imperial rule. Elkins exposes the hypocrisy of Britain's supposed colonial "civilizing mission" and its subsequent cover-ups. Elkins's account was also the subject of a 2002 BBC documentary entitled Kenya: White Terror.

S A F A R I S A L A M A!

CULTURAL ADJUSTMENT

- Look for a cultural broker, someone who has and understanding of both U.S. culture and the local culture. An expatriate who has spent many years living in the host country, or a local who has lived in the U.S. can be invaluable in helping you negotiate and understand your host country.
- Learn as much as you can about your host country's history, values, language, culture and norms.
- Resist the urge to assume that people are just "doing things wrong" in your host country, and that you know better. Try to understand the reasons why things might be handled differently.
- Remember that, in general, developing countries tend to be more formal than the U.S. and communication is more likely to be indirect. Value is placed on respecting social hierarchies, "saving face" and avoiding embarrassment.
- Be aware that needing to re-learn even simple routines in a foreign culture is stressful. Give yourself time to adapt, and don't be afraid to make mistakes.

In her book, *Foreign to Familiar*, (2000, McDougal Publishing), Sarah Lanier discusses the differences between "Hot-Climate" and "Cold-Climate" cultures. Although this distinction is a vast oversimplification, they do represent spectrums of cultural norms that can provide a useful framework for understanding cultural differences. The chart below is loosely adapted from her work.

	"Cold-Climate" Cultures	**"Hot-Climate" Cultures**
Social Interactions	Efficiency is valued. It is acceptable to be businesslike with people you don't know, and personal questions are to be avoided.	Relationships are valued more than efficiency. It is important to acknowledge people and not rush interactions. Getting to the point too quickly is rude, and personal questions are welcome.
Emotions	Logic, restraint and objectivity are valued, and displays of emotion are rare.	People are emotionally demonstrative. Subjective feelings and intuition are given credibility.
Communication	Accurate, truthful information is valued. Communication is direct, words are to be taken at face value, and people say what they mean. "No" means "no," and things are not meant to be taken personally.	Maintaining harmony is important, and disagreeing, complaining or causing offense or embarrassment is to be avoided. Indirect methods of communication are frequently used. It is impolite to directly say "no" or not give the answer a person expects to hear.
Individuality	Individuality, autonomy, personal initiative and self-reliance are valued. Individual likes and dislikes are important. People are expected to speak their opinions, and look after their own needs. People see themselves as "free to do as they please."	Community cohesion and group identity are valued over individuality. ("I belong, therefore I am.") The needs of the community are more important than personal desires. A person's opinions should reflect those of the group. One's actions should reflect well on the group.
Hierarchy	Society is fluid. People generally see themselves as equals, and authority is earned and can be	Society is hierarchical. Class and social distinctions are maintained, acknowledged and deferred to. Authority is not to be

	openly questioned. What you know is more important than who you know, and the value of an idea depends on its utility, not its source. "Low-power distance"	questioned, and the value of one's opinion increases with social rank. "High-power distance"
Formality	Interactions are casual. First names are used. Clothing choices reflect personal tastes and comfort. "Low context"	Interactions are formal, and it is important to follow protocols and demonstrate respect for elders and superiors. People are referred to by their titles. Greetings carry great importance, and clothing should reflect one's place in society. "High context"
Privacy	People have a "right to privacy," their own personal space and time to themselves.	People have a right to be included. Privacy is considered rude. Plans and conversations should include all.
Property	Personal property is considered sacred. People pay their own way, are responsible for their own things, and there is no obligation or expectation to share.	Property is communal and belongs to the group. This is particularly true for food, which is expected to be shared by all.
Planning Planning Continued	Planning is expected, and schedules are adhered to except in extreme circumstances.	Spontaneity is preferred. Schedules are always subject to change. Flexibility and patience are valued. It is acceptable to show up unannounced or not follow through on plans.
Hospitality	Visitors are expected to make arrangements for their own food, housing and transportation, and payments are negotiated ahead of time. When people are invited out, it is expected that they will all pay their own way. Social events usually take place at public establishments.	Hospitality is important. Visitors need to be taken care of, and it is not appropriate to ask them to pay, although it is expected that they will leave gifts in exchange. When people are invited out, it is expected that the person who gave the invitation will pay. Social events usually take place in the home.
Gender	Gender differences are minimized. Women are judged on the same criteria as men. Traditional roles are less respected.	Gender differences are important, and women are expected to be submissive to men. Traditional roles are respected.
Time	Time is a linear phenomenon, measured by clocks. Punctuality and planning are valued. It is important to respect someone's time: Time is money. "Monochromic time"	Time is relative, and is measured by events. It is important to be living in the moment and to deal with things as they come up. Attending to people's needs is valued, regardless of how long it takes. "Polychromic time"

Culture Shock

"Culture shock" is real, and it is important to be prepared for it and to recognize when it is occurring. What people generally mean by culture shock is the stress that occurs from being away from familiar surroundings and continually

having to struggle to understand what is going on around you. What begins as discomfort and confusion can subtly progress to frustration, anxiety, irritability, loneliness and withdrawal. More often than not, anger is the result, and it is not uncommon for this to lead to unprofessional behavior and lashing out at the local community. When you find your frustration mounting, be sure to take a step back and find productive and healthy ways to manage your stress. Remember, you are ultimately just a guest in their country. Above all, try and keep a sense of humor. Be aware that you will likely have some reverse culture shock upon returning to the U.S.


KENYA
National capital
Provincial capital
Town, village
Airports
International boundary
Provincial boundary
Main road
Secondary road
Other road or track
Railroad
SUDAN
ETHIOPIA
SOMALIA
UGANDA
UNITED REPUBLIC OF TANZANIA
INDIAN OCEAN
RIFT VALLEY
EASTERN
NORTH-EASTERN
WESTERN
NYANZA
CENTRAL
NAIROBI AREA
COAST
Lake Turkana (Lake Rudolf)
Lake Victoria
Lake Natron
Administrative Boundary
Konso
Yabelo
Houdat
Negele
Mega
Moyale
Dolo Odo
Banissa
Ramu
Mandera
Takaba
El Wak
El Beru Hagia
Buna
Tarbaj
Wajir
Habaswein
Madó Gashi
Dif
Liboi
Hagadera
Bilis Qooqaani
Garissa
Bura
Hola
Kolbio
Buur Gaabo
Kaambooni
Lamu
Garsen
Malindi
Kilifi
Mombasa
Moa
Tanga
Pemba I.
Korogwe
Same
Mariakani
Voi
Tsavo
Taveta
Moshi
Arusha
Kilimanjaro
Tsavo East National Park
Tsavo West Nat. Park
Mtito Andei
Kibwezi
Namanga
Magadi
Kajiado
Sultan-Hamud
Machakos
Nairobi
Kitui
Mwingi
Nguni
Thika
Embu
Murang'a
Nyeri
Mt. Kenya
Meru
Isiolo
Nanyuki
Nyahururu
Nakuru
Naivasha
Narok
Kericho
Kisii
Homa Bay
Migori
Musoma
Kisumu
Kakamega
Bungoma
Busia
Tororo
Eldoret
Kitale
Mbale
Moroto
Lodwar
Lokichar
Lokori
Lokichokio
Kakuma
Lokwa Kangole
Kaabong
Lolimi
Todenyang
Kalam
Banya
Sabarei
North Horr
Loiyangalani
Marsabit
Marsabit National Park
Laisamis
Baragoi
Maralal
Kisima
Archer's Post
Lorule
Marigat
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Wajir
Giriito
Masai Mara Nat. Res.
Ch'ew Bahir
Ungama Bay
© Nations Online Project
0 50 100 150 200 km
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CHICAGO JOURNALS

SHEA
The Society for Healthcare Epidemiology of America

Updated US Public Health Service Guidelines for the Management of Occupational Exposures to Human Immunodeficiency Virus and Recommendations for Postexposure Prophylaxis
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Source: *Infection Control and Hospital Epidemiology*, Vol. 34, No. 9 (September 2013), pp. 875-892
Published by: The University of Chicago Press on behalf of The Society for Healthcare Epidemiology of America
Stable URL: http://www.jstor.org/stable/10.1086/672271
Accessed: 28/09/2014 09:33

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US PUBLIC HEALTH SERVICE GUIDELINE

Updated US Public Health Service Guidelines for the Management of Occupational Exposures to Human Immunodeficiency Virus and Recommendations for Postexposure Prophylaxis

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for the US Public Health Service Working Group

This report updates US Public Health Service recommendations for the management of healthcare personnel (HCP) who experience occupational exposure to blood and/or other body fluids that might contain human immunodeficiency virus (HIV). Although the principles of exposure management remain unchanged, recommended HIV postexposure prophylaxis (PEP) regimens and the duration of HIV follow-up testing for exposed personnel have been updated. This report emphasizes the importance of primary prevention strategies, the prompt reporting and management of occupational exposures, adherence to recommended HIV PEP regimens when indicated for an exposure, expert consultation in management of exposures, follow-up of exposed HCP to improve adherence to PEP, and careful monitoring for adverse events related to treatment, as well as for virologic, immunologic, and serologic signs of infection. To ensure timely postexposure management and administration of HIV PEP, clinicians should consider occupational exposures as urgent medical concerns, and institutions should take steps to ensure that staff are aware of both the importance of and the institutional mechanisms available for reporting and seeking care for such exposures. The following is a summary of recommendations: (1) PEP is recommended when occupational exposures to HIV occur; (2) the HIV status of the exposure source patient should be determined, if possible, to guide need for HIV PEP; (3) PEP medication regimens should be started as soon as possible after occupational exposure to HIV, and they should be continued for a 4-week duration; (4) new recommendation—PEP medication regimens should contain 3 (or more) antiretroviral drugs (listed in Appendix A) for all occupational exposures to HIV; (5) expert consultation is recommended for any occupational exposures to HIV and at a minimum for situations described in Box 1; (6) close follow-up for exposed personnel (Box 2) should be provided that includes counseling, baseline and follow-up HIV testing, and monitoring for drug toxicity; follow-up appointments should begin within 72 hours of an HIV exposure; and (7) new recommendation—if a newer fourth-generation combination HIV p24 antigen–HIV antibody test is utilized for follow-up HIV testing of exposed HCP, HIV testing may be concluded 4 months after exposure (Box 2); if a newer testing platform is not available, follow-up HIV testing is typically concluded 6 months after an HIV exposure.

Infect Control Hosp Epidemiol 2013;34(9):875-892

Preventing exposures to blood and body fluids (ie, primary prevention) is the most important strategy for preventing occupationally acquired human immunodeficiency virus (HIV) infection. Both individual healthcare providers and the institutions that employ them should work to ensure adherence to the principles of Standard Precautions,[1] including ensuring access to and consistent use of appropriate work practices, work practice controls, and personal protective equipment. For instances in which an occupational exposure has occurred, appropriate postexposure management is an important element of workplace safety. This document provides updated recommendations concerning the management of occupational exposures to HIV.

The use of antiretrovirals as postexposure prophylaxis (PEP) for occupational exposures to HIV was first considered in guidelines issued by the Centers for Disease Control and Prevention (CDC) in 1990.[2] In 1996, the first US Public Health Service (PHS) recommendations advocating the use of PEP after occupational exposure to HIV were published; these recommendations have been updated 3 times.[3-6] Since

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Received June 27, 2013; accepted June 27, 2013; electronically published August 6, 2013.

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publication of the most recent guidelines in 2005, several new antiretroviral agents have been approved by the Food and Drug Administration (FDA), and additional information has become available regarding both the use and the safety of agents previously recommended for administration for HIV PEP.

As a direct result of 7 years' experience with the 2005 guidelines, several challenges in the interpretation and implementation of those guidelines have been identified. These challenges include difficulties in determining levels of risk of HIV transmission for individual exposure incidents, problems determining the appropriate use of 2 versus 3 (or more) drugs in PEP regimens, the high frequency of side effects and toxicities associated with administration of previously recommended drugs, and the initial management of healthcare personnel (HCP) with exposures to a source patient whose HIV infection status was unknown. The PHS working group has attempted to address both the new information that has been developed and the challenges associated with the practical implementation of the 2005 guidelines in this update.

This report encourages using HIV PEP regimens that are optimally tolerated, eliminates the recommendation to assess the level of risk associated with individual exposures to determine the number of drugs recommended for PEP, modifies and expands the list of antiretroviral medications that can be considered for use as PEP, and offers an option for concluding HIV follow-up testing of exposed personnel earlier than 6 months after exposure. This report also continues to emphasize the following: (1) primary prevention of occupational exposures; (2) prompt management of occupational exposures and, if indicated, initiation of PEP as soon as possible after exposure; (3) selection of PEP regimens that have the fewest side effects and that are best tolerated by prophylaxis recipients; (4) anticipating and preemptively treating side effects commonly associated with taking antiretroviral drugs; (5) attention to potential interactions involving both drugs that could be included in HIV PEP regimens and other medications that PEP recipients might be taking; (6) consultation with experts on postexposure management strategies (especially determining whether an exposure has actually occurred and selecting HIV PEP regimens, particularly when the source patient is antiretroviral treatment experienced); (7) HIV testing of source patients (without delaying PEP initiation in the exposed provider) using methods that produce rapid results; and (8) counseling and follow-up of exposed HCP.

Recommendations concerning the management of occupational exposures to hepatitis B virus and/or hepatitis C virus (HCV) have been published previously[5,7] and are not included in this report. Recommendations for nonoccupational (eg, sexual, pediatric, and perinatal) HIV exposures also have been published previously.[8-10]

METHODS

In 2011, the CDC reconvened the interagency PHS working group to plan and prepare an update to the 2005 *Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HIV and Recommendations for Postexposure Prophylaxis*.[6] The PHS working group was comprised of members from the CDC, the FDA, the Health Resources and Services Administration, and the National Institutes of Health. Names, credentials, and affiliations of the PHS working group members are listed as the byline of this guideline. The working group met twice a month to monthly to create a plan for the update as well as draft the guideline.

A systematic review of new literature that may have become available since 2005 was not conducted; however, an initial informal literature search did not reveal human randomized trials demonstrating superiority of 2-drug antiretroviral medication regimens versus those with 3 (or more) drugs as PEP or an optimal PEP regimen for occupational exposures to HIV. Because of the low risk of transmission associated with occupational exposures (ie, approximately 0.3% per exposure when all parenteral exposures are considered together),[11] neither the conduct of a randomized trial assessing efficacy nor the conduct of trials assessing the comparative efficacy of 2- versus 3-drug regimens for PEP is practical. In light of the absence of such randomized trials, the CDC convened a meeting of the interagency PHS working group and an expert panel of consultants in July 2011 to discuss the use of HIV PEP and develop the recommendations for this update. The expert panel consisted of professionals in academic medicine considered to be experts in the treatment of HIV-infected individuals, the use of antiretroviral medications, and PEP. Names, credentials, and affiliations of the expert panel of consultants are listed in "Expert Panel Consultants" at the end of this guideline.

Prior to the July 2011 meeting, the meeting participants were provided an electronic copy of the 2005 guidelines and asked to review them and consider the following topics for discussion at the upcoming meeting: (1) the challenges associated with the implementation of the 2005 guidelines, (2) the role of ongoing risk stratification in determining the use of 2-drug PEP regimens versus those with 3 or more drugs, (3) updated drug choices for PEP, (4) the safety and tolerability of antiretroviral agents for the general population and for pregnant or lactating HCP, and (5) any other topics in the 2005 guideline that needed to be updated.

At the July 2011 meeting, a CDC representative presented a review of the 2005 guideline recommendations, surveillance data on occupational exposures from the National Surveillance System for Healthcare Workers,[12] and data from the National Clinicians' Post-Exposure Prophylaxis Hotline (PEPline) on the number of occupational exposures to HIV managed annually, PEP regimens recommended, and challenges experienced with implementation of the 2005 guidelines. An FDA representative presented a review of the new medications that have become available since 2005 for the treatment of HIV-infected individuals, information about medication tolerability and toxicity, and the use of these medications during pregnancy. These presentations were followed by a discussion of the topics listed above.

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Among the challenges discussed regarding implementation of the 2005 guidelines were the difficulties in determining level of risk of HIV transmission for individual exposure incidents, which in turn determined the number of drugs recommended for HIV PEP. The consensus of the meeting participants was to no longer recommend exposure risk stratification (discussed in detail in "Recommendations for the Selection of Drugs for HIV PEP" below). To update the drug choices for PEP, all drugs available for the treatment of HIV-infected individuals were discussed with regard to tolerability, side effects, toxicity, safety in pregnancy and lactation, pill burden, and frequency of dosing. A hierarchy of recommended drugs/regimens was developed at the meeting and utilized in creating the PEP regimen recommendations (Appendixes A and B) in these guidelines. Among other topics identified as needing an update were the acceptable HIV testing platforms available for source patient and follow-up testing of exposed HCP; the timing of such testing, depending on the platform used; and the potential utility of source patient drug-resistance information/testing in PEP regimens.

After the expert consultation, the expert panelists received draft copies of these guidelines as they were updated and provided insights, information, suggestions, and edits and participated in subsequent teleconferences with the PHS working group, to assist in developing these recommendations. Proposed recommendation updates were presented to the Healthcare Infection Control Practices Advisory Committee in November 2011[13] and June 2012[14] during public meetings. The PHS working group considered all available information, expert opinion, and feedback in finalizing the recommendations in this update.

DEFINITION OF HCP AND EXPOSURE

The definitions of HCP and occupational exposures are unchanged from those used in 2001 and 2005.[5,6] The term HCP refers to all paid and unpaid persons working in healthcare settings who have the potential for exposure to infectious materials, including body substances (eg, blood, tissue, and specific body fluids), contaminated medical supplies and equipment, and contaminated environmental surfaces. HCP might include but are not limited to emergency medical service personnel, dental personnel, laboratory personnel, autopsy personnel, nurses, nursing assistants, physicians, technicians, therapists, pharmacists, students and trainees, contractual staff not employed by the healthcare facility, and persons not directly involved in patient care but potentially exposed to blood and body fluids (eg, clerical, dietary, housekeeping, security, maintenance, and volunteer personnel). The same principles of exposure management could be applied to other workers with potential for occupational exposure to blood and body fluids in other settings.

An exposure that might place HCP at risk for HIV infection is defined as a percutaneous injury (eg, a needlestick or cut with a sharp object) or contact of mucous membrane or nonintact skin (eg, exposed skin that is chapped, abraded, or afflicted with dermatitis) with blood, tissue, or other body fluids that are potentially infectious. In addition to blood and visibly bloody body fluids, semen and vaginal secretions are also considered potentially infectious. Although semen and vaginal secretions have been implicated in the sexual transmission of HIV, they have not been implicated in occupational transmission from patients to HCP. The following fluids are also considered potentially infectious: cerebrospinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, and amniotic fluid. The risk for transmission of HIV infection from these fluids is unknown; the potential risk to HCP from occupational exposures has not been assessed by epidemiologic studies in healthcare settings. Feces, nasal secretions, saliva, sputum, sweat, tears, urine, and vomitus are not considered potentially infectious unless they are visibly bloody.[11]

Any direct contact (ie, contact without barrier protection) to concentrated virus in a research laboratory or production facility requires clinical evaluation. For human bites, clinical evaluation must include the possibility that both the person bitten and the person who inflicted the bite were exposed to bloodborne pathogens. Transmission of HIV infection by this route has been reported rarely, but not after an occupational exposure.[15-20]

RISK FOR OCCUPATIONAL TRANSMISSION OF HIV

Factors associated with risk for occupational transmission of HIV have been described; risks vary with the type and severity of exposure.[4,5,11] In prospective studies of HCP, the average risk for HIV transmission after a percutaneous exposure to HIV-infected blood has been estimated to be approximately 0.3% (95% confidence interval [CI], 0.2%–0.5%)[11] and that after a mucous membrane exposure to be approximately 0.09% (95% CI, 0.006%–0.5%).[21] Although episodes of HIV transmission after nonintact skin exposure have been documented, the average risk for transmission by this route has not been precisely quantified but is estimated to be less than the risk for mucous membrane exposures. The risk for transmission after exposure to fluids or tissues other than HIV-infected blood also has not been quantified but is probably considerably lower than that for blood exposures.

Epidemiologic and laboratory studies suggest that multiple factors might affect the risk of HIV transmission after an occupational exposure.[22] In a retrospective case-control study of HCP who had percutaneous exposure to HIV, increased risk for HIV infection was associated with exposure to a larger quantity of blood from the source person as indicated by (1) a device (eg, a needle) visibly contaminated with the patient's blood, (2) a procedure that involved a needle being placed directly in a vein or artery, or (3) a deep injury. The risk also was increased for exposure to blood from source persons with terminal illness, likely reflecting the higher titer of HIV in blood late in the course of acquired immunodeficiency syndrome (AIDS). Taken together, these factors suggest a direct inoculum effect (ie, the larger the viral inoculum, the higher

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the risk for infection). One laboratory study that demonstrated that more blood is transferred by deeper injuries and hollow-bore needles lends further credence to the observed variation in risk related to inoculum size.[23]

Exposure to a source patient with an undetectable serum viral load does not eliminate the possibility of HIV transmission or the need for PEP and follow-up testing. While the risk of transmission from an occupational exposure to a source patient with an undetectable serum viral load is thought to be very low, PEP should still be offered. Plasma viral load (eg, HIV RNA) reflects only the level of cell-free virus in the peripheral blood; persistence of HIV in latently infected cells, despite patient treatment with antiretroviral drugs, has been demonstrated,[24,25] and such cells might transmit infection even in the absence of viremia. HIV transmission from exposure to a source person who had an undetectable viral load has been described in cases of sexual and mother-to-child transmissions.[26,27]

ANTIRETROVIRAL AGENTS FOR PEP

Antiretroviral agents from 6 classes of drugs are currently available to treat HIV infection.[28] These include the nucleoside and nucleotide reverse-transcriptase inhibitors (NRTIs), nonnucleoside reverse-transcriptase inhibitors (NNRTIs), protease inhibitors (PIs), a fusion inhibitor (FI), an integrase strand transfer inhibitor (INSTI), and a chemokine (C-C motif) receptor 5 (CCR5) antagonist. Only antiretroviral agents approved by the FDA for treatment of HIV infection are included in these guidelines, although none of these agents has an FDA-approved indication for administration as PEP. The rationale for offering antiretroviral medications as HIV PEP is based on our current understanding of the pathogenesis of HIV infection and the plausibility of pharmacologic intervention in this process, studies of the efficacy of antiretroviral chemoprophylaxis in animal models,[29,30] and epidemiologic data from HIV-exposed HCP.[22,31] The recommendations in this report provide guidance for PEP regimens comprised of 3 (or, when appropriate, more) antiretrovirals, consonant with currently recommended treatment guidelines for HIV-infected individuals.[28]

TOXICITY AND DRUG INTERACTIONS OF ANTIRETROVIRAL AGENTS

Persons receiving PEP should complete a full 4-week regimen.[5] However, previous results show that a substantial proportion of HCP taking an earlier generation of antiretroviral agents as PEP frequently reported side effects,[12,32-40] and many were unable to complete a full 4-week course of HIV PEP due to these effects and toxicities.[32-37] Because all antiretroviral agents have been associated with side effects (Appendix B),[28] the toxicity profile of these agents, including the frequency, severity, duration, and reversibility of side effects, is a critical consideration in selection of an HIV PEP regimen. The majority of data concerning adverse events has been reported primarily for persons with established HIV infection receiving prolonged antiretroviral therapy and therefore might not reflect the experience of uninfected persons who take PEP. In fact, anecdotal evidence from clinicians knowledgeable about HIV treatment indicates that antiretroviral agents are tolerated more poorly by HCP taking HIV PEP than by HIV-infected patients on antiretroviral medications. As side effects have been cited as a major reason for not completing PEP regimens as prescribed, the selection of regimens should be heavily influenced toward those that are best tolerated by HCP receiving PEP. Potential side effects of antiretroviral agents should be discussed with the PEP recipient, and, when anticipated, preemptive prescribing of agents for ameliorating side effects (eg, antiemetics and antispasmodics) may improve PEP regimen adherence.

In addition, the majority of approved antiretroviral agents might have potentially serious drug interactions when used with certain other drugs, thereby requiring careful evaluation of concomitant medications, including over-the-counter medications and supplements (eg, herbals), used by an exposed person before prescribing PEP and close monitoring for toxicity of anyone receiving these drugs.[28] PIs and NNRTIs have the greatest potential for interactions with other drugs. Information regarding potential drug interactions has been published, and up-to-date information can be found in the *Guidelines for the Use of Antiretroviral Agents in HIV-1-Infected Adults and Adolescents*.[28] Additional information is included in manufacturers' package inserts. Consultation with a pharmacist or physician who is an expert in HIV PEP and antiretroviral medication drug interactions is strongly encouraged.

SELECTION OF HIV PEP REGIMENS

Guidelines for treating HIV infection, a condition typically involving a high total body burden of HIV, recommend the use of 3 or more drugs. Although the applicability of these recommendations to PEP is unknown, newer antiretroviral agents are better tolerated and have preferable toxicity profiles than agents previously used for PEP.[28] As less toxic and better-tolerated medications for the treatment of HIV infection are now available, minimizing the risk of PEP noncompletion, and the optimal number of medications needed for HIV PEP remains unknown, the PHS working group recommends prescribing 3 (or more) tolerable drugs as PEP for all occupational exposures to HIV. Medications included in an HIV PEP regimen should be selected to optimize side effect and toxicity profiles and a convenient dosing schedule to encourage HCP completion of the PEP regimen.

RESISTANCE TO ANTIRETROVIRAL AGENTS

Known or suspected resistance of the source virus to antiretroviral agents, particularly to 1 or more of those that might be included in a PEP regimen, raises concerns about reduced PEP efficacy.[41] Drug resistance to all available antiretroviral agents has been reported, and cross-resistance within drug

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classes occurs frequently.[42] Occupational transmission of drug-resistant HIV strains, despite PEP with combination drug regimens, has been reported.[43-45] If a source patient is known to harbor drug-resistant HIV, expert consultation is recommended for selection of an optimal PEP regimen. However, awaiting expert consultation should not delay the initiation of HIV PEP. In instances of an occupational exposure to drug-resistant HIV, administration of antiretroviral agents to which the source patient's virus is unlikely to be resistant is recommended for PEP.

Information on whether a source patient harbors drug-resistant HIV may be unclear or unavailable at the time of an occupational exposure. Resistance should be suspected in a source patient who experiences clinical progression of disease, a persistently increasing viral load, or a decline in $CD4^+$ T cell count despite therapy and in instances in which a virologic response to therapy fails to occur. However, resistance testing of the source virus at the time of an exposure is impractical because the results will not be available in time to influence the choice of the initial PEP regimen. If source patient HIV drug resistance is suspected in the management of an occupational exposure to HIV, consultation with an expert in HIV management is recommended so that antiretroviral agents to which the source patient's virus is unlikely to be resistant may be identified and prescribed. However, awaiting expert consultation should, again, not delay initiation of HIV PEP. If drug resistance information becomes available later in a course of PEP, this information should be discussed with the expert consultant for possible modification of the PEP regimen.

ANTIRETROVIRAL DRUGS DURING PREGNANCY AND LACTATION

The decision to offer HIV PEP to a pregnant or breast-feeding healthcare provider should be based on the same considerations that apply to any provider who sustains an occupational exposure to HIV. The risk of HIV transmission poses a threat not only to the mother but also to the fetus and infant, as the risk of mother-to-child HIV transmission is markedly increased during acute HIV infection during pregnancy and breast-feeding.[46] However, unique considerations are associated with the administration of antiretroviral agents to pregnant HCP, and the decision to use antiretroviral drugs during pregnancy should involve both counseling and discussion between the pregnant woman and her healthcare provider(s) regarding the potential risks and benefits of PEP for both the healthcare provider and her fetus.

The potential risks associated with antiretroviral drug exposure for pregnant women, fetuses, and infants depend on the duration of exposure as well as the number and type of drugs. Information about the use of newer antiretroviral agents, administered as PEP to HIV-uninfected pregnant women, is limited. For reasons including the complexities associated with appropriate counseling about the risks and benefits of PEP as well as the selection of antiretroviral drugs in pregnant women, expert consultation should be sought in all cases in which antiretroviral medications are prescribed to pregnant HCP for PEP.

In general, antiretroviral drug toxicity has not been shown to be increased during pregnancy. Conflicting data have been published concerning the risk of preterm delivery in pregnant women receiving antiretroviral drugs, particularly PIs;[47] in studies that have reported a positive association, the increase in risk was primarily observed in women who were receiving antiretroviral drug regimens at the time of conception and continued during pregnancy. Fatal[48] and nonfatal[49] lactic acidosis has been reported in pregnant women treated throughout gestation with a combination of stavudine and didanosine. Prescribing this drug combination for PEP is not recommended. Physiologic changes that occur during pregnancy may alter antiretroviral drug metabolism and, therefore, optimal drug dosing. The clinical significance of these changes is not clear, particularly when used for PEP in HIV-uninfected women. For details on antiretroviral drug choice and dosing in pregnancy, see *Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1-Infected Women for Maternal Health and Interventions to Reduce Perinatal HIV Transmission in the United States.*[10]

Prospective data from the Antiretroviral Pregnancy Registry do not demonstrate an increase in overall birth defects associated with first-trimester antiretroviral drug use. In this population, the birth defect prevalence is 2.9 per 100 live births, similar to the prevalence in the general population in the CDC's birth defect surveillance system (ie, 2.7 per 100 live births).[50] Central nervous system defects were observed in fetal primates that experienced in utero efavirenz (EFV) exposure and that had drug levels similar to those representing human therapeutic exposure; however, the relevance of in vitro laboratory and animal data to humans is unknown.[10] While human data are reassuring,[51] 1 case of meningomyelocele has been reported among the Antiretroviral Pregnancy Registry prospective cases, and data are insufficient to conclude that there is no increase in a rare outcome, such as neural tube defect, with first-trimester EFV exposure.[50] For these reasons, we recommend that pregnant women not use EFV during the first trimester.[10] If EFV-based PEP is used in women, a pregnancy test should be done to rule out early pregnancy, and nonpregnant women who are receiving EFV-based PEP should be counseled to avoid pregnancy until after PEP is completed. HCP who care for women who receive antiretroviral drugs during pregnancy are strongly advised to report instances of prenatal exposure to the Antiretroviral Pregnancy Registry (http://www.APRegistry.com/). The currently available literature contains only limited data describing the long-term effects (eg, neoplasia and mitochondrial toxicity) of in utero antiretroviral drug exposure. For this reason, long-term follow-up is recommended for all children who experience in utero exposures.[10,52,53]

Antiretroviral drug levels in breast milk vary among drugs,

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with administration of some drugs resulting in high levels (eg, lamivudine), while other drugs, such as PIs and tenofovir (TDF), are associated with only limited penetration into milk.[54,55] Administration of antiretroviral triple-drug regimens to breast-feeding HIV-infected women has been shown to decrease the risk of transmission to their infants and infant toxicity has been minimal. Prolonged maternal antiretroviral drug use during breast-feeding may be associated with increased infant hematologic toxicity,[56,57] but limited drug exposure during 4 weeks of PEP may also limit the risk of drug toxicity to the breast-feeding infant. Breast-feeding should not be a contraindication to use of PEP when needed, given the high risk of mother-to-infant transmission with acute HIV infection during breast-feeding.[46] The lactating healthcare provider should be counseled regarding the high risk of HIV transmission through breast milk should acute HIV infection occur (in a study in Zimbabwe, the risk of breast milk HIV transmission during the 3 months after seroconversion was 77.6 infections per 100 child-years).[58] To completely eliminate any risk of HIV transmission to her infant, the provider may want to consider stopping breast-feeding. Ultimately, lactating women with occupational exposures to HIV who will take antiretroviral medications as PEP must be counseled to weigh the risks and benefits of continued breast-feeding both while taking PEP and while being monitored for HIV seroconversion.

MANAGEMENT OF OCCUPATIONAL EXPOSURE BY EMERGENCY PHYSICIANS

Many HCP exposures to HIV occur outside of occupational health clinic hours of operation and at sites at which occupational health services are unavailable, and initial exposure management is often overseen by emergency physicians or other providers who are not experts in the treatment of HIV infection or the use of antiretroviral medications. These providers may not be familiar with either the PHS guidelines for the management of occupational exposures to HIV or the available antiretroviral agents and their relative risks and benefits. Previous focus groups conducted among emergency department physicians who had managed occupational exposures to blood and body fluids in 2002[59] identified 3 challenges in occupational exposure management: evaluation of an unknown source patient or a source patient who refused testing, inexperience in managing occupational HIV exposures, and counseling of exposed workers in busy emergency departments. For these reasons, the PHS working group recommends that institutions develop clear protocols for the management of occupational exposures to HIV, indicating a formal expert consultation mechanism (eg, the in-house infectious diseases consultant or PEPline), appropriate initial source patient and exposed provider laboratory testing, procedures for counseling the exposed provider, identifying and having an initial HIV PEP regimen available, and a mechanism for outpatient HCP follow-up. In addition, these protocols must be distributed appropriately and must be readily available (eg, posted on signs in the emergency department, posted on a website, or disseminated to staff on pocket-sized cards) to emergency physicians and any other providers who may be called on to manage these exposure incidents.

RECOMMENDATIONS FOR THE MANAGEMENT OF HCP POTENTIALLY EXPOSED TO HIV

Exposure prevention remains the primary strategy for reducing occupational bloodborne pathogen infections. However, when occupational exposures do occur, PEP remains an important element of exposure management.

HIV PEP

The recommendations provided in this report apply to situations in which a healthcare provider has been exposed to a source person who has HIV infection or for whom there is reasonable suspicion of HIV infection. These recommendations reflect expert opinion and are based on limited data regarding safety, tolerability, efficacy, and toxicity of PEP. If PEP is offered and taken and the source is later determined to be HIV negative, PEP should be discontinued, and no further HIV follow-up testing is indicated for the exposed provider. Because the great majority of occupational HIV exposures do not result in transmission of HIV, the potential benefits and risks of PEP (including the potential for severe toxicity and drug interactions, such as may occur with oral contraceptives, H_2-receptor antagonists, and proton pump inhibitors, among many other agents) must be considered carefully when prescribing PEP. HIV PEP medication regimen recommendations are listed in Appendix A, and more detailed information on individual antiretroviral medications is provided in Appendix B. Because of the complexity of selecting HIV PEP regimens, these recommendations should, whenever possible, be implemented in consultation with persons who have expertise in the administration of antiretroviral therapy and who are knowledgeable about HIV transmission. Reevaluation of exposed HCP is recommended within 72 hours after exposure, especially as additional information about the exposure or source person becomes available.

Source Patient HIV Testing

Whenever possible, the HIV status of the exposure source patient should be determined to guide appropriate use of HIV PEP. Although concerns have been expressed about HIV-negative sources who might be in the so-called window period before seroconversion (ie, the period of time between initial HIV infection and the development of detectable HIV antibodies), no such instances of occupational transmission have been detected in the United States to date. Hence, investigation of whether a source patient might be in the window period is unnecessary for determining whether HIV PEP is

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indicated unless acute retroviral syndrome is clinically suspected. Rapid HIV testing of source patients facilitates timely decision making regarding the need for administration of HIV PEP after occupational exposures to sources whose HIV status is unknown. FDA-approved rapid tests can produce HIV test results within 30 minutes, with sensitivities and specificities similar to those of first- and second-generation enzyme immunoassays (EIAs).[60] Third-generation chemiluminescent immunoassays, run on automated platforms, can detect HIV-specific antibodies 2 weeks sooner than conventional EIAs[60] and generate test results in an hour or less.[61] Fourth-generation combination p24 antigen–HIV antibody (Ag/Ab) tests produce both rapid and accurate results, and their p24 antigen detection allows identification of most infections during the window period.[62] Rapid determination of source patient HIV status provides essential information about the need to initiate and/or continue PEP. Regardless of which type of HIV testing is employed, all of the above tests are acceptable for determination of source patient HIV status. Administration of PEP should not be delayed while waiting for test results. If the source patient is determined to be HIV negative, PEP should be discontinued, and no follow-up HIV testing for the exposed provider is indicated.

Timing and Duration of PEP

Animal studies have suggested that PEP is most effective when begun as soon as possible after the exposure and that PEP becomes less effective as time from the exposure increases.[29,30] PEP should be initiated as soon as possible, preferably within hours of exposure. Occupational exposures to HIV should be considered urgent medical concerns and treated immediately. For example, a surgeon who sustains an occupational exposure to HIV while performing a surgical procedure should promptly scrub out of the surgical case, if possible, and seek immediate medical evaluation for the injury and PEP. Additionally, if the HIV status of a source patient for whom the practitioner has a reasonable suspicion of HIV infection is unknown and the practitioner anticipates that hours or days may be required to resolve this issue, antiretroviral medications should be started immediately rather than delayed.

Although animal studies demonstrate that PEP is likely to be less effective when started more than 72 hours after exposure,[30,63] the interval after which no benefit is gained from PEP for humans is undefined. If initiation of PEP is delayed, the likelihood increases that benefits might not outweigh the risks inherent in taking antiretroviral medications. Initiating therapy after a longer interval (eg, 1 week) might still be considered for exposures that represent an extremely high risk of transmission. The optimal duration of PEP is unknown; however, duration of treatment has been shown to influence success of PEP in animal models.[30] Because 4 weeks of PEP appeared protective in in vitro, animal,[29,30,63,64] and occupational[22] studies, PEP should be administered for 4 weeks, if tolerated.

Recommendations for the Selection of Drugs for HIV PEP

The PHS no longer recommends that the severity of exposure be used to determine the number of drugs to be offered in an HIV PEP regimen, and a regimen containing 3 (or more) antiretroviral drugs is now recommended routinely for all occupational exposures to HIV. Examples of recommended PEP regimens include those consisting of a dual NRTI backbone plus an INSTI, a PI (boosted with ritonavir), or a NNRTI. Other antiretroviral drug combinations may be indicated for specific cases (eg, exposure to a source patient harboring drug-resistant HIV) but should be prescribed only after consultation with an expert in the use of antiretroviral agents. No new definitive data exist to demonstrate increased efficacy of 3-drug HIV PEP regimens compared with the previously recommended 2-drug HIV PEP regimens for occupational HIV exposures associated with a lower level of transmission risk. The recommendation for consistent use of 3-drug HIV PEP regimens reflects (1) studies demonstrating superior effectiveness of 3 drugs in reducing viral burden in HIV-infected persons compared with 2 agents,[28,65,66] (2) concerns about source patient drug resistance to agents commonly used for PEP,[67,68] (3) the safety and tolerability of new HIV drugs, and (4) the potential for improved PEP regimen adherence due to newer medications that are likely to have fewer side effects. Clinicians facing challenges such as antiretroviral medication availability, potential adherence and toxicity issues, and others associated with a 3-drug PEP regimen might still consider a 2-drug PEP regimen in consultation with an expert.

The drug regimen selected for HIV PEP should have a favorable side effect profile as well as a convenient dosing schedule to facilitate both adherence to the regimen and completion of 4 weeks of PEP. Because the agents administered for PEP still can be associated with severe side effects, PEP is not justified for exposures that pose a negligible risk for transmission. Expert consultation could be helpful in determining whether an exposure constitutes a risk that would warrant PEP. The preferred HIV PEP regimen recommended in this guideline should be reevaluated and modified whenever additional information is obtained concerning the source of the occupational exposure (eg, possible treatment history or antiretroviral drug resistance) or if expert consultants recommend the modification. Given the complexity of choosing and administering HIV PEP, consultation with an infectious diseases specialist or another physician who is an expert in the administration of antiretroviral agents is recommended whenever possible. Such consultation should not, however, delay timely initiation of PEP.

The PHS now recommends emtricitabine (FTC) plus TDF (these 2 agents may be dispensed as Truvada, a fixed-dose combination tablet) plus raltegravir (RAL) as HIV PEP for occupational exposures to HIV. This regimen is tolerable, potent, and conveniently administered, and it has been associated with minimal drug interactions. Additionally, al-

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Box 1: Situations for Which Expert Consultation for Human Immunodeficiency Virus (HIV) Postexposure Prophylaxis (PEP) Is Recommended

Delayed (ie, later than 72 hours) exposure report
- Interval after which benefits from PEP are undefined

Unknown source (eg, needle in sharps disposal container or laundry)
- Use of PEP to be decided on a case-by-case basis
- Consider severity of exposure and epidemiologic likelihood of HIV exposure
- Do not test needles or other sharp instruments for HIV

Known or suspected pregnancy in the exposed person
- Provision of PEP should not be delayed while awaiting expert consultation

Breast-feeding in the exposed person
- Provision of PEP should not be delayed while awaiting expert consultation

Known or suspected resistance of the source virus to antiretroviral agents
- If source person's virus is known or suspected to be resistant to 1 or more of the drugs considered for PEP, selection of drugs to which the source person's virus is unlikely to be resistant is recommended
- Do not delay initiation of PEP while awaiting any results of resistance testing of the source person's virus

Toxicity of the initial PEP regimen
- Symptoms (eg, gastrointestinal symptoms and others) are often manageable without changing PEP regimen by prescribing antimotility or antiemetic agents
- Counseling and support for management of side effects is very important, as symptoms are often exacerbated by anxiety

Serious medical illness in the exposed person
- Significant underlying illness (eg, renal disease) or an exposed provider already taking multiple medications may increase the risk of drug toxicity and drug-drug interactions

Expert consultation can be made with local experts or by calling the National Clinicians' Post-Exposure Prophylaxis Hotline (PEPline) at 888-448-4911.

though we have only limited data on the safety of RAL during pregnancy, this regimen could be administered to pregnant HCP as PEP (see the discussion above). Preparation of this PEP regimen in single-dose "starter packets," which are kept on hand at sites expected to manage occupational exposures to HIV, may facilitate timely initiation of PEP.

Several drugs may be used as alternatives to FTC plus TDF plus RAL. TDF has been associated with renal toxicity,[69] and an alternative should be sought for HCP who have underlying renal disease. Zidovudine could be used as an alternative to TDF and could be conveniently prescribed in combination with lamivudine, to replace both TDF and FTC, as Combivir. Alternatives to RAL include darunavir plus ritonavir (RTV), etravirine, rilpivirine, atazanavir plus RTV, and lopinivir plus RTV. When a more cost-efficient alternative to RAL is required, saquinivir plus RTV could be considered. A list of preferred alternative PEP regimens is provided in Appendix A.

Some antiretroviral drugs are contraindicated as HIV PEP or should be used for PEP only under the guidance of expert consultants (Appendixes A and B). Among these drugs are nevirapine, which should not be used and is contraindicated as PEP because of serious reported toxicities, including hepatotoxicity (with 1 instance of fulminant liver failure requiring liver transplantation), rhabdomyolysis, and hypersensitivity syndrome.[70-72] Antiretroviral drugs not routinely recommended for use as PEP because of the higher risk for potentially serious or life-threatening adverse events include didanosine and tipranavir. The combination of didanosine and stavudine should not be prescribed as PEP due to increased risk of toxicity (eg, peripheral neuropathy, pancreatitis, and lactic acidosis). Additionally, abacavir should be used as HIV PEP only in the setting of expert consultation, due to the need for prior HLA B57-01 testing to identify individuals at higher risk for a potentially fatal hypersensitivity reaction.[28] The FI enfuvirtide (Fuzeon, T20) is also not generally recommended as PEP, unless its use is deemed necessary during expert consultation, due to its subcutaneous route of administration, significant side effects, and potential for development of anti-T20 antibodies that may cause false-positive HIV antibody tests among uninfected patients.

When the source patient's virus is known or suspected to be resistant to 1 or more of the drugs considered for the PEP regimen, the selection of drugs to which the source person's virus is unlikely to be resistant is recommended; again, expert consultation is strongly advised. If this information is not immediately available, the initiation of PEP, if indicated, should not be delayed; the regimen can be modified after PEP has been initiated whenever such modifications are deemed appropriate. For HCP who initiate PEP, reevaluation of the exposed person should occur within 72 hours after exposure, especially if additional information about the exposure or source person becomes available.

Regular consultation with experts in antiretroviral therapy and HIV transmission is strongly recommended. Preferably,

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Box 2: Follow-Up of Healthcare Personnel (HCP) Exposed to Known or Suspected Human Immunodeficiency Virus (HIV)–Positive Sources

Counseling (at the time of exposure and at follow-up appointments). Exposed HCP should be advised to use precautions (eg, use of barrier contraception and avoidance of blood or tissue donations, pregnancy, and, if possible, breast-feeding) to prevent secondary transmission, especially during the first 6–12 weeks after exposure.

For exposures for which postexposure prophylaxis (PEP) is prescribed, HCP should be informed regarding the following:

- Possible drug toxicities (eg, rash and hypersensitivity reactions that could imitate acute HIV seroconversion and the need for monitoring)
- Possible drug interactions
- The need for adherence to PEP regimens

Early reevaluation after exposure. Regardless of whether a healthcare provider is taking PEP, reevaluation of exposed HCP within 72 hours after exposure is strongly recommended, as additional information about the exposure or source person may be available.

Follow-up testing and appointments. Follow-up testing at a minimum should include the following:

- HIV testing at baseline and at 6 weeks, 12 weeks, and 6 months after exposure; alternatively, if the clinician is certain that a fourth-generation combination HIV p24 antigen–HIV antibody test is being utilized, then HIV testing could be performed at baseline, 6 weeks after exposure, and 4 months after exposure
- Complete blood counts and renal and hepatic function tests (at baseline and 2 weeks after exposure; further testing may be indicated if abnormalities are detected)

HIV testing results should preferably be given to the exposed healthcare provider at face-to-face appointments.

a process for involvement of an expert consultant should be formalized in advance of an exposure incident. Certain institutions have required consultation with a hospital epidemiologist or infectious diseases consultant when HIV PEP use is under consideration. At a minimum, expert consultation is recommended for the situations described in Box 1.

Resources for consultation are available from the following sources:

- PEPline at http://www.nccc.ucsf.edu/about_nccc/pepline/; telephone: 888-448-4911.
- Antiretroviral Pregnancy Registry at http://www.apregistry.com/index.htm; address: Research Park, 1011 Ashes Drive, Wilmington, NC 28405; telephone: 800-258-4263; fax: 800-800-1052; e-mail: registies@kendle.com.
- FDA (for reporting unusual or severe toxicity to antiretroviral agents) at http://www.fda.gov/medwatch/; telephone: 800-332-1088; address: MedWatch, The FDA Safety Information and Adverse Event Reporting Program, Food and Drug Administration, 5600 Fishers Lane, Rockville, MD 20852.
- The CDC's Cases of Public Health Importance (COPHI) coordinator (for reporting HIV infections in HCP and failures of PEP) at telephone number 404-639-2050.
- HIV/AIDS Treatment Information Service at http://aidsinfo.nih.gov/.

FOLLOW-UP OF EXPOSED HCP

Importance of Follow-Up Appointments

HCP who have experienced occupational exposure to HIV should receive follow-up counseling, postexposure testing, and medical evaluation regardless of whether they take PEP. Greater emphasis is placed on the importance of follow-up of HCP on HIV PEP within 72 hours of exposure and improving follow-up care provided to exposed HCP (Box 2). Careful attention to follow-up evaluation within 72 hours of exposure can (1) provide another (and perhaps less anxiety-ridden) opportunity to allow the exposed HCP to ask questions and for the counselor to make certain that the exposed HCP has a clear understanding of the risks for infection and the risks and benefits of PEP, (2) ensure that continued treatment with PEP is indicated, (3) increase adherence to HIV PEP regimens, (4) manage associated symptoms and side effects more effectively, (5) provide an early opportunity for ancillary medications or regimen changes, (6) improve detection of serious adverse effects, and (7) improve the likelihood of follow-up serologic testing for a larger proportion of exposed personnel to detect infection. Closer follow-up should in turn reassure HCP who become anxious after these events.[73,74] The psychological impact of needlesticks or exposure to blood or body fluid should not be underestimated for HCP. Exposed personnel should be advised to use precautions (eg, use of barrier contraception and avoidance of blood or tissue donations, pregnancy, and, if possible, breast-feeding) to prevent secondary transmission, especially during the first 6–12 weeks after exposure. Providing HCP with psychological counseling should be an essential component of the management and care of exposed HCP.

Postexposure Testing

HIV testing should be used to monitor HCP for seroconversion after occupational HIV exposure. After baseline testing at the time of exposure, follow-up testing should be performed at 6 weeks, 12 weeks, and 6 months after exposure. Use of fourth-generation HIV Ag/Ab combination immunoassays allow for earlier detection of HIV infection.[60,62,75] If a provider is certain that a fourth-generation combination

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HIV Ag/Ab test is used, HIV follow-up testing could be concluded earlier than 6 months after exposure. In this instance, an alternative follow-up testing schedule could be used (eg, testing at baseline and 6 weeks after exposure, then concluding testing at 4 months after exposure). Extended HIV follow-up (eg, for 12 months) is recommended for HCP who become infected with HCV after exposure to a source who is coinfected with HIV and HCV. Whether extended follow-up is indicated in other circumstances (eg, for exposure to a source coinfected with HIV and HCV in the absence of HCV seroconversion or for exposed persons with a medical history suggesting an impaired ability to mount an antibody response to acute infection) is unknown. Although rare instances of delayed HIV seroconversion have been reported,[76,77] adding to an exposed person's anxiety by routinely extending the duration of postexposure follow-up is not warranted. However, decisions to extend follow-up in a particular situation should be based on the clinical judgment of the exposed person's healthcare provider and should not be precluded because of HCP anxiety. HIV tests should also be performed for any exposed person who has an illness compatible with an acute retroviral syndrome, regardless of the interval since exposure. A person in whom HIV infection is identified should be referred to a specialist who has expertise in HIV treatment and counseling for medical management. Healthcare providers caring for persons who have occupationally acquired HIV infection should report these cases to their state health departments and to the CDC's COPHI coordinator at telephone number 404-639-2050.

Monitoring and Management of PEP Toxicity

If PEP is used, HCP should be monitored for drug toxicity by testing at baseline and again 2 weeks after starting PEP. In addition, HCP taking antiretrovirals should be evaluated if any acute symptoms develop while receiving therapy. The scope of testing should be based on medical conditions in the exposed person and the known and anticipated toxicities of the drugs included in the PEP regimen. Minimally, laboratory monitoring for toxicity should include a complete blood count and renal and hepatic function tests. If toxicities are identified, modification of the regimen should be considered after expert consultation. In addition, depending on the clinical situation, further diagnostic studies may be indicated (eg, monitoring for hyperglycemia in a diabetic whose regimen includes a PI).

Exposed HCP who choose to take PEP should be advised of the importance of completing the prescribed regimen. Information should be provided about potential drug interactions and prescription/nonprescription drugs and nutritional supplements that should not be taken with PEP or require dose or administration adjustments, side effects of prescribed drugs, measures (including pharmacologic interventions) that may assist in minimizing side effects, and methods of clinical monitoring for toxicity during the follow-up period. HCP should be advised that evaluation of certain symptoms (eg, rash, fever, back or abdominal pain, pain on urination or blood in the urine, dark urine, yellowing of the skin or whites of the eyes, or symptoms of hyperglycemia [eg, increased thirst or frequent urination]) should not be delayed. Serious adverse events should be reported to the FDA's MedWatch program.

REEVALUATION AND UPDATING OF HIV PEP GUIDELINES

As new antiretroviral agents for treatment of HIV infection and additional information concerning early HIV infection and prevention of HIV transmission become available, the interagency PHS working group will assess the need to update these guidelines. Updates will be published periodically as appropriate.

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ACKNOWLEDGMENTS

We thank Lynne M. Mofenson, MD (National Institutes of Health), for providing expert assistance with drafting the section of the guideline titled "Antiretroviral Drugs during Pregnancy and Lactation" as well as S. Michele Owen, PhD (Centers for Disease Control and Prevention [CDC]), and Bernard M. Branson, MD (CDC), for providing expert assistance with drafting the sections titled "Source Patient HIV Testing" and "Postexposure Testing." We also acknowledge contributions from John T. Brooks, MD (CDC), Kenneth Dominguez, MD, MPH (CDC), and David Kim, MD (CDC).

Potential conflicts of interest. The expert panel consultants report the following competing interests: J.A. has a board membership with and has received funding from Bristol-Myers Squibb, Janssen, Merck, and ViiV; J.E. has consulted for Bristol-Myers Squibb, Gilead, GlaxoSmithKline, Janssen, Merck, and ViiV and has received grant funding from Bristol-Myers Squibb, GlaxoSmithKline, Merck, and ViiV; M.S.S. has consulted for Bristol-Myers Squibb, Gilead, Janssen, Merck, and ViiV and has received grant funding from Bristol-Myers Squibb, Gilead, Merck, and ViiV; M.L.T. owns Merck stock. All other authors report no conflicts of interest relevant to this article.

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Information included in these recommendations might not represent US Food and Drug Administration (FDA) approval or approved labeling for the particular product or indications in question. Specifically, the terms "safe" and "effective" might not be synonymous with the FDA-defined legal standard for product approval.

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APPENDIX A

TABLE A1. Human Immunodeficiency Virus (HIV) Postexposure Prophylaxis (PEP) Regimens

Preferred HIV PEP Regimen

Raltegravir (Isentress; RAL) 400 mg PO twice daily
Plus
Truvada, 1 PO once daily
(Tenofovir DF [Viread; TDF] 300 mg + emtricitabine [Emtriva; FTC] 200 mg)

Alternative Regimens

(May combine 1 drug or drug pair from the left column with 1 pair of nucleoside/nucleotide reverse-transcriptase inhibitors from the right column; prescribers unfamiliar with these agents/regimens should consult physicians familiar with the agents and their toxicities)[a,b]

Raltegravir (Isentress; RAL)	Tenofovir DF (Viread; TDF) + emtricitabine (Emtriva; FTC); available as Truvada
Darunavir (Prezista; DRV) + ritonavir (Norvir; RTV)	Tenofovir DF (Viread; TDF) + lamivudine (Epivir; 3TC)
Etravirine (Intelence; ETR)	Zidovudine (Retrovir; ZDV; AZT) + lamivudine (Epivir; 3TC); available as Combivir
Rilpivirine (Edurant; RPV)	Zidovudine (Retrovir; ZDV; AZT) + emtricitabine (Emtriva; FTC)
Atazanavir (Reyataz; ATV) + ritonavir (Norvir; RTV)	
Lopinavir/ritonavir (Kaletra; LPV/RTV)	

The following alternative is a complete fixed-dose combination regimen, and no additional antiretrovirals are needed: Stribild (elvitegravir, cobicistat, tenofovir DF, emtricitabine)

Alternative Antiretroviral Agents for Use as PEP Only with Expert Consultation[b]

Abacavir (Ziagen; ABC)
Efavirenz (Sustiva; EFV)
Enfuvirtide (Fuzeon; T20)
Fosamprenavir (Lexiva; FOSAPV)
Maraviroc (Selzentry; MVC)
Saquinavir (Invirase; SQV)
Stavudine (Zerit; d4T)

Antiretroviral Agents Generally Not Recommended for Use as PEP

Didanosine (Videx EC; ddI)
Nelfinavir (Viracept; NFV)
Tipranavir (Aptivus; TPV)

Antiretroviral Agents Contraindicated as PEP

Nevirapine (Viramune; NVP)

NOTE. For consultation or assistance with HIV PEP, contact the National Clinicians' Post-Exposure Prophylaxis Hotline at telephone number 888-448-4911 or visit its website at http://www.nccc.ucsf.edu/about_nccc/pepline/. DF, disoproxil fumarate; PO, per os.

[a] The alternatives regimens are listed in order of preference; however, other alternatives may be reasonable based on patient and clinician preference.

[b] For drug dosing information, see Appendix B.

APPENDIX B

TABLE B1. Information on Human Immunodeficiency Virus (HIV) Postexposure Prophylaxis (PEP) Medications

Drug name	Drug class	Dosing (dosage form)	Advantages	Disadvantages
Abacavir (Ziagen; ABC)	Nucleoside reverse-transcriptase inhibitor (NRTI)	ABC: 300 mg daily; available as 300-mg tablet Also available as component of fixed-dose combination Epzicom, dosed daily (300 mg of 3TC + 600 mg of ABC) Trizivir, dosed twice daily (150 mg of 3TC + 300 mg of ABC + 300 mg of AZT)	Take without regard for food	Potential for life-threatening ABC hypersensitivity reaction (rash, fever, nausea, vomiting, diarrhea, abdominal pain, malaise, respiratory symptoms) in patients with HLA-B*5701; requires patient testing prior to use, which may not be available or practical prior to initiating PEP

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TABLE B1 (*Continued*)

Drug name	Drug class	Dosing (dosage form)	Advantages	Disadvantages
Atazanavir (Reyataz; ATV)	Protease inhibitor (PI)	ATV: 300 mg + RTV: 100 mg once daily (preferred dosing for PEP[a]) ATV: 400 mg once daily without RTV (alternative dosing—may not be used in combination with TDF) Available as 100-, 150-, 200-, and 300-mg capsules	Well tolerated	Indirect hyperbilirubinemia and jaundice common Rash Nephrolithiasis Potential for serious or life-threatening drug interactions that may affect dosing Absorption depends on low pH; caution when coadministered with H_2 antagonists, antacids, and proton pump inhibitors PR interval prolongation Caution in patients with underlying conduction defects or on concomitant medications that can cause PR prolongation Must be given with food
Darunavir (Prezista; DRV)	PI	DRV: 800 mg once daily + RTV: 100 mg once daily (preferred dosing for PEP[a]) DRV: 600 mg twice daily + RTV: 100 mg twice daily (alternative dosing) Available as 75-, 150-, 400-, and 600-mg tablets	Well tolerated	Rash (DRV has sulfonamide moiety) Diarrhea, nausea, headache Hepatotoxicity Potential for serious or life-threatening drug interactions that may affect dosing Must be given with food and with RTV
Efavirenz (Sustiva; EFV)	Nonnucleoside reverse-transcriptase inhibitor (NNRTI)	EFV: 600 mg daily; available as 50- and 200-mg capsules and 600-mg tablets Also available as component of fixed-dose combination Atripla, dosed daily (200 mg of FTC + 300 mg of TDF + 600 mg of EFV)	Available as a complete regimen dosed once per day	Rash Neuropsychiatric side effects (eg, dizziness, somnolence, insomnia, abnormal dreaming) common; severe psychiatric symptoms possible (dosing before bedtime might minimize these side effects); use with caution in shift workers Do not use during pregnancy; teratogen in nonhuman primates Potential for serious or life-threatening drug interactions that may affect dosing May cause false-positive results with some cannabinoid and benzodiazepine screening assays Take on an empty stomach
Elvitegravir (EVG)	Integrase strand transfer inhibitor (INSTI)	Available as a component of fixed-dose combination Stribild, dosed daily (150 mg of EVG + 150 mg of cobicistat + 300 mg of TDF + 200 mg of FTC)	Well tolerated Available as a complete regimen dosed once per day	Diarrhea, nausea, headache Nephrotoxicity; should not be administered to individuals with acute or chronic kidney injury or those with eGFR <70 Cobicistat is a pharmacokinetic enhancer to increase EVG exposures and has no antiviral activity but is a potent CYP3A inhibitor Potential for serious or life-threatening drug interactions Must be given with food

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TABLE B1 (*Continued*)

Drug name	Drug class	Dosing (dosage form)	Advantages	Disadvantages
Emtricitabine (Emtriva; FTC)	NRTI	200 mg once daily; available as 200-mg capsule Also available as component of fixed-dose combination Atripla, dosed daily (200 mg of FTC + 300 mg of TDF + 600 mg of EFV) Complera, dosed daily (25 mg of RPV + 300 mg of TDF + 200 mg of FTC) Stribild, dosed daily (150 mg of EVG + 150 mg of cobicistat + 300 mg of TDF + 200 mg of FTC) Truvada, dosed daily (200 mg of FTC + 300 mg of TDF)	Well tolerated Minimal toxicity Minimal drug interactions Take without regard for food	Rash perhaps more frequent than with 3TC Hyperpigmentation/skin discoloration If the PEP recipient has chronic hepatitis B, withdrawal of this drug may cause an acute hepatitis exacerbation
Enfuvirtide (Fuzeon; T20)	Fusion inhibitor (FI)	T20: 90 mg (1 mL) twice daily by subcutaneous injection; available as single-dose vial, reconstituted to 90 mg/mL	...	Local injection-site reactions occur in almost 100% of patients Never studied among antiretroviral-naive or HIV-negative patients False-positive EIA HIV antibody tests might result from formation of anti-T20 antibodies that cross-react with anti-gp41 antibodies Twice-daily injection
Etravirine (Intelence; ETR)	NNRTI	200 mg twice daily; available as 100- and 200-mg tablets	Well tolerated and has not had the same frequency of CNS side effects reported as EFV	Rash (including SJS) and hypersensitivity (sometimes with organ dysfunction, including hepatic failure) Nausea Potential for serious or life-threatening drug interactions that may affect dosing Must be given with food
Fosamprenavir (Lexiva; FOSAPV)	PI	FOSAPV: 1,400 mg daily + RTV: 100 mg once daily (preferred dosing for PEP) FOSAPV: 1,400 mg twice daily without RTV (alternative dosing) Available as 700-mg tablet	Well tolerated	Diarrhea, nausea, vomiting, headache, rash (FOSAPV has sulfonamide moiety) Potential for serious or life-threatening drug interactions that may affect dosing Oral contraceptives decrease FOSAPV concentrations Take with food if given with RTV
Lamivudine (Epivir; 3TC)	NRTI	3TC: 300 mg once daily (preferred dosing for PEP) 3TC: 150 mg twice daily (alternative dosing) Available as 150- and 300-mg tablets Also available as component of fixed-dose combination generic lamivudine/zidovudine, dosed twice daily (150 mg of 3TC + 300 mg of AZT) Combivir, dosed twice daily (150 mg of 3TC + 300 mg of AZT) Epzicom, dosed daily (300 mg of 3TC + 600 mg of ABC) Trizivir, dosed twice daily (150 mg of 3TC + 300 mg of ABC + 300 mg of AZT)	Well tolerated Minimal toxicity Minimal drug interactions Take without regard for food	If the PEP recipient has chronic hepatitis B, withdrawal of this drug may cause an acute hepatitis exacerbation

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TABLE B1 (*Continued*)

Drug name	Drug class	Dosing (dosage form)	Advantages	Disadvantages
Lopinavir/ritonavir (Kaletra; LPV/RTV)	PI	Kaletra: 400/100 mg = 2 tablets twice daily (preferred dosing for PEP) Kaletra: 800/200 mg = 4 tablets once daily (alternative dosing) Available as 200/50-mg tablets	Take without regard for food	GI intolerance, nausea, vomiting, diarrhea are common PR and QT interval prolongation have been reported; use with caution in patients at risk of cardiac conduction abnormalities or receiving other drugs with similar effect Potential for serious or life-threatening drug interactions that may affect dosing
Maraviroc (Selzentry; MVC)	CCR5 coreceptor antagonist	MVC: 300 mg twice daily (if on concomitant CYP3A inducers, dose may need adjustment by expert consultant); available as 150- and 300-mg tablets	Well tolerated	Abdominal pain, cough, dizziness, musculoskeletal symptoms, pyrexia, rash, orthostatic hypotension Hepatotoxicity that may present with an allergic reaction, including rash Requires HIV tropism testing of source virus before treatment to ensure CCR5-tropic virus and efficacy, which may not be available or practical prior to initiating PEP Potential for serious or life-threatening drug interactions that may affect dosing Dose adjustments for MVC required when given with potent CYP3A inhibitors or inducers
Raltegravir (Isentress; RAL)	INSTI	400 mg twice daily; available as 400-mg tablet	Well tolerated Minimal drug interactions Take without regard for food	Insomnia, nausea, fatigue, headache, and severe skin and hypersensitivity reactions have been reported
Rilpivirine (Edurant; RPV)	NNRTI	25 mg once daily; available as 25-mg tablet Also available as component of fixed-dose combination Complera, dosed daily (25 mg of RPV + 300 mg of TDF + 300 mg of FTC)	Well tolerated and fewer rashes and discontinuations for CNS adverse effects compared with EFV Available as a complete regimen dosed once per day	Depression, insomnia, rash, hypersensitivity, headache Potential for serious or life-threatening drug interactions that may affect dosing Caution when coadministered with H_2 antagonists and antacids Coadministration with proton pump inhibitors is contraindicated Use RPV with caution when coadministered with a drug having a known risk of torsades de pointes Must be given with food
Saquinavir (Invirase; SQV)	PI	SQV: 1,000 mg + RTV: 100 mg twice daily (preferred dosing for PEP); available as 500 mg tablet	Well tolerated, although GI events common	GI intolerance, nausea, diarrhea, headache Pretreatment ECG recommended SQV/r is not recommended for patients with any of the following: (1) congenital or acquired QT prolongation, (2) pretreatment ECG >450 msec, (3) receiving concomitant therapy with other drugs that prolong QT interval, (4) complete AV block without implanted pacemakers, and (5) risk of complete AV block PR and QT interval prolongations, torsades de pointes has been reported Potential for serious or life-threatening drug interactions that may affect dosing Must be given with food

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TABLE B1 (*Continued*)

Drug name	Drug class	Dosing (dosage form)	Advantages	Disadvantages
Stavudine (Zerit; d4T)	NRTI	d4T: 40 mg twice daily if body weight is >60 kg d4T: 30 mg twice daily if body weight is <60 kg Available as 15-, 20-, 30-, and 40-mg tablets	Take without regard for food	GI side effects include diarrhea and nausea Hepatotoxicity, neurologic symptoms (eg, peripheral neuropathy), pancreatitis
Tenofovir DF (Viread; TDF)	NRTI	300 mg once daily; available as 300-mg tablet Also available as component of fixed-dose combination Atripla, dosed daily (200 mg of FTC + 300 mg of TDF + 600 mg of EFV) Complera, dosed daily (25 mg of RPV + 300 mg of TDF + 200 mg of FTC) Stribild, dosed daily (150 mg of EVG + 150 mg of cobicistat + 300 mg of TDF + 200 mg of FTC) Truvada, dosed daily (200 mg of FTC + 300 mg of TDF)	Well tolerated Take without regard for food	Asthenia, headache, diarrhea, nausea, vomiting Nephrotoxicity; should not be administered to individuals with acute or chronic kidney injury or those with eGFR <60 If the PEP recipient has chronic hepatitis B, withdrawal of this drug may cause an acute hepatitis exacerbation Drug interactions
Zidovudine (Retrovir; ZDV; AZT)	NRTI	AZT: 300 mg twice daily; available as 100-mg capsule or 300-mg tablet Also available as component of fixed-dose combination generic lamivudine/zidovudine, dosed twice daily (150 mg of 3TC + 300 mg of AZT) Combivir, dosed twice daily (150 mg of 3TC + 300 mg of AZT) Trizivir, dosed twice daily (150 mg of 3TC + 300 mg of ABC + 300 mg of AZT)	Take without regard for food	Side effects (especially nausea, vomiting, headache, insomnia, and fatigue) common and might result in low adherence Anemia and neutropenia

NOTE. This appendix does not provide comprehensive information on each individual drug. For detailed information, please refer to individual drug package inserts. AV, atrioventricular; CNS, central nervous system; ECG, electrocardiogram; eGFR, estimated glomerular filtration rate; EIA, enzyme immunoassay; GI, gastrointestinal; SJS, Stevens-Johnson syndrome.

[a] Certain antiretroviral agents, such as PIs, have the option of once- or twice-daily dosing depending on treatment history and use with ritonavir. For PEP, the selection of dosing and schedule is to optimize adherence while minimizing side effects where possible. This table includes the preferred dosing schedule for each agent, and in all cases with the exception of Kaletra the once-daily regimen option is preferred for PEP. Twice-daily administration of Kaletra is better tolerated with respect to GI toxicities compared with the once-daily regimen. Alternative dosing and schedules may be appropriate for PEP in certain circumstances and should preferably be prescribed by individuals experienced in the use of antiretroviral medications.

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ERRATUM

In the September 2013 issue of the journal, in the article by Kuhar et al (Kuhar DT, Henderson DK, Struble KA, Heneine W, Thomas V, Cheever LW, Gomaa A, Panlilio AL, US Public Health Service Working Group. Updated US Public Health Service guidelines for the management of occupational exposures to human immunodeficiency virus and recommendations for postexposure prophylaxis. *Infect Control Hosp Epidemiol* 2013;34(9):875–892), there are 3 errors. In Appendix Table B1, row 1 ("Abacavir"), column 3 ("Dosing (dosage form)"), "300 mg daily" is incorrect; the correct dosing is 600 mg daily. Also in Appendix Table B1, row 17 ("Tenofovir DF"), column 5 ("Disadvantages"), the text immediately following "Nephrotoxicity" ("should not be administered to individuals with acute or chronic kidney injury or those with eGFR <60") should be deleted. Finally, the correct affiliation for author Ahmed Gomaa is Division of Surveillance, Hazard Evaluation, and Field [*not* "Health"] Studies, National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, Cincinnati, Ohio. The authors regret these errors.

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