

# Appendix

## *Treating advanced HIV disease: medicines for HIV, and common infections and their treatments*

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## Medicines for HIV

HIV cannot be cured but it can be treated. Medicines can quickly and dramatically improve the health of a person with HIV. It is common for a person who was very underweight and sick to gain weight, feel stronger, and have many fewer opportunistic infections within a few months of starting

HIV medicines. People who take medicines to treat HIV live for many more years than people who have no access to these drugs. Medicines can also help prevent the spread of HIV from a mother to her baby.

This section explains a few combinations of medicines that can directly treat HIV, as well as how to use cotrimoxazole, which can prevent many opportunistic infections. After this section we discuss opportunistic infections and their specific treatments.

## Cotrimoxazole

Taking cotrimoxazole daily can prevent many serious infections and prolong the lives of adults and children with HIV. It prevents malaria, diarrhea, pneumonia, and a brain infection called toxoplasmosis. Fortunately, cotrimoxazole is a common antibiotic available all over the world and rarely causes bad reactions. If a person develops a mild skin rash from cotrimoxazole, she or he can slowly increase the dose of the medicine, which lessens the chance that the reaction will occur again. If a person gets a serious skin reaction, including peeling of the skin or involvement of the mouth, lips, or vagina, then cotrimoxazole should be stopped, the person should seek medical care, and the drug should not be restarted.

For a daily preventive dose, give adults (anyone over 15 years) trimethoprim/sulfamethoxazole 160 mg / 800 mg (2 single strength tablets) once a day. See the chart below for doses for children.

Cotrimoxazole dosage for HIV infected or exposed children				
Age	Dosage	By liquid, 40 mg/200 mg in 5ml syrup	By pediatric tablet 20 mg/100 mg	By single strength adult tablet 80 mg/400 mg
<b>For children age 6 to 14 years old</b>	80 mg trimethoprim/ 400 mg sulfamethoxazole once a day	10 ml	4 tablets	1 tablet
<b>For children 6 months to 5 years old</b>	40 mg trimethoprim/ 200 mg sulfamethoxazole once a day	5 ml	2 tablets	½ tablet
<b>For babies less than 6 months old</b>	20 mg trimethoprim/ 100 mg sulfamethoxazole once a day	2.5 ml	1 tablet	¼ tablet
Babies of HIV-positive mothers should receive cotrimoxazole from birth. If you find later that the baby does not have HIV, you can stop the cotrimoxazole.				

# Antiretroviral therapy (ART, ARV, or HAART)

Medicines that directly fight the HIV virus are called antiretrovirals (ARV). HIV is a type of virus called a retrovirus. Antiretrovirals fight retroviruses. For antiretrovirals to work effectively, a number of them should be given in combination. The combined use of these drugs is called antiretroviral therapy (ART), or Highly Active Antiretroviral Therapy (HAART).

In most cases, once a person starts ART, she must continue to take these medicines for the rest of her life. Stopping and starting again can cause resistance to the medicine.

There are a number of challenges that make providing ART difficult:

- The biggest challenge of ART is that most people have no access to it. For many years, companies that made these medicines charged as much for them as they could. Since activists around the world and certain local governments have put strong pressure on these companies to make drugs available to poor people, it is now possible for poor countries to buy drugs at lower prices, or to make generic drugs. Generic drugs are made locally and are much cheaper. As the drugs have become less costly, some international initiatives have begun to provide funding to distribute them. But these efforts are still not enough to provide medicines for everyone who needs them.
- For ART to work well, people must take a combination of drugs and continue taking the drugs for their whole lives. Taking more than one drug at a time can be confusing. If the first combination does not work or causes health problems, the person with HIV may need to switch to another set of drugs.

## Before giving ART

ART may not be safe for people with certain health problems. For example, a person with liver disease may not be able to use some of these medicines because they can cause hepatitis. People with HIV should have a physical exam and medical history before starting ART.

HIV medicines are probably safest and most effective if they are given after a person's HIV disease has progressed to a certain stage. If you can test the person's CD4 count, start ART when the person's CD4 count is between 200 and 350 cells/mm<sup>3</sup> (or if the person's CD4 count is less than 200 when you first test the person).

For children 18 months old and older, start ART when the child's CD4 percentage is less than 15%.

If CD4 cell counts are not available, you can use a total lymphocyte count or the stage of the person's disease to decide whether to put the person on ART. The World Health Organization (WHO) has developed a list with symptoms for 4 stages of HIV to help with this decision (see the next page).

## ART treatment

There are a number of different combinations of medicines that can treat HIV effectively. This book gives the treatments that are most available and effective at the time this book is being printed (January 2006). No matter what medicines you give, remember that you must give a combination of at least 3 medicines (treating HIV with only one or two medicines is not effective) and some combinations of medicines are available as one pill. This makes medicines easier to take and less expensive. Two combined pills are Combivir, a combination of lamivudine and zidovudine, and Triomune, a combination of lamivudine, stavudine, and nevirapine.

It is important to consider several questions when deciding what combination of medicines to have available in a clinic or to give to an individual.

- What medicines are available and affordable where I live? Are these medicines likely to be available in the coming months and years?
- Is a combination pill available for some or all of these medicines?
- What are the side effects or requirements of the medicines? (For example, some medicines need to be refrigerated; some must be taken with food.)
- Are laboratory tests needed to check if the drug is causing problems for the person taking them?
- Is the person taking rifampicin (a TB medicine) or other medicines that could be dangerous to combine with certain ART medicines?
- Is the person pregnant now or planning to become pregnant? Certain antiretrovirals are not safe in pregnancy.
- If you are giving medicine to a child, how will you give it? Is a liquid available? If not, you may need to open a capsule (though not all capsules may be broken open), or crush a pill (dividing it, if necessary, to get the right dose). You can mix the powder or capsule contents with water or a small amount of food and feed it immediately to the child.

## WHO Stages of HIV Infection

### Stage 1

- No symptoms.
- Persistent swollen lymph nodes (generalized lymphadenopathy).
- Normal level of activity.

**Do not give ART.**

### Stage 2

- Weight loss of less than 10% of body weight.
- Minor mucocutaneous problems (seborrheic dermatitis, prurigo, fungal nail infections, recurrent oral ulcerations, angular cheilitis).
- Herpes zoster within the last five years.
- Recurrent upper respiratory tract infections ( bacterial sinusitis).
- Normal activity level.

**Do not give ART** unless the total lymphocyte count is below 1200 cells/mm<sup>3</sup>. (Total lymphocyte count means a white blood cell count per high-powered field multiplied by the percentage of lymphocytes.)

### Stage 3

- Oral candidiasis (thrush).
- Oral hairy leukoplakia.
- Pulmonary TB within the past 12 months.
- Severe bacterial infections (pneumonia, pyomyositis).
- Weight loss greater than 10%
- Diarrhea lasting more than 1 month.
- Fever lasting more than 1 month.
- Bedridden less than half every day during the last month

**Give ART** to an adult or child in this stage of disease.

### Stage 4

- Extra-pulmonary TB.
- Kaposi's sarcoma.
- Cryptococcal meningitis.
- Cerebral toxoplasmosis.
- Cryptosporidiosis with diarrhea for more than 1 month.
- Cytomegalovirus disease of an organ other than liver, spleen or lymph nodes.
- HIV wasting syndrome.
- Pneumocystis jiroveci pneumonia.
- Toxoplasmosis of the brain.
- Herpes simplex virus infection, mucocutaneous for more than 1 month, or visceral for any length of time.
- Progressive multifocal leukoencephalopathy.
- Any disseminated endemic mycosis (histoplasmosis, coccidioidomycosis).
- Candidiasis of the esophagus, trachea, bronchi or lungs.
- Atypical mycobacteriosis that has spread throughout the body.
- Non-typhoid Salmonella septicemia.
- Lymphoma.
- HIV encephalopathy.
- Bedridden for more than half of every day during the last month.

**Give ART** to an adult or child in this stage of HIV disease.

Here are a few combinations of drugs that work well and are available in many places.

### ART for adults

Give this combination 2 times a day, every day:

- stavudine (d4T) 40 mg, and lamivudine (3TC) 150 mg, and nevirapine (NVP) 200mg

This set of drugs is usually available in a combined dose pill.

(If the person weighs less than 60 kilograms, give 30 mg d4T instead of 40mg.)

**If the person has numbness or a burning feeling in their arms or legs**

(peripheral neuropathy) — or cannot take d4T for some other reason,

give this combination 2 times a day, every day:

- zidovudine (AZT) 300 mg, and lamivudine (3TC) 150 mg, and nevirapine (NVP) 200mg.

**If the person has liver problems, TB, is taking rifampicin, or cannot take NVP for some other reason,** give this combination 2 times a day, every day:

- stavudine (d4T) 40 mg, and lamivudine (3TC) 150 mg, and efavirenz (EFV) 200mg

(If the person weighs less than 60 kilograms, give 30 mg d4T instead of 40mg.)

**Note:** nevirapine (NVP) can cause liver problems and rashes. To avoid these problems, give NVP 200 mg only once a day for the first 2 weeks — then increase to 200 mg twice a day.

EFV should not be given to women in the first 3 months of pregnancy, or women who may become pregnant.

### Pregnant women and newborn babies

Pregnant women with advanced HIV should take ART to protect their own health. ART is also effective in preventing transmission of HIV to infants.

ART is usually safe for pregnant women, but certain medicines should not be given. For example, EFV can cause birth defects in the child. Women of childbearing age who are using EFV should use birth control. Also, pregnant women should not take d4T and didanosine at the same time because these two drugs can be toxic to the developing fetus when they are combined.

**A baby born to a mother with HIV** should receive:

- 2 mg oral suspension of nevirapine (NVP)/kg by mouth  
one time within 3 days of the birth

**And**

- 4 mg oral solution zidovudine (AZT)/kg by mouth  
2 times a day for the first 7 days of life.

**If the mother was not taking ART during pregnancy** because she could not get the medicines or because she did not yet need the drugs to treat her HIV, she should take 200 mg nevirapine (NVP) one time at the beginning of labor.

Babies of HIV-positive mothers should also receive cotrimoxazole (see page 184).

## ART for children

AIDS should be suspected in an infant or child who has at least two major signs and two minor signs and no other known causes of immunosuppression.

### Major signs of AIDS in children

- Weight loss or failure to thrive
- Chronic diarrhea for more than 1 month
- Prolonged fever for more than 1 month

### Minor signs of AIDS in children

- Generalized lymphadenopathy (lymph nodes larger than ½ cm in at least two sites)
- Candidal infection in mouth and throat
- Repeated common infections (ear, throat, etc.)
- Persistent cough for more than one month
- Generalized skin infections
- HIV infection in the mother

**Children under 18 months old:** A sick child who is diagnosed with a PCR test as having HIV can be given ART. Follow your national guidelines, but in general ART should also be given to sick children under 18 months with a positive HIV antibody test if PCR tests are not available. Once a child is 18 months old, the antibody test should be repeated and ART stopped if the child does not have HIV. (If the child is still breastfeeding, wait until 3 months after breastfeeding has stopped to perform the test.) It is important to treat not just the child; the parents and other children often need ART as well and this can help the child live a healthier life.

**Children under 3 years old, or under 10 kg, should be given:** AZT and 3TC and NVP

**Children over 3 years old and over 10 kg should be given:** AZT and 3TC and EFV

### DOSES FOR CHILDREN

**AZT:** For a child weighing:

- 5 kg to under 7 kg      give 7 ml by liquid (70 mg) 2 times a day.
- 7 kg to under 15 kg    give 100 mg 2 times a day.
- 15 kg to under 25 kg    give 200 mg 2 times a day.
- 25kg to under 40 kg    give 300 mg 2 times a day. At age 13, give adult dose.

**3TC:** over 30 days old    give 4 mg/kg 2 times a day. At age 16, give adult dose.

**NVP:**

- For children under 8 years      give 4 mg/kg once a day for 2 weeks, then give 7 mg/kg 2 times a day.
- For children 8 years and older    give 4 mg/kg 2 times a day.

**EFV:** For a child weighing:

- 10 to under 15 kg      give 200 mg by capsule (or 270 mg = 9 ml liquid) once a day.
- 15 to under 20 kg      give 250 mg by capsule (or 300 mg = 10 ml liquid) once a day.
- 20 to under 25 kg      give 300 mg by capsule (or 360 mg = 12 ml liquid) once a day.
- 25 to under 33 kg      give 350 mg by capsule (or 450 mg = 15 ml liquid) once a day.
- 33 to under 40 kg      give 400 mg by capsule (or 510 mg = 17 ml liquid) once a day.
- over 40 kg              give 600 mg once a day.

For second line treatments, discuss with a specialist.

# Opportunistic infections

People with HIV disease have weakened immune systems. Because of this they often get opportunistic infections caused by bacteria, viruses, or fungi that do not create problems in people who are healthy. These infections are often serious and difficult to treat in people with AIDS.

Some organisms, such as *Pneumocystis jiroveci* (a fungus), cause disease only in people with weak immune systems. Other organisms, such as *Candida* (a fungus), which normally causes mild vaginal infections, can cause serious throat, vaginal, or blood infections in people with HIV. Just as each part of the world has its own animals, each part has its own opportunistic organisms: people with HIV who live in Africa will have some diseases that are the same as those of people living in Europe, and some that are different. For example, pneumonia caused by *Pneumocystis jiroveci* is rare in Africa but common in Europe.

People with AIDS often have more than one opportunistic infection. This may cause difficulty in diagnosis and treatment. As people with HIV become more ill, treatment becomes more difficult; in this case, giving medicines becomes less important than providing support and comfort (see Chapter 10). This is a time to ask your patient (and yourself) what she wants and expects from your treatment. Sometimes the best treatment will be none at all.

This appendix discusses some of the diseases seen in people with HIV and their treatments. We are trained as Western doctors and are most familiar with Western medicine, which uses X-rays, pills, and injections to diagnose and treat disease. We list several treatments for each disease based on our experience and reading. We also discuss treatments that may be necessary to prevent illnesses from returning; often these medicines must be given for the rest of a person's life. The list of diseases and treatments is not complete. In addition, many of the recommended drugs may not be available or are too expensive for most patients. In many cases there are other treatments, including local ones such as medicinal herbs or acupuncture. Most people use a combination of treatment approaches, and this appendix is meant as a framework; diagnosis and treatment should be adapted to what is available in your community. In addition, diagnosis and treatment change over time as the world learns more about HIV, and all of these recommendations should be read with this in mind.

The information in this appendix was obtained from books and articles listed in the resources section and from the authors' personal experience. The standards of care and therapies available for HIV and HIV-related illnesses are continually changing. The clinical recommendations in this book are

neither absolute nor universal recommendations, and in no way supervene the informed clinical judgment of treating practitioners. The reader is advised to consult package inserts and other references before using any therapeutic agent. The authors and publisher disclaim responsibility for any adverse effects resulting directly or indirectly from omissions or undetected errors.

## Skin diseases

HIV disease often causes skin problems that may not be life-threatening but can make a person miserable.

### Atopic dermatitis

Atopic dermatitis begins as dry, itchy skin. Because people scratch their skin it becomes red and raised and develops scales. Atopic dermatitis is often found where the arms and legs bend. People with asthma or allergies are more likely to have atopic dermatitis than others.

#### **Treatment:**

- Avoid strong soaps or excessive bathing. These can cause dry skin and make the problem worse.
- Apply moisturizing cream 2 to 4 times a day.
- Use a steroid-containing cream or ointment like 1%–2.5% hydrocortisone cream 2 times a day.

Do not use strong steroid creams or ointments on the face or genital areas because these medicines weaken the skin.

### Bacillary angiomatosis and bacillary peliosis

Bacillary angiomatosis (BA) and bacillary peliosis (BP) are diseases caused by *Bartonella henselae* or *Bartonella quintana*. These bacteria are carried by fleas and lice. They cause fragile, bright red and purple raised bumps and can

How to name skin problems		
Type of lesion	Smaller than 1 cm	Larger than 1 cm
Flat	macule	patch
Raised	papule	plaque
Fluid-filled	vesicle	blister or bulla
Pus-filled	pustule	abscess

## Drug reactions

**Acyclovir:** Kidney damage with high IV doses if not given enough fluids; also gastrointestinal problems, headache, confusion, tremor, seizures.

**Amphotericin B:** Fever, chills, low potassium, low magnesium, kidney damage, low red blood cell count, vein inflammation.

**Ceftriaxone:** Rash, nausea, diarrhea.

**Ciprofloxacin:** Nausea, diarrhea, vomiting, headache, rash.

**Clindamycin:** Diarrhea, nausea, vomiting, rash, liver damage.

**Dapsone:** Methemoglobinemia, red blood cell destruction, “dapsone syndrome” (rash, fever, and liver damage, usually after 3–8 weeks of treatment), hepatitis.

**Doxycycline:** Nausea, diarrhea, tooth discoloration in children who receive the drug or whose mothers received it when pregnant, severe rash (avoid sunlight). Avoid in pregnancy.

**Erythromycin:** Nausea, vomiting, abdominal pain. IM shots are extremely painful. IV administration causes vein inflammation. Rarely, jaundice.

**Ethambutol:** Decreased vision, abdominal pain, rash.

**Fluconazole:** Nausea, vomiting, diarrhea, abdominal pain, rash. Rarely, liver damage.

**Flucytosine:** Low platelet count, low white blood cell count, nausea, vomiting, rash, liver damage.

**Foscarnet:** Kidney damage, bone marrow damage, low calcium, irregular heart rhythms, low or high phosphate, low potassium, low magnesium, low red blood cell count, penile sores.

**Ganciclovir:** Low white blood cell and platelet counts from bone marrow damage.

**Isoniazid:** Hepatitis, rash, nerve damage, nausea. Hepatitis is more common in older patients.

**Ketaconazole:** Nausea, vomiting, abdominal pain, liver damage.

**Metronidazole:** Metallic taste in mouth, nausea, abdominal pain, drowsiness. Severe abdominal pain and vomiting are common in patients who drink alcohol within two days of taking the medicine.

**Penicillin:** Nausea, vomiting, rash. Severe allergic reactions, such as Stevens-Johnson syndrome (a life-threatening skin reaction) and anaphylaxis, can also occur.

**Primaquine:** Red blood cell destruction, methemoglobinemia, low or high white blood cell count, nausea, vomiting, headache, rash.

### Drug reactions (continued)

**Pyrazinamide:** Hepatitis, gout.

**Pyrimethamine:** Abdominal pain, vomiting, tremor, rash (including Stevens-Johnson syndrome), low red blood cell count, diarrhea, vomiting, nausea.

**Rifampin:** Rash, nausea, vomiting, liver damage, orange urine and tears.

**Sulfadiazine:** Rash, kidney stones, hepatitis, low white blood cell count.

**Tetracycline:** Nausea, diarrhea, tooth discoloration in children who receive the drug or whose mothers received it when pregnant. Rarely, pancreatitis with large doses. Avoid in pregnancy. Sun sensitivity is common, avoid sunlight.

**Thiacetazone:** Rash, Stevens-Johnson syndrome.

**Trimethoprim-sulfamethoxazole:** Rash (including Stevens-Johnson syndrome), anaphylaxis, nausea, vomiting, low white and red blood cell counts from bone marrow damage, kidney problems, hepatitis, high potassium.

cause swollen lymph nodes, fever, and malaise. In people with HIV, *Bartonella* can cause serious problems of the skin, lymph nodes, lungs, heart, liver, bone, spleen, brain, digestive tract, blood, or bone marrow. It can be deadly.

BA and BP may look like Kaposi's sarcoma but lesions are usually redder and have a collar of scale around the lesion.

BA and BP can be diagnosed with a biopsy, examined with a modified silver stain such as Warthin-Stary. If available, a blood culture may be used to confirm the diagnosis.

For bacillary angiomatosis or peliosis of the skin, use erythromycin 500 mg by mouth 4 times a day, doxycycline 100 mg twice a day, or rifampin 600 mg once a day. Continue treatment for 14–21 days. If the bones or viscera are involved, treatment should continue for at least 8 weeks.

### Drug reactions

Rashes are common among people using medications for opportunistic infections and HIV. These rashes are caused by reactions to medicines or combinations of medicines, especially antibiotics such as penicillin and sulfa-containing drugs. Most reactions are macular and papular eruptions, but sometimes they cause hives or the life-threatening Stevens-Johnson syndrome. Drug rashes usually start within 1–2 weeks of starting a medication. The drug or drugs suspected of causing the reaction should be stopped. The person may also need medicines to treat the reaction.

Sometimes a medicine is so important to the health of a person with HIV that it has to be used even if it causes a minor drug reaction. Try gradually increasing the dose of a medicine over several days or weeks to avoid a reaction. You can also give the person diphenhydramine 25 mg before giving the drug to prevent a reaction.

### Folliculitis and eosinophilic folliculitis

Folliculitis is an infection of the skin at the root of a hair. It causes a red, itchy, or painful bump that may be filled with pus. The bumps often have a hair in the middle. Folliculitis is commonly found on the face, trunk, buttocks, and groin. Common bacteria such as *Staphylococcus aureus* or *Streptococcus* cause most cases of folliculitis. If folliculitis causes a deeper infection, a furuncle or boil (a 1–2 cm tender, red, pus-filled nodule) can occur.

#### **Treatment:**

- Soak affected areas in hot water or press a hot cloth against the area several times a day.
- Let the furuncles open themselves. Pressing or popping the boil may spread the infection. But if the furuncles do not open after 3 days, they may need to be cut open with a sterile scalpel to remove the pus.
- Apply antibiotic cream or ointment to the area.

If the person with folliculitis gets a fever give dicloxacillin 500 mg 4 times a day for 7 to 21 days.

Eosinophilic folliculitis is a type of folliculitis that consists of small red papules on the face and trunk that itch intensely. If folliculitis is not responding to the usual treatments, a biopsy can be used to look for eosinophilic folliculitis. The exact cause is not known; however, treatment with antihistamines or oral antifungal agents can be helpful.

### Fungal skin infections

Many types of fungal infections cause skin problems for people with HIV. Tinea pedis causes scaling and cracks on the feet (athlete's foot). Tinea capitis causes hair loss and sores on the head. Tinea corporis causes ring-like patches on the body (ringworm); Tinea unguium infection can cause destruction of the nails; and Tinea versicolor can cause light patches on the skin. *Candida* affects the skin on moist areas of the body, such as on and around the genitals, causing redness and irritation. All can be treated with a topical antifungal cream or powder such as nystatin or miconazole.

## Impetigo

Impetigo is a bacterial infection of the skin caused by *Streptococcus* and *Staphylococcus* species. The bacteria cause a red area of skin with yellow crusts, sores, and blisters; the area can be large and painful. The skin peels off easily. Impetigo may become serious if the bacteria enter the blood. Impetigo is common in children and can be easily diagnosed.

Gently soak off the crusts 3–4 times a day using soap and clean water. Paint the sores with gentian violet or another drying agent and cover with antibiotic ointment, such as bacitracin. Give dicloxacillin 500 mg by mouth 4 times a day for 7–10 days.

## Itching, or prurigo

People with HIV often have skin that itches on many parts of the body. There may be small (1–2 cm), itchy papules on the skin. Itching can be treated with oral antihistamines such as hydroxyzine and diphenhydramine.

People with HIV frequently have severe reactions to insect bites, including those of mosquitoes, fleas, and flies. They should try to avoid insects by removing them from the home and by wearing insect repellent. Bites at night can be reduced by using bed netting and wearing long-sleeved shirts and long pants. Treatment for itching can include antihistamines (e.g., hydroxyzine 50–75 mg 3 times a day), or, if especially severe, topical steroid creams.

## Kaposi's sarcoma

Before HIV, Kaposi's sarcoma (KS), a cancer, was usually found in men between 50 and 70 years old. It was seen on the extremities and was rarely fatal. Now most KS is found in people with HIV disease. It is caused by human herpesvirus 8 (HHV8). KS lesions are usually red, purple, or black, and are small (0.5–2 cm), firm papules and plaques. KS is often found inside the mouth, especially on the roof. The lesions can become quite large and may block lymph vessels and cause swelling of the arms or legs. KS on the soles of the feet, on the arms or legs, or in the groin may make it difficult to move. Skin cancers, moles, or bacillary angiomatosis may also look like KS; a biopsy should be done for diagnosis. KS often causes disfigurement, and people who have it may suffer from discrimination. Most people with KS have limited disease; however, severe KS can be fatal because of involvement of internal organs such as the gut or lungs.

Treatment of KS rarely lengthens life but can make a person more comfortable. There are many ways to treat KS on the skin. Most of them cause

a sore that eventually heals. A cotton swab with liquid nitrogen or dry ice can be put on the KS until the bumps turn white (approximately 15 seconds). This treatment can be done every 2–3 weeks until the bumps disappear. Another treatment is vinblastine, which can be injected inside KS bumps. A small (tuberculin) syringe containing 0.01 mg of vinblastine in 0.1 ml of sterile water is used. This usually shrinks the size of the bump and may be repeated as needed. If the person has many areas that need treatment, care should be taken that the person does not get too much medicine at one time.

Radiation (800 cGy) can also be used for large areas of KS. Whole-body treatment may be necessary for people with KS over large parts of the body or in organs such as the lungs and liver: vincristine 2 mg is given once a week, vinblastine 0.5–1 mg/kg once a week by mouth, and bleomycin 10 mg/m<sup>2</sup> every 14 days.

## Leishmaniasis

Leishmaniasis is an infection with the parasite *Leishmania* that is spread by the bite of the sandfly. The disease is more common in areas around the equator. It affects the skin and internal organs.

Skin leishmaniasis occurs about 24 months after the sandfly bite. It starts as pale bumps on the skin of the face, ears, hands, and legs; the bumps can become infected by bacteria and develop into open sores. The bumps and sores may eventually get better. Sometimes they move to the nose and throat, causing large internal sores months to years after the original sandfly bite.

Visceral leishmaniasis, or kala-azar, usually appears around 3 months after the fly bite. Symptoms include skin sores, fever, diarrhea, and cough. Internal organs such as the spleen, bone marrow, or liver may also be affected. Lymph nodes may swell.

HIV causes *Leishmania* that had been living quietly in a person's body to spread. How ill a person with HIV and leishmaniasis becomes depends on the type of *Leishmania* involved and the strength of the person's immune system. Biopsies of affected skin, bone marrow, spleen, or lymph nodes can support the diagnosis. Cultures of the peripheral blood buffy coat may be positive. People with HIV disease may have the parasites in unusual sites, such as bronchoalveolar lavage fluid or pleural effusions. Whereas a swollen spleen is common in HIV-negative people with leishmaniasis, HIV-positive people with leishmaniasis may not have this sign.

Visceral leishmaniasis can be treated with sodium antimony gluconate 20 mg of Sb/kg once a day to a maximum daily dose of 850 mg, for 20–40 days. Amphotericin B 0.5–1 mg/kg IV every other day or pentamidine 3–4 mg/kg IV every other day for 5–25 days may also work. Skin leishmaniasis

can be treated with shorter courses (around 10 days) of the same drugs. Sodium antimony gluconate, amphotericin B, and pentamidine may cause life-threatening side effects (see the box on drug reactions earlier in the appendix). Although it is difficult to escape sandflies in areas where they are endemic, people with HIV disease should be especially careful to avoid being bitten by them.

### Molluscum contagiosum

Molluscum contagiosum is caused by a virus. It is seen as small, pearl-colored bumps with central dimples. The bumps are commonly found on the face, anus, and genitals. Shaving can spread the virus and the bumps. The appearance of small flesh-colored bumps with central dimpling is usually enough to make the diagnosis of molluscum.

Molluscum can be treated by applying cantharidin ointment to facial bumps. Wash off the ointment after 4–6 hrs. Do not use this on the anus or genitalia. Curettage (scraping with a sharp, curved knife), electrosurgery (burning with electricity), or carbolic acid may also be used to remove the bumps. Liquid nitrogen or dry ice, applied in small amounts for 15–30 seconds, also works well. All treatments may be repeated every 2–3 weeks until the bumps disappear.

### Psoriasis

Psoriasis is a skin disease that causes red to blue-gray plaques with silvery scale and sharply defined edges. They are found mostly on the elbows, knees, and lower back. In advanced HIV disease plaques may be found in the underarms and groin. Pitting of the nails may also occur. It is not known what causes psoriasis. Treatments help, but it rarely goes away completely. It is occasionally associated with severe arthritis.

Scratching worsens psoriasis. Sunshine improves it. For psoriasis on the scalp, remove the crusts with 2–3% salicylic acid in olive oil. Then shampoo with coal tar shampoo, selenium sulfide, or zinc pyrithione. For psoriasis anywhere on the body except the face or genitals, steroid creams such as triamcinolone acetonide 0.1% or hydrocortisone 2.5% 3 times a day, or tar-based ointments 3 times a day, can be used for as long as needed (usually months or years).

## Scabies

Scabies is caused by a mite that burrows into the skin. It usually digs into the areas between fingers and toes and into the armpits and groin. It causes intense itching and small red burrows. A skin scraping of a burrow, looked at under the microscope, may show a scary-looking mite. Treatment is lindane or 5% permethrin, rubbed over the entire body (except the face), washed off after 12 hours, and repeated one week later. Clothes and bedding should be washed in hot water at the same time to kill the mites.

## Seborrheic dermatitis

Seborrheic dermatitis causes patches of fine, white to yellow, greasy scales on the skin. Sometimes the patches are slightly red. Seborrheic dermatitis is usually found on the scalp, eyebrows, folds of skin next to the nose and behind the ears, chest, upper back, underarms, and groin.

Seborrheic dermatitis on the scalp can be treated with a selenium sulfide-based shampoo or a ketoconazole shampoo. Hydrocortisone 1% or 2.5% cream, or other steroid-containing creams, can be applied to affected areas twice a day. Adding ketoconazole 2% cream twice a day may also help. For severe cases, in addition to the creams, give ketoconazole 200–400 mg by mouth once a day for 2–4 weeks. Topical creams may need to be used for months to years.

## Shingles (herpes zoster, zona, varicella zoster)

Shingles is a painful infection of nerves in the skin caused by the chicken pox virus (varicella zoster virus, or VZV). Shingles happens when VZV, which has been living quietly inside a nerve since the time a person had chicken pox, appears again. In people with HIV, shingles can occur at any age. It is often the first sign of HIV disease.

VZV causes a patch of small, very painful vesicles and blisters, which crust over. The blisters are found in a pattern where a nerve meets the skin, and they may merge together. Shingles usually occurs on only one side (right or left) of the body, in the area where one nerve reaches the skin. The appearance of blisters in distinct patches on only one side of the body is usually enough to make a diagnosis; however, if there is any doubt, a Tzanck preparation will reveal multinucleated giant cells. VZV can sometimes spread to internal organs like the lungs; this can be fatal.

Shingles is very painful, and strong pain drugs are usually needed. The pain may continue even after the blisters are gone. Put light bandages over the rash

so clothes do not rub the skin. Burow's solution or other skin treatments that dry the blisters can be useful. Acyclovir can be used, 600–800 mg by mouth 5 times a day for 7–10 days, or 30 mg/kg IV once a day. Treatment should be started as soon as possible, as it is not useful once the blisters have crusted over. If the zoster has spread widely or is near the eyes, then give acyclovir 10–12 mg/kg IV over 1 hour every 8 hours for 7–14 days. If acyclovir does not work, consider using foscarnet 40 mg/kg IV every 8 hours for as long as needed. Antibiotics that work for skin infections, such as dicloxacillin, cephalosporins, or erythromycin, can be used if the blisters become infected by bacteria.

For pain that occurs even after the zoster is gone, medicines can include phenytoin 100 mg by mouth once a day, slowly increasing to 250–300 mg a day, or carbamazepine 100 mg by mouth once a day, increasing to 400 mg once a day over 10 days.

## Skin cancer

Squamous cell carcinoma is a skin cancer that starts as a hard nodule and later forms an ulcer with hardened edges. It is caused by sunlight, radiation, or cancer-causing chemicals. The cancer is more common in light-skinned people. Leukoplakia, a white plaque inside the mouth, may be the beginning of squamous cell carcinoma when it is in the mouth or on the lips of someone who has smoked or chewed tobacco. Most squamous cell cancers can be cured if found and treated early. Taking a biopsy of the affected area is the only way to be sure it is cancer.

Removing the skin cancer is the best way to treat it. Treating the site of the ulcer and the surrounding area with radiation or electro-surgery may also help kill remaining cancer cells.

## Sun sensitivity

When exposed to sunlight, some people with HIV have a skin reaction that often takes the form of red plaques or blisters. This is usually because they are taking a medication, such as doxycycline or trimethoprim-sulfamethoxazole, that causes their skin to be sensitive to sunlight. Treatment includes stopping the offending drug, covering up (for example, wearing a hat and long-sleeved clothing), or using sunblock lotion.

# Eye diseases

The eye is one of the first places that signs of opportunistic diseases can be found. Most of these infections cause problems in other parts of the body as well as the eye. When a person with HIV reports symptoms of eye infection, the eyes should be examined carefully because some infections cause blindness. To see diseases of the retina you will need an ophthalmoscope. Differentiating between different infections by looking at eye findings is often difficult; it may be necessary to assume that an eye problem is caused by the same disease that is affecting another part of the body. Treatment may have to be started without being sure of the diagnosis.

## Conjunctivitis

Conjunctivitis is inflammation of the white part of the eye (conjunctiva), which becomes red and produces a yellowish discharge. Conjunctivitis is usually caused by viruses for which there is no treatment. These infections go away in 1–2 weeks. A thick yellow or green discharge means that the conjunctivitis is likely to be caused by bacteria. Bacterial conjunctivitis can be treated with topical antibiotic ointments or solutions. Severe pain or loss of vision can be a sign of serious infection, and an eye doctor should be consulted.

## Cotton wool spots

Cotton wool spots are the most common problem in the retinas of people with HIV disease. Cotton wool spots look like bits of white wool surrounded by small retinal hemorrhages. They are caused by small blood clots in the vessels and usually go away on their own. Spots caused by cytomegalovirus (CMV; see section below) look similar to cotton wool spots but do not go away without treatment. People with cotton wool spots usually have no symptoms.

## Cytomegalovirus

Cytomegalovirus (CMV) is a common problem in people with HIV. CMV is a virus in the same family as the herpes simplex virus and varicella zoster virus (chicken pox virus). Like herpes, CMV can live for a long time in a person without causing disease. In many communities nearly everyone has CMV by the time they reach adulthood. It is spread through sex, by sharing needles, from mother to baby before birth or during breast-feeding, and by blood

transfusions. CMV can affect the eyes, lungs, adrenal glands, liver, brain, spinal cord, esophagus, or gut. About one in four people with HIV disease will have life- or sight-threatening problems caused by infection with CMV.

CMV retinitis usually affects one eye and then moves to the other. People often see small spots, or “floaters,” moving across their visual fields. They may also have “blind spots” and sensitivity to sunlight. Yellow and red areas that look like “cottage cheese and ketchup” (fluid and blood) can be seen on the retina during a careful eye exam with an ophthalmoscope. Retinal detachment may occur. CMV viremia may also be detected by PCR.

Treatment for CMV retinitis is ganciclovir 5 mg/kg IV infusion over 1 hour twice a day, or 2.5 mg/kg IV every 8 hours, for 14–21 days. Maintenance therapy is one-half of the induction dose or 5 mg/kg once a day for 5–7 days per week. An alternative treatment is foscarnet 60 mg/kg IV every 8 hours for 14–21 days. Oral ganciclovir can be used for maintenance therapy. Serious side effects may occur, such as neutropenia from ganciclovir and electrolyte abnormalities and kidney damage from foscarnet, so extra care must be taken when working with them. CMV is slowed by ganciclovir or foscarnet, but not stopped. Maintenance therapy should be continued for life unless the person is receiving ART.

#### Herpes zoster of the eye

Herpes zoster usually affects nerves to the skin. If it also attacks a nerve to the eye, it can cause blindness. Herpes zoster blisters that appear on one half of the forehead, the side of the nose, or the eyelid are especially likely to do this. They are painful and sometimes there is conjunctivitis. The cornea may be inflamed, and the iris can be involved. In severe cases or when the zoster is near the eyes, give acyclovir 10–12 mg/kg IV over 1 hour every 8 hours for 7–14 days. Acyclovir can cause renal problems and adequate hydration is necessary. If IV acyclovir is not available, it can be given 600–800 mg by mouth 5 times a day for 7–10 days. If acyclovir does not work, consider using foscarnet 40 mg/kg IV every 8 hours for as long as needed.

#### Kaposi’s sarcoma of the eyelids

People with HIV may develop KS on their eyelids or eyes. Treatment is needed only if the KS is bothersome to the patient. Treatment may involve both local and systemic therapy (see the section on KS under “Skin diseases”).

### *Pneumocystis jiroveci* retinitis

*Pneumocystis jiroveci* causes multiple yellow plaques on the retina. The treatment for *Pneumocystis jiroveci* in the eye is similar to the treatment for *Pneumocystis jiroveci* pneumonia (PCP). Trimethoprim-sulfamethoxazole, pentamidine, or clindamycin are useful (see the section on PCP under “Chest diseases”).

### *Toxoplasma* chorioretinitis

*Toxoplasma* is a microscopic parasite spread by undercooked meat and pet cats. It causes homogenous, yellow-white, edematous retinal lesions with fluffy borders. Usually people with *Toxoplasma* have vitreitis and inflammation of the anterior segment of the eye, symptoms not seen in CMV. *Toxoplasma* lesions are not bloody. Many people with toxoplasmosis in the eye will also have it in other places, such as the brain. The treatment for *Toxoplasma* chorioretinitis is the same as the treatment for systemic toxoplasmosis (see the section on toxoplasmosis encephalitis under “Nerve and brain problems”).

## Nerve and brain problems

### Cryptococcal meningitis

*Cryptococcus neoformans* is a yeast-like fungus found worldwide in soil and bird droppings. *Cryptococcus* is spread by breathing air contaminated with dust containing the fungus. (People cannot spread the fungus to each other.) The symptoms of cryptococcosis develop slowly. They include nausea, vomiting, seizures, headache, fever, and confusion. The headache is usually in the forehead above the eyes. Many people experience neck stiffness and sensitivity to light. People may also have signs of *Cryptococcus* in the lungs, kidneys, blood, prostate, and skin.

The most useful test for *Cryptococcus* is to examine the cerebrospinal fluid (CSF) for fungus, using an india ink stain and a microscope. You will see round organisms, each surrounded by a clear area. Blood and CSF can also be tested for *Cryptococcus* protein. Other studies of the CSF, such as levels of protein and glucose levels and cell counts, are often close to normal.

Severe cryptococcosis can be treated with amphotericin B 0.6–0.8 mg/kg IV per day, to a total dose of 750–1,000 mg, along with flucytosine 25 mg/kg by mouth every 6 hours, for 2 weeks followed by 8 weeks of fluconazole at

400 mg/day. For increased intracranial pressure, the patient will require daily lumbar punctures until the CSF opening pressure normalizes. Fluconazole 200–400 mg by mouth once a day can be used in mild cases for initial treatment and to prevent recurrence of symptoms. Amphotericin B is a very toxic drug and the patient should be watched closely for signs of renal failure, low magnesium, low potassium, and anemia. Flucytosine can cause myelosuppression, leading to leukopenia or a low platelet count.

Cryptococcosis will return if suppressive therapy is not given after initial treatment. Maintenance therapy is fluconazole 200 mg by mouth once a day or amphotericin B 0.5–1 mg/kg IV 1–3 times a week. Ketoconazole can also be given at 400 mg by mouth once a day. Therapy should be continued for life. If the patient starts taking ARV, they may be able to discontinue treatment after 6 months.

## HIV dementia

Dementia is the most common brain problem from HIV disease. Many people with HIV will get dementia, which may cause personality changes and confusion, and may also affect coordination and mobility. People may forget things easily and lose their ability to do simple mental tasks, such as going to the market or remembering people in their families. It is often difficult to notice these changes because they happen slowly. Depression is also a common part of HIV dementia. Problems with thinking usually precede problems with movement, but over time people may develop poor balance and coordination. A tap on the tendons over the joints will cause the muscles to jump very briskly. People with serious forms of HIV dementia may not be able to talk, move, or hold in urine or feces.

Before making the diagnosis of HIV dementia, look for other causes, such as opportunistic infections, metabolic problems, drug reactions, and lymphoma. People will need support, since they will slowly lose the ability to carry out daily tasks.

## Lymphoma

When lymphoma, a type of cancer, occurs in the brain, it can cause headaches, confusion, personality changes, memory loss, and difficulty walking or talking. People with lymphoma can also have difficulty swallowing and may suffer from seizures or paralysis. Lymphoma in the brain usually does not cause fever or other systemic signs of illness. Toxoplasmosis may cause problems similar to lymphoma. Both diseases cause masses in the brain that may look similar on a computed tomography (CT) scan. If there is a lesion

that looks like lymphoma or toxoplasmosis on a CT scan, most people treat first for toxoplasmosis because it responds to safer medicines than does lymphoma (see the section on toxoplasmosis below).

### Meningitis and encephalitis

Meningitis is an infection of the covering of the brain. It can be caused by many different organisms: bacteria, fungi, viruses, and the organisms that cause sleeping sickness and syphilis. Some common signs of meningitis are fever, a stiff neck, headache, nausea, and vomiting. Meningitis causes people to be confused or, in severe cases, comatose. Diagnosis of meningitis is best made by doing a lumbar puncture and testing the fluid that surrounds the brain.

Encephalitis is inflammation of the brain. People with encephalitis may be confused, delirious, stuporous, or comatose. They may have seizures. Encephalitis may be caused by brain abscesses, malaria, toxoplasmosis, lymphoma, *Cryptococcus*, herpes simplex virus, CMV, TB, or even HIV itself.

### Mental health problems

People with HIV experience anxiety and stress. HIV disease, like other serious illnesses, can cause people to lose hope. Depression is more common among individuals with HIV compared to the general population. Look for signs of depression and suicidal thoughts in people with HIV, and treat discussions of suicide seriously. Depression can cause people to lose weight, not sleep well, lose pleasure in things, and have difficulty thinking clearly. Depression can also interfere with people's ability to take ARV medicines consistently. Antidepressant medicines or counseling can help people to feel better. Sometimes mental health problems can be confused with other illnesses. It is important consider mental health problems when trying to diagnose a nerve or brain problem in a person with HIV.

### Nerve problems in the arms and legs

People with HIV commonly have nerve problems in their arms and legs. The symptoms can vary from having burning feet to experiencing so much pain that it is impossible to walk. Sometimes HIV infection leads to rapid loss of the covering of nerves, which leaves people severely weak (Guillain-Barré syndrome). People may also have nerve problems caused by poor nutrition, ARVs, or viruses such as hepatitis C or CMV.

Look for treatable causes. Nutrition can be improved and vitamins taken. Nerve problems caused by drugs can be helped by stopping or decreasing

### Peripheral nerve problems in people with HIV

**Distal symmetric polyneuropathy (DSPN):** Tingling, burning, and pain in hands, feet, and legs. Best treatment is medicines good for nerve pain, such as tricyclic antidepressants and narcotics.

**Acute and chronic inflammatory demyelinating polyneuropathy (CIDP):** This is Guillain-Barré syndrome that lasts for a long time. Characterized by an increasing loss of ability to move the arms and legs, without loss of sensitivity to touch, heat, or pressure.

**Mononeuritis multiplex:** This is a loss of function in a single nerve. It can be seen as the inability to lift a foot or use a hand and is usually caused by CMV infection.

**Cauda equina syndrome:** Severe pain and weakness in the back and legs, also frequently caused by CMV.

the dose of the drug. Viruses can sometimes be treated. Otherwise, treat the person with analgesics such as aspirin, acetaminophen, tricyclic antidepressants, or narcotics.

#### Progressive multifocal leukoencephalopathy

Progressive multifocal leukoencephalopathy (PML) is caused by the JC virus. The virus destroys the coverings of the nerves in the brain and causes increasing weakness, difficulty swallowing, loss of vision, inability to walk, loss of memory, and difficulty thinking and speaking. There is no good treatment for PML.

#### Toxoplasmosis encephalitis

*Toxoplasma gondii* is a microscopic parasite found all over the world. It is spread by eating undercooked lamb, beef, and pork and through cat feces. About 75% of people in the world have the parasite in their bodies. Most people do not know when they have toxoplasmosis; the *toxoplasma* lives quietly within them. If the immune system is damaged by HIV, signs of toxoplasmosis begin to emerge. At first the person may have fever, a mild headache, confusion, and seizures. Some experience personality changes, signs of dementia, or problems walking or seeing. About one-third of all people who have HIV and *toxoplasma* infection will have toxoplasmosis encephalitis. *Toxoplasma* can also affect other parts of the body, including the eyes, gut, lungs, heart, and testes.

A sample of the CSF may show the organism itself (use a Wright-Giemsa stain and a microscope). Blood tests that look for antibodies against *Toxoplasma* cannot tell the difference between an old and a new infection, though most people with an antibody titer greater than 1:1,000 have an active infection. Although most people have already been infected with *Toxoplasma*, those who have not may be able to avoid infection. Meat should be very well cooked (at 60 degrees centigrade for 10 minutes), smoked, or cured in brine. People should avoid touching their mouths and eyes while handling raw meat, and should wash their hands, kitchen surfaces, fruits, and vegetables thoroughly. They also should not touch cat feces.

Toxoplasmosis can be treated by first giving pyrimethamine 200 mg, followed by 50–100 mg by mouth once a day, with folinic acid 10 mg by mouth once a day and sulfadiazine 1–2 gm by mouth every 6 hours, for 4–8 weeks (depending on whether the person gets better). Clindamycin 600 mg by mouth or IV every 6 hours can be substituted for the sulfadiazine. Alternative treatments are dapsone 100 mg by mouth once a day, trimethoprim-sulfamethoxazole (trimethoprim component 5 mg/kg) by mouth or IV every 6 hours, or pyrimethamine and folinic acid as discussed above.

Once treated, people require lifelong therapy to prevent symptoms from returning. You can use pyrimethamine 25–50 mg by mouth once a day, folinic acid 5–10 mg once a day, and sulfadiazine 0.5–1 gm by mouth 4 times a day. Clindamycin 300–600 mg by mouth 4 times a day can be substituted for the sulfadiazine. Pyrimethamine-sulfadoxine 25 mg/500 mg (Fansidar), one tablet 3 times a week, can also be used in place of all of the above.

## Mouth problems

People with HIV often get problems in their mouths. These can be caused by bacteria, viruses, fungi, cancers, or a lack of certain vitamins. Regular dental care is essential to prevent many of these illnesses. (For more information about HIV and problems of the mouth, see the chapter on HIV/AIDS in *Where There Is No Dentist*.)

### Aphthous ulcers

Aphthous ulcers are small red bumps in the mouth or esophagus that become ulcers. They are painful and may look like herpes virus sores but are never found on the outside of the lips. The appearance of small painful ulcers inside the mouth is usually enough to make the diagnosis.

## Mouth care

Mouth care is very important for people who have weak immune systems. These are some of the things that people can do to keep their mouths clean.

Brush teeth in the morning and at night.

Gently clean teeth every day with dental floss.

Soak false teeth in hydrogen peroxide each night.

### Mouthwash for mouth pain

Swish and spit out the following mixture several times a day. Ingredients can be changed depending on what is available, and flavored liquids can be added to make the mouthwashes taste better.

Tetracycline	2 gm
Diphenhydramine hydrogen chloride syrup	240 ml
Hydrocortisone	60 mg
Nystatin	6 million units

If esophageal ulcers are present, swish and swallow the following mixture.

Diphenhydramine hydrogen chloride syrup	55 ml
Lidocaine injection 2%	10 ml
Magnesia-alumina suspension	175 ml

Medicines can be used to lessen the inflammation and pain. Examples include steroid creams, such as fluocinonide (Lidex) 0.05% ointment or benzocaine, applied to the ulcer up to 6 times a day. Decadron elixir (0.5 mg/ml) as a mouth rinse may also help. Decadron should not be swallowed. Elixirs are especially helpful when the ulcer is hard to reach, making it difficult to apply creams. Thalidomide can also be useful, given as 200 mg by mouth once a day until ulcers improve, then 100 mg by mouth 3 times a week for prevention. Thalidomide should not be used by women who are or might become pregnant while taking the drug, as it causes birth defects. The mouthwash described in the box on mouth care will also lessen pain from aphthous ulcers.

## Dry mouth

In “dry mouth,” which can be caused by drugs, the salivary glands fail to make enough saliva. Dry mouth makes tooth and gum disease more likely. Sucking hard candies or using artificial saliva will keep the mouth wet. Fluoride mouth rinses, toothpaste, chewing sticks, or toothpicks may help prevent cavities, which are more common in people with dry mouth.

## Hairy leukoplakia

Hairy leukoplakia is a white, stuck-on-looking plaque that is usually found on the side of the tongue. The white plaques look like thrush, but unlike thrush they do not scrape off. Hairy leukoplakia generally causes no problems. The appearance is usually enough to make the diagnosis, but a biopsy can also be done to look for cancer (which can look similar), especially in people who use tobacco.

## Herpes simplex virus

Herpes simplex virus (HSV) infection is very common. It is the cause of “blisters” or “cold sores” on the mouth and lips and in the genital area. Fever, sore throat, and swollen lymph nodes sometimes accompany the blisters, especially during the first outbreak. Some people feel tingling and numbness several hours before an outbreak of blisters. The painful red sores last for about two weeks in people without HIV, but in people with HIV the blisters and sores can last for many weeks. Outbreaks of blisters can occur several times in a year. Contact with the mouth or genitals of someone who has herpes can spread herpes to other people. Herpes sores also make it easier for HIV to spread from one person to another during sex. The diagnosis of herpes is usually made by recognizing the typical appearance of the sores or by examining the fluid from a blister under the microscope using a Tzanc smear.

Most cases of recurrent HSV blisters last about a week. For blisters lasting over 10 days, or for blisters in the esophagus, give acyclovir 200 mg by mouth 5 times a day or 15–30 mg/kg IV once a day. If acyclovir does not work, foscarnet 40 mg/kg IV every 8 hours for 21 days can be used.

Stress and sunlight on the face can bring out herpes blisters. For blisters that occur frequently, acyclovir 200–400 mg by mouth 2–4 times a day can be used to lower the number of attacks. This treatment can be used safely for several years.

## Inflamed gums, or gingivitis

Gingivitis is an inflammation of the gums that is usually caused by bacteria. The most common signs of gingivitis are bleeding and pain in the gums after eating or brushing the teeth. Gingivitis causes the gums to pull back from the teeth. Gums may become reddened or blue. In long-standing cases the gums can be firm and light in color. These problems happen in people without HIV infection, but in people with HIV they happen more often and may be more serious. The appearance of the gums is usually enough to make the diagnosis.

People with HIV should brush their teeth or use a chewing stick every day, especially after eating sweet foods. They should use toothpaste. Toothpaste can be made by mixing salt and baking soda (bicarbonate of soda) in equal amounts. The mixture will stick to a wet toothbrush. To prevent tooth problems in children, do not bottle-feed older babies who can eat solid foods. Sucking on a bottle bathes the baby's teeth in a sweet liquid, whether milk, formula, or juice, and causes tooth decay.

For mild gum disease, remove plaque on teeth and gums with toothbrushing 2–3 times a day and use mouthwashes such as diluted hydrogen peroxide, chlorhexidine gluconate 0.2%, or povidone-iodine 10% solution.

### Oral and esophageal candidiasis (thrush)

Candidiasis is caused by the fungus *Candida albicans*. *Candida* grows on areas of the body that are warm and moist, such as in the mouth, on the feet, and in the groin and vagina. It appears as white patches in the mouth and throat. It can make food taste bad and cause people to gag or have sore throats. If it is in the esophagus, it may cause difficulty swallowing. Candidiasis may appear after people take antibiotics, which kill both helpful and disease-causing bacteria living in the body, allowing the fungus to grow.

The appearance of candidiasis is usually enough to make the diagnosis. Scrape the white patch off and then spread it on a microscope slide. If it does not scrape off, it may be hairy leukoplakia (see earlier section). Add a drop or two of potassium hydroxide (KOH) solution to the scraping and then look under a microscope for the *Candida* fungi.

#### **Treatment:**

If a person has been given unnecessary antibiotics, stop them.

Gently scrub the tongue and gums with a soft toothbrush or clean cloth 3 or 4 times a day. Then rinse the mouth with salt water or lemon water and spit it out (do not swallow). In addition, use one of these remedies:

- Suck a lemon if it is not too painful. The acid slows the growth of the fungus.
- Rinse the mouth with 1% Gentian Violet liquid 2 times a day. Do not swallow.
- Put nystatin solution, 5 ml in the mouth and hold it there for 1 minute. Then swallow it. Repeat 4 times a day for 5 days.
- Dissolve nystatin tablets, 500,000 – 1,000,000 units in the mouth 3-5 times a day for 10 days or until cured.
- Dissolve clotrimazole troches, 10 mg in the mouth 5 times a day for 10 days or until cured.
- Dissolve miconazole, 250 mg in the mouth 4 times a day for 10 days or until cured.

If thrush is very bad, give ketoconazole, 200 mg by mouth 1 time a day or fluconazole 50-100 mg by mouth 1 time a day. Pregnant women should not take ketoconazole. Treatment may take months.

For candidiasis of the esophagus, take one of the following:

- Fluconazole, 100-200 mg by mouth 1 time a day for 2-3 weeks.
- Ketoconazole, 200-400 mg 1 time a day for 2-3 weeks. Do not take if pregnant.

If those medicines do not work give amphotericin B 0.3 mg/kg IV 1 time a day for 7 days.

### Periodontitis and necrotizing stomatitis, or “trench mouth”

Gingivitis may become the more serious periodontitis, or “trench mouth.” Periodontitis is an inflammation that destroys teeth. It is a painless, quickly destructive disease that needs immediate treatment. The gums between the teeth develop ulcers and a gray look. If the gray covering is removed, a tender, bleeding area is left with a “punched out” look. The person often has a foul taste and odor in the mouth.

If treated early as gingivitis, the disease is reversible. Once periodontal disease is present, some of the gum is already lost and the person should see a dentist to smooth any rough surfaces on fillings, correct tooth position problems, and remove mobile teeth. In addition, dead tissue next to teeth may have to be removed. Mouthwashes with 0.2% chlorhexidine gluconate or 10% povidone-iodine solution will help by stopping bacteria from growing. Without treatment, periodontal disease may progress to necrotizing stomatitis, a painful disease associated with spontaneous bleeding and destruction of gingiva and bone. Treatment involves debridement, curettage, and povidone-iodine and chlorhexidine mouthwashes. Metronidazole 250 mg by mouth 4 times a day or clindamycin 300 mg by mouth 3 times a day for 5 days can be added.

## Diseases of the gut

All parts of the gastrointestinal (GI) system, from the mouth to the anus, can be affected by HIV disease. Sometimes people with HIV have problems with swallowing, vomiting, diarrhea, and weight loss. These result in loss of fluids. Most people need two liters or more of fluid a day. People with diarrhea need much more.

## Diarrhea

People with HIV often have severe diarrhea. To prevent infections that cause diarrhea, people should try to avoid food and water that might be contaminated. To make fresh vegetables and fruit safe, soak them for 20 minutes in 1 liter of water with 5–10 drops of bleach. If this is not possible, a good rule is to “boil it, cook it, peel it, or forget it.”

Giving oral or IV fluid and treating the cause of the diarrhea can be life-saving (see the box on oral rehydration therapy). Sometimes it is impossible to tell what is causing the diarrhea. Antibiotics can be used to treat the most common infections and can be given even when the exact cause of the diarrhea is not known. Lomotil or Imodium 1–2 pills by mouth after every loose stool will often stop the diarrhea but does not treat the cause. Some people may still have 5–6 liters of diarrhea a day. For these people other treatments, such as deodorized tincture of opium 0.6 ml by mouth four times a day, or long-acting morphine sulphate 15 mg by mouth once a day, may be needed.

*Salmonella* and *Shigella* are more common in people with HIV than the general population. Symptoms include stomach cramping, nausea, and diarrhea, sometimes with blood and mucus. *Salmonella* can also cause a septicemia in people with HIV. These bacteria can be detected with blood and stool cultures. Give one of the following treatments. For *Salmonella* treat for 7–10 days. For septicemia, treat for 4–6 weeks.

- Ciprofloxacin 500 mg by mouth twice a day.
- Trimethoprim-sulfamethoxazole (Septra) 160 mg/800 mg by mouth twice a day or 5 mg/kg (based on trimethoprim) IV every 6 hours.
- Extended spectrum cephalosporins for salmonella septicemia.

For *Shigella*: treat mostly to shorten duration of illness and prevent spread to others. Treat with either ciprofloxacin or Trimethoprim-sulfamethoxazole according to the dose above for 3–7 days.

*Campylobacter jejuni* causes stomach cramping, nausea, and diarrhea, sometimes with blood and mucus. Diarrhea is often more severe and prolonged and invasive among people with more severe immunodeficiency. These bacteria can be detected with blood and stool cultures.

A mild case of *Campylobacter jejuni* does not need to be treated, but persistent cases should be. Give one of these drugs:

- Erythromycin stearate 500 mg by mouth 4 times a day for 7 days.
- Ciprofloxacin 500 mg by mouth twice a day for 7–10 days.
- Norfloxacin 400 mg by mouth twice a day for 7–10 days.

## Oral rehydration therapy

Dehydration from diarrhea has killed millions of people worldwide. Children with diarrhea are especially at risk. Before oral rehydration therapy (ORT) was developed, people with severe diarrhea either received fluids intravenously or they died. In many places IV equipment and fluids are not readily available, but an ORT solution can easily be made and used at the hospital, clinic, or home. ORT is much better than plain water, and the use of ORT to combat dehydration has saved millions of lives.

An ORT solution is made of water, salt, and sugar and is taken by mouth. The salt and sugar allow the body to absorb eight times as much water as it could if the person drank plain water alone. Clean water should be used in order not to cause new diarrheal illnesses. ORT can be made in several different ways. The essential ingredients are one teaspoon of salt and 8 teaspoons of sugar per liter of water. If available, add half a teaspoon of sodium bicarbonate (baking soda). One cup of orange juice or two bananas can also be added to replace lost potassium. When sugar is scarce, 50 grams of cereal flour from rice, maize (corn), sorghum, millet, wheat, or potato can be used.

If a person is unable to replace the amount of water he is losing from diarrhea, then he may need to be given IV fluids in a clinic or hospital.

*Clostridium difficile* causes acute, watery diarrhea with abdominal pain, fever, and leukocytosis. It often occurs after exposure to antibiotics. It can be diagnosed with a stool bioassay for *C. difficile cytotoxins*. Treat with metronidazole 500 mg by mouth 3 times a day for 7 days or vancomycin 500 mg by mouth 4 times a day for 7 days.

*Mycobacterium avium-intracellulare* complex (MAI or MAC) is treated with multiple drugs because it can quickly become resistant to a single medicine. See the section on MAC under “blood disorders”.

*Giardia lamblia* causes watery discharge with foul-smelling stool. Occasionally, *Giardia* can be seen under the microscope wet mount of the stool. Treatment is metronidazole 500 mg by mouth 3 times a day, quinacrine 100 mg by mouth 3 times a day, or furazolidone 5 mg/kg, up to 400 mg a day. Treat for 7 days.

*E. histolytica* or “amoeba” can cause bloody diarrhea as well as liver and lung problems. *E. histolytica* cysts can sometimes be seen in the stool when examined under the microscope. Treat with metronidazole 750 mg by mouth 3 times a day for 5–10 days, followed by iodoquinol 650 mg by mouth 3 times a day for 20 days. Dehydroemetine 1–1.5 mg/kg IM once a day for 5 days, or emetine 1 mg/kg IM once a day for 5 days, can be substituted for metronidazole. These last two medicines can have toxic effects on the heart and they should not be used during pregnancy.

*Cryptosporidium* or *Isospora belli* causes watery diarrhea often with nausea, vomiting, fever, and abdominal pain. People may lose 1-3 liters of stool a day and the diarrhea can last for weeks. *Cryptosporidium* may also affect the biliary tract, causing liver and gallbladder problems. Small eggs can be seen in the stool when examined under a microscope using a modified Ziehl-Neelsen, auramine phenol, or safranin stain. Currently, there is no good treatment for *Cryptosporidium* diarrhea. *Isospora belli* responds to trimethoprim-sulfamethoxazole 160 mg / 800 mg 4 times a day for 10 days, then twice a day for 3 weeks. The diarrhea usually stops within a few days after treatment is started.

If you do not know the cause of the diarrhea or there is blood in the stool, you can try treating it with ciprofloxacin 500 mg by mouth twice a day for 7-10 days or trimethoprim-sulfamethoxazole 160 mg/800 mg by mouth twice a day for 7-10 days. This will treat many bacterial infections. However, resistance to trimethoprim-sulfamethoxazole is common. If there is no improvement, take metronidazole 500 mg by mouth 3 times a day for 7 days. This will treat some of the parasites that might be causing diarrhea.

## Esophageal diseases

People with HIV sometimes have pain or difficulty swallowing. Many diseases can cause these problems. Aphthous ulcers can occur in the mouth or esophagus. *Candida* irritates the esophagus much the same way it causes problems in the mouth. People with candidal esophagitis may have the feeling that food is sticking in the esophagus. HSV and CMV can cause painful ulcers in the esophagus, making swallowing painful. Rarely, lymphomas, Kaposi's sarcoma, and histoplasmosis also cause problems in the esophagus. If no obvious lesions are present in the mouth, endoscopy can help with diagnosis.

The treatment for candidal esophagitis is fluconazole 100–200 mg by mouth once a day or ketoconazole 200–400 mg by mouth once a day for 2–3 weeks. Patients should improve in 7–10 days. Amphotericin B 0.3 mg/kg IV once a day for 7 days may be used in severe cases where oral medicines do not work. Often fluconazole 100 mg a day or ketoconazole 200 mg a day is needed for life to prevent the esophagitis from returning.

The treatment for HSV esophagitis is acyclovir 5 mg/kg IV over 1 hour every 8 hours for 7–14 days. For less serious cases oral acyclovir 200–400 mg by mouth 5 times a day can be used for 7–14 days. Acyclovir 400 mg by mouth twice a day for life can be used after the initial treatment to prevent return of the problem.

The treatment for CMV esophagitis is ganciclovir 5 mg/kg IV over 1 hour twice a day for 14–21 days. An alternative is foscarnet 60 mg/kg IV every 8 hours for 14–21 days. Recurrence can be prevented by giving ganciclovir 5–6 mg/kg IV once a day 5 days a week for life or foscarnet 90–120 mg/kg IV once a day for life. Extra care must be taken when working with these drugs, since serious side effects may occur, including neutropenia with ganciclovir and kidney and electrolyte problems with foscarnet.

## Liver and biliary diseases

HIV itself does not damage the liver, but many of the illnesses and treatments that are a part of HIV disease do. Pain and tenderness in the right upper part of the abdomen is often the first sign of liver disease. Liver disease should always be considered when this pain is present along with other signs that bile is not flowing well, such as jaundice (yellow eyes) caused by a high level of bilirubin in the blood, or an elevated alkaline phosphatase.

MAC is the most common opportunistic infection of the liver in HIV disease, causing fever and an enlarged liver. Hepatitis B and hepatitis C can also cause hepatitis, and alcohol abuse and some medicines such as isoniazid can cause hepatitis and increased liver enzymes in the blood.

Cholecystitis is inflammation of the gallbladder. Usually it is caused by stones in the gallbladder. In HIV disease, cholecystitis and inflammation of the liver and biliary tree happen in younger people even without gallstones. This may be due to infections with CMV or *Cryptosporidium*. The liver and gallbladder are painful and may be larger than normal. A thickened gallbladder or air in the walls are signs of gallbladder disease that may be seen using ultrasound imaging.

## Rectal and anal problems

Bacterial abscesses, warts, HSV, KS, squamous cell carcinoma, CMV, *Neisseria gonorrhoeae*, and *Chlamydia* can all cause problems around and in the anus and rectum. Hemorrhoids, fissures, and abscesses may also be seen. As in other parts of the body, making a correct diagnosis is the key to finding a treatment. For example, a Tzanc preparation from an ulcer may show multinucleated giant cells consistent with HSV infection. A culture of the wound might grow *N. gonorrhoeae*.

# Sinus infections (sinusitis)

Sinusitis is an inflammation of the sinuses caused by bacteria, virus, or fungi. The bacteria *Hemophilus influenzae* and *Streptococcus pneumoniae* may cause bacterial sinusitis. Sometimes more unusual bacteria like *Pseudomonas*, *Moraxella catarrhalis*, and *Enterobacter* may cause chronic sinusitis. Sinusitis can be a chronic problem in people with HIV, and weeks of antibiotic use may be needed. Signs of sinusitis include a stuffy nose, cough, headaches, pain over the sinuses, and a thick green or yellowish discharge from the nose. An X-ray may show fluid in the sinuses or thickening of the linings of the sinuses.

Treatment of bacterial sinusitis may include trimethoprim-sulfamethoxazole 160 mg / 800 mg by mouth twice a day, amoxicillin 500 mg by mouth three times a day, or doxycycline 100 mg by mouth twice a day for 10 days. For persistent infections, antibiotics with little resistance, such as ciprofloxacin 500 mg by mouth twice a day, can be used. For chronic sinusitis, treatment for 3–4 weeks is necessary. A decongestant can be used for the first 1–2 weeks to help drain the sinuses and relieve symptoms.

# Chest diseases

People with HIV can get serious lung infections. A person with HIV should seek help if she becomes short of breath or has pain with breathing. In addition to treatments for specific lung diseases, there are ways to prevent illness. For example, medicine can be used to prevent *Pneumocystis jiroveci* pneumonia and tuberculosis, and vaccines can be used to prevent influenza infection.

## Bacterial lung infections

### Bacterial pneumonia

Bacterial pneumonias are common among people with HIV. They are commonly caused by *Streptococcus pneumoniae*, *Hemophilus influenzae*, or *Staphylococcus aureus* and cause pneumonia with a fever, a cough that produces yellow-green sputum, trouble breathing, and chest pain. The lung may sound wet when listened to with a stethoscope or dull when tapped. Chest X rays usually show a solid area of infiltration in the lung that consists of fluid, cells, and bacteria; however, sometimes the pattern on the X-ray is diffuse rather than focal. Gram stains of sputum show white cells and bacteria. Blood cultures often grow bacteria.

Influenza virus causes the “flu.” Infection with the virus makes it difficult to clear dirt and bacteria from the throat and lungs. This means that a person is more likely to become ill from bacteria like *S. pneumoniae*. Influenza and pneumococcal vaccines are helpful in preventing pneumonia. (Of course, vaccination does not help those who are already infected.)

Severe bacterial pneumonias may require IV treatment. Many different antibiotics can be used for bacterial pneumonia, including trimethoprim-sulfamethoxazole, which works against *Pneumococcus*, *H. influenza*, and *Moraxella*. Other useful medicines include second-generation cephalosporins, ampicillin, semi-synthetic penicillin, and aminoglycosides. Treatment is usually for 7–10 days. A macrolide antibiotic like erythromycin can be added if an atypical pneumonia such as *Mycoplasma*, *Legionella*, or *Chlamydia* is suspected.

If possible, a person with symptoms of pneumonia should be tested for TB, or if they have a CD4 < 200, for *Pneumocystis jiroveci pneumonia* (PCP).

### Tuberculosis

Tuberculosis (TB) is the leading cause of death by infectious disease worldwide. In some countries as many as 50% of people are infected with TB, though most do not have the active disease. Those who have HIV infection as well as TB, however, are much more likely to become ill. Around 7–10% of people with both HIV and TB become ill with TB each year.

#### The PPD test

The purified protein derivative (PPD) test uses fragments of the killed tuberculosis organism to see if a person is infected with *M. tuberculosis*. The protein is injected under the skin. If there is a bump after 48–72 hours, the person is probably infected even if she does not have active disease. Each country has decided what size the bump has to be to indicate infection with TB (check your local guidelines).

Since people with HIV may have weakened immune systems, they may not react to the PPD test even if they are infected with *M. tuberculosis*. This failure to react, called anergy, means that a negative PPD test is not very useful in people with HIV disease—but a positive test is. In many areas of the world people are vaccinated with bacillus Calmette-Guérin (BCG) as children. In children, a positive PPD test may also mean prior BCG vaccination rather than TB. However, most adults with a positive PPD test are infected with *M. tuberculosis*, even if they had a BCG vaccination as a child. Persons with HIV infection who have a positive PPD and no signs of active tuberculosis can take isoniazid (INH) 300 mg by mouth once a day for 9 months to prevent the occurrence of active TB. Pyridoxine 10 mg by mouth once a day can be added to prevent nerve problems, which can result from INH treatment.

TB, which is caused by *Mycobacterium tuberculosis*, is most commonly found in the lungs but can also affect the brain, adrenal glands, kidneys, bones, gut, and blood. People with HIV are more likely to have TB outside of the lungs than people who do not have HIV. Anyone with a chronic cough, fever, weight loss, or night sweats should be examined for TB.

The diagnosis of tuberculosis is made by looking at sputum under a microscope with an acid-fast stain. If no tuberculosis bacteria are seen in three separate sputum samples, it is unlikely that the person has active tuberculosis in her lungs. Samples of sputum, urine, blood, lymph node, bone marrow, or even liver tissue can also be cultured for *M. tuberculosis*. Culture can sometimes detect *M. tuberculosis* in samples that are not positive on acid-fast stain.

People with HIV disease who have signs of TB should be treated with medicine (see below). People with HIV who have no signs of TB but are PPD-test positive (check your local guidelines for the definition of a positive test) should get at least a year of the drug isoniazid (INH) as prophylaxis (a maximum of 300 mg by mouth once a day), along with pyridoxine (vitamin B6) 10 mg by mouth once a day to prevent nerve problems.

Treatment for TB takes months or years. People with active TB should be supported so that they finish a full course of treatment. Often the clinical signs go away within a few weeks of treatment, and people may think that they are cured. If they stop treatment they risk developing drug-resistant TB, which is almost impossible to cure and can be spread to others.

Standard treatment is the following (may vary by country):

### **Months 1–2**

isoniazid (INH) 300 mg by mouth once a day

rifampin 600 mg once a day (450 mg if weight is less than 50 kg)

pyrazinamide 25 mg/kg by mouth once a day

ethambutol 25 mg/kg by mouth once a day if extra-pulmonary disease or INH resistance is suspected

### **Months 3–6**

INH 300 mg by mouth once a day

rifampin 600 mg by mouth once a day or 3 times a week

### **Prophylaxis**

INH 5 mg/kg once a day (maximum dose 300 mg) for 9 months, with pyridoxine (vitamin B6) 10 mg by mouth once a day to prevent nerve problems

### Preventing drug resistance

The spread of HIV has caused a rise in the number of people with tuberculosis. Because of this, there has also been an increase in cases of drug-resistant tuberculosis. While some people are originally infected with a drug-resistant strain of *M. tuberculosis*, most cases of drug resistance occur in people with tuberculosis who are given the wrong medicine, are not given treatment for the necessary amount of time, or do not take the medicine regularly. To prevent drug resistance, make sure that each person with active TB gets the right treatment for the full amount of time. Watch her take her medicines.

### Fungal lung infections

Fungi are found in soil everywhere in the world. Fungi that people come in contact with can cause disease, especially if the immune system is weak. Many parts of the body, including the lungs, can be affected. Some common fungal infections of the lungs are histoplasmosis, blastomycosis, cryptococcosis, and coccidioidomycosis.

#### Coccidioidomycosis

*Coccidioides* is a fungus that causes lung infection. It is found mostly in Latin America and the southwestern United States. Most people who become sick with *Coccidioides* were infected much earlier. It often lives in healthy people without causing harm. The new illness is usually a reactivation of this old infection. Active *Coccidioides* infection causes cough, fever, weight loss, and breathing problems. A chest X ray may show small round masses in one or both lungs or enlarged hilar lymph nodes. Diagnosis can be made by doing laboratory studies on blood, sputum, and CSF. Bronchoalveolar lavage fluid stained with a periodic acid–Schiff stain may also be done to find *Coccidioides*. Biopsies of bone marrow, liver, lungs, or skin can also be useful.

*Coccidioides* is treated with amphotericin B 0.5–1 mg/kg IV once a day until symptoms go away (usually 6–8 weeks). Alternative treatment is fluconazole 400–800 mg by mouth once a day, ketoconazole 400 mg by mouth once a day, or itraconazole 800 mg by mouth twice a day. To prevent return of the *Coccidioides*, itraconazole 200 mg by mouth twice a day or fluconazole 400 mg by mouth once a day. Amphotericin B 1 mg/kg IV once a week for life can also be used for prevention.

#### Histoplasmosis

*Histoplasma* is a fungus found mostly in the United States, the Caribbean, and Latin America. Anybody who lives in or travels to these areas can get histoplasmosis by breathing dust that contains the organism. Histoplasmosis

causes fever, weight loss, and what may look like bacterial pneumonia on a chest X ray. Diagnosis of histoplasmosis is difficult. Biopsies of bone marrow, lymph nodes, liver, and lung can be stained using a Wright-Giemsa or methenamine silver stain and examined under the microscope for the fungus. The peripheral blood buffy coat may also have the fungus. Blood and CSF can also be cultured. For histoplasmosis that has spread throughout the body, the fungus can be detected in the blood or urine.

Treatment for severe cases is amphotericin B 0.5–1 mg/kg IV once a day until symptoms go away (usually 3–10 days), followed by oral therapy with itraconazole or ketoconazole. Give itraconazole 300 mg by mouth twice a day for 3 days, then 200 mg twice a day for 12 weeks, or fluconazole 400 mg by mouth twice a day for 12 weeks. To prevent return of the histoplasmosis, itraconazole 200 mg once a day by mouth or amphotericin B 1 mg/kg IV once a week for life can be used.

*Pneumocystis jiroveci* pneumonia (PCP)

*Pneumocystis jiroveci* pneumonia (PCP) is an infection of the lungs by a small fungus called *Pneumocystis jiroveci*. It is more commonly found in Western industrialized countries than in Africa. Like *Coccidioides*, *Pneumocystis jiroveci* is found in many people's lungs but only becomes a problem when the immune system is weakened. People with PCP experience shortness of breath,

#### Trimethoprim-sulfamethoxazole desensitization

In areas of the world where PCP is common, preventing PCP in people with HIV is very important. This is true even for people with allergies to sulfa-containing medicines. You can desensitize people to trimethoprim-sulfamethoxazole by giving it in low doses and slowly increasing the amount over time. This often allows people to take this medicine safely.

Increasing dosages of trimethoprim-sulfamethoxazole elixir can be given as follows (1 teaspoon = 5 ml = 80 drops):

1/8 teaspoon once a day for 5 days

1/4 teaspoon once a day for 5 days

1/2 teaspoon once a day for 5 days

1 teaspoon once a day for 5 days

2 teaspoons once a day for 5 days

PCP prophylaxis: Septra DS one tablet once every day

Stop treatment if serious rash appears.

For adults, or children who can take pills, equivalent doses to those listed above can be given by splitting trimethoprim-sulfamethoxazole pills into parts.

fever, tiredness, weight loss, and a cough that brings up white sputum or none at all. They may have a “catch” in the chest when they take a deep breath.

PCP can be treated with one of the following: trimethoprim-sulfamethoxazole, 2 double-strength (160 mg / 800 mg) tablets by mouth three times a day, or 5 mg/kg (based on trimethoprim) IV every 8 hours, for 21 days; pentamidine 3–4 mg/kg IV mixed in 250 ml of 5% dextrose in water and given over 1 hour once a day for 21 days; dapsone 100 mg by mouth once a day for 21 days with trimethoprim 5 mg/kg by mouth every 6 hours; primaquine 15 mg base by mouth once a day for 21 days with clindamycin 600 mg IV every 6 hours; or trimetrexate 30–45 mg/m<sup>2</sup> IV once a day for 21 days with folinic acid 20 mg/m<sup>2</sup> by mouth or IV every 6 hours. Each of these treatments has significant side effects. Talk to a local pharmacist to better understand these effects. For people with moderate to severe symptoms, the addition of steroids to the antibiotic regimen can be lifesaving. Prednisone is given 40 mg by mouth twice a day for days 1–5, 20 mg by mouth twice a day for days 6–10, and 20 mg by mouth once a day for days 11–21.

People with HIV who have shown signs of having weak immune systems, including having had PCP or having been diagnosed with AIDS, should receive medicines to prevent PCP. Prophylactic treatment is trimethoprim-sulfamethoxazole 160 mg / 800 mg by mouth once every day. Pyramethamine-sulfadoxine 25 mg / 500 mg (Fansidar) can also be used, one tablet by mouth once a week. If someone is allergic to trimethoprim-sulfamethoxazole, dapsone can be given, 50–100 mg by mouth once a day for life or until ART has brought the person's CD4 count up to 200 or more for 3-6 months.

## Blood disorders

### Anemia

Infections, malnutrition, and drugs can cause blood disorders in people with HIV. Infections of the bone marrow can cause people to become anemic (to have a low red blood cell count), leukopenic (to have a low white blood cell count), thrombocytopenic (to have a low platelet count), or pancytopenic (to have low counts of all cell types). People with HIV and weak immune systems almost always have a mild anemia related to the disease. Other common causes of anemia are organisms like malaria and MAC; TB; and fungi, such as *Histoplasma*. Sometimes anemia is the result of kidney disease or a lack of vitamins or iron. Other causes include blood loss or destruction of the red cells. HIV also causes some white cells (CD4 cells) and neutrophils to be destroyed, which makes it difficult for people to fight common diseases.

## Mycobacterium avium-intracellulare complex (MAC)

The bacteria that cause MAC are similar to *M. tuberculosis*. They are found in the soil and water in most of the world. It is not known how MAC is spread. MAC infection can cause fever, weakness, weight loss, abdominal pain, long-lasting diarrhea, and low numbers of red and white blood cells. People with advanced HIV disease are at increased risk for MAC.

MAC is diagnosed through special blood cultures or a tissue biopsy. MAC is not easy to treat and requires lifelong therapy. You can try rifampin 600 mg by mouth once a day, ethambutol 15–25 mg/kg by mouth once a day, and, if available, ciprofloxacin 500–750 mg by mouth twice a day. Amikacin can be added at a dose of 7.5 mg/kg IV or IM once a day. In the United States, either clarithromycin 500 mg by mouth twice a day or azithromycin 500–1,000 mg once a day is used with one of the following: ethambutol 15–25 mg/kg once a day, rifabutin 600 mg once a day, or ciprofloxacin 500–750 mg by mouth twice a day. Amikacin can be added at 7.5 mg/kg once a day. Rifabutin 300 mg once a day, clarithromycin 500 mg by mouth twice a day, or azithromycin 500 mg 3 times a week for life can be used to help prevent someone with severe HIV disease from getting MAC.

## Sexually transmitted diseases

Sexually transmitted diseases (STDs) are very widespread, and many have become resistant to common medicines. Sexually transmitted diseases greatly increase the chance that HIV will be spread during sex (see box on treating STDs). They last longer and can be more serious in people with HIV. For these reasons, it is very important to treat sexually transmitted diseases in people with HIV. Do not forget to treat the sexual partners of your patients as well! Otherwise, the infection will return.

### Chancroid

Chancroid is caused by infection with the bacteria *Hemophilus ducreyi*. It causes very tender sores (chancres) and swollen lymph nodes in the genital area. The chancres appear 1–8 days after sex with an infected partner. A diagnosis can be made by swabbing the edge of a chancre and culturing the swab for *H. ducreyi*.

Treatment is one of the following: erythromycin 500 mg by mouth 3 times a day for 7 days (in the presence of severe GI upset, decrease the dosage to 250 mg 3 times a day for 14 days); ciprofloxacin 500 mg by mouth

### Treating STDs helps prevent HIV infection

Men with HIV who have other STDs shed up to ten times as much HIV in their semen as men with no STDs. The more virus in the semen, the more likely that HIV will be spread. Treating the men for the STDs—such as gonorrhea, chlamydia, and trichomoniasis—drops the amount of HIV in their semen to the level of men without STDs. Treating STDs in women probably has the same effect on the level of HIV in vaginal secretions. In addition, people with STDs are much more likely to become infected with HIV during sex than people without STDs. This means that treating people for STDs is a critical tool in stopping the spread of HIV.

once; ceftriaxone 250 mg IM once; or spectinomycin 2 gm IM once. Longer treatment courses are often necessary in patients with HIV. If dark-field microscopy and blood tests for syphilis are not available, the patient should also be treated for syphilis.

## Chlamydia

*Chlamydia trachomatis* is a sexually transmitted bacterium. Most men and women with *Chlamydia* infections do not have symptoms. However, some men may have pain with urination or a clear fluid from the penis, and in some women the cervix may be tender and produce pus. A smear of urethral or cervical fluid usually shows many white blood cells and epithelial cells but no yeasts or other organisms. A culture, however, will show *Chlamydia*.

*Chlamydia* infections of the urethra, cervix, eye, or rectum should be treated with doxycycline 100 mg by mouth twice a day for 7 days, or tetracycline 500 mg by mouth 4 times a day for 7 days. If the infection does not respond to doxycycline, try erythromycin 500 mg by mouth 4 times a day for 7 days, or ofloxacin 300 mg by mouth twice a day for 7 days.

Doxycycline and other tetracyclines should not be used for pregnant women. Instead, use one of the following: erythromycin 500 mg by mouth 4 times a day for 7 days; amoxicillin 500 mg by mouth 3 times a day for 10 days; clindamycin 450 mg by mouth 4 times a day for 10 days; or sulfasoxazole (or other equivalent sulfonamide) 500 mg by mouth 4 times a day for 10 days.

Infection during pregnancy can cause early delivery, low birth weight, and death of the infant. Chlamydia and gonorrhea often occur together, and all infants should be given eyedrops at birth to treat possible *N. gonorrhoeae* infection (see section below). If an infant has conjunctivitis and it does not improve immediately, erythromycin syrup 50 mg/kg should be given by mouth 4 times a week for 2 weeks to treat possible *Chlamydia* infection.

## Genital herpes

Genital herpes is caused by a sexually transmitted herpes virus. Symptoms are usually most severe when a person is first infected; within a week of infection, people usually get extremely painful vesicles on the penis or vaginal lips and in the vagina and rectum. The vesicles open, crust over, and go away. However, the virus lives inside nerves and will often return, causing painful vesicles three to four times a year for the rest of a person's life. In people with HIV, these attacks can be particularly severe.

There is no cure for genital herpes. People are especially infectious to their sexual partners when the sores are present and should not have sex during these times. Treatment involves pain medicine, and if available, acyclovir. Mild attacks can be treated with acyclovir 200 mg by mouth 5 times a day for 10 days. Severe attacks can be treated with acyclovir 5 mg/kg IV every 8 hours for 5 days or until resolution of symptoms. Sores can be prevented from returning, or at least made less frequent and less severe, by giving acyclovir 400 mg by mouth 2 times a day. Foscarnet 40 mg/kg IV 3 times a day can be used for genital herpes that does not respond to acyclovir.

## Gonorrhea

Gonorrhea is caused by the bacterium *Neisseria gonorrhoeae*. In women, there are often no signs of gonorrhea. Even if a woman has no symptoms, she can give the disease to others during sex or during birth. Men with gonorrhea usually have drops of white pus from the penis and pain when they urinate. In men, signs of gonorrhea usually begin 2–5 days after having sex with a person with gonorrhea. In both men and women it can cause pharyngitis after oral sex, as well as severe arthritis.

The diagnosis in men can usually be confirmed by examining discharge from the penis under a microscope and looking for *N. gonorrhoeae* inside white blood cells with a Gram stain. In women a Gram stain of cervical or urethral discharge may be positive. Fluid from men and women can also be cultured on chocolate agar for *N. gonorrhoeae*.

In many parts of the world, common medicines like penicillin, doxycycline, and tetracycline do not work against *N. gonorrhoeae* because the bacterium has become resistant to these drugs. If laboratory tests in your area have shown that one of these drugs still works, you can use it—for example, doxycycline 100 mg by mouth twice a day for 7 days. If you do not know whether any of them still work, or you know that where you live they do not work, then genital, anal, or pharyngeal gonorrhea can be treated with one shot of ceftriaxone 125–250 mg IM. Alternatives are cefixime 400 mg by mouth

once; ciprofloxacin 500 mg by mouth once; ofloxacin 400 mg by mouth once; or one shot of spectinomycin 2 gm IM (this is not effective for pharyngeal infection). Trimethoprim-sulfamethoxazole 400 mg / 80 mg, 10 tablets (or 5 double-strength tablets) by mouth once a day for 3 days, can also be used, although *N. gonorrhoeae* is becoming resistant to this medicine. Anyone with gonorrhea should also be treated for *Chlamydia* infection, because they frequently occur together.

Bacteremia and arthritis can be treated with ceftriaxone 1 gm IV once a day for 7–10 days. An alternative is ceftizoxime or cefotaxime 1 gm IV every 8 hours for 2–3 days or until the person's condition improves, followed by cefixime 400 mg by mouth twice a day or ciprofloxacin 500 mg by mouth twice a day to complete 7–10 days of total therapy. In areas where these medicines still work, you can give amoxicillin 500 mg by mouth 4 times a day, doxycycline 100 mg by mouth twice a day, or tetracycline 500 mg by mouth 4 times a day, for 7–10 days.

Gonococcal conjunctivitis is treated with one of the following: ceftriaxone 125 mg IM once, plus saline washes; cefotaxime 25 mg/kg IV or IM every 8–12 hours for 7 days, plus saline washes; or penicillin G 100,000 units/kg IV each day, in 4 doses, for 7 days, plus saline washes. Neonatal meningitis is treated with cefotaxime 50 mg/kg IV every 8–12 hours for 10–14 days, or penicillin G 100,000 units/kg IV each day, in 3 or 4 doses, for at least 10 days. Urogenital, rectal, and pharyngeal gonorrhea in children weighing less than 45 kg can be treated with ceftriaxone 125 mg IM once.

The eyes of all newborn babies should be protected from gonorrhea (and possible blindness) by using 1% tetracycline ointment, 1% erythromycin ointment, or 1% silver nitrate drops at birth. This should be done even if the mother and father do not have signs of gonorrhea.

## Granuloma inguinale

Granuloma inguinale is a disease caused by *Calymmatobacterium granulomatis*. It occurs in the tropics and subtropics. A papule appears in the genital area 9–90 days after sex with an infected partner. The papule becomes a painless ulcer and grows. The infection may spread from the skin to the liver, spleen, and bone. Severe scarring can occur.

Granuloma inguinale can be treated with trimethoprim-sulfamethoxazole 80 mg / 400 mg two tablets twice a day, tetracycline 500 mg by mouth 4 times a day for 14 days, chloramphenicol 500 mg by mouth 4 times a day for 21 days, or gentamicin 1 mg/kg IM 3 times a day for 21 days.

## Human papillomavirus (HPV)

Human papillomavirus is a common virus that can cause warts on the penis, scrotum, vagina, vaginal walls, cervix, or anus. The virus is the leading cause of cervical cancer. About 500,000 cases of cervical cancer happen each year, 75% of them in parts of the world where screening for cervical cancer is rare. In some areas, cervical cancer is the leading cause of cancer deaths in women. Among women with HPV, those who also have HIV are more likely to get cervical cancer than those without HIV. By treating HPV, you will help prevent the spread of the virus and the cancer. Screening with Pap smears and treating women can save lives.

Warts are hard to cure and often return; treatment may need to be repeated several times. Putting vinegar or low-strength acetic acid on the warts will turn them white and help with diagnosis. Since HPV can cause cervical cancer in women after many years, it is important not only to treat the HPV, but also to closely watch women who have had it. This can be done with frequent Pap smears. Every woman with HIV should have a Pap smear done every 6 to 12 months to look for the beginnings of cancer (cervical dysplasia).

Podophyllum resin (10–25% in tincture of benzoin) or podophyllotoxin 0.5% can be used to get rid of the warts. Either should be applied to the warts once a week; the treatment may be used up to four times. Podophyllum should be placed carefully only on the warts and should be allowed to dry before coming into contact with normal skin, as it is very caustic and painful to the patient. Podophyllotoxin is less toxic and can be applied by patients themselves. Both should be washed off after 1–4 hours. Cryotherapy (frozen carbon dioxide or liquid nitrogen), immunologic therapy with alidara, and laser treatments also work well when available. Swabs should be used on only one patient and then thrown away to avoid spreading HPV to others.

## Lymphogranuloma venereum (LGV)

Lymphogranuloma venereum is a *Chlamydia* infection spread through sex. The types of *Chlamydia* that cause LGV are different from the types that cause common *Chlamydia* infections. The first sign of LGV in men is a painless ulcer on the penis; in women the ulcer is usually not noticed. The ulcer heals within a few days. After a few more days to months, lymph nodes begin to swell on one side of the groin. They become painful, open sores and drain pus. There may also be painful, oozing, or bleeding sores around the anus. Other common signs are fever, fatigue, headache, and joint pain. Do not biopsy the sore, since biopsy sites do not heal well. However, LGV can cause strictures and fistulae that may require surgery despite possible problems with wound healing.

Treatment is one of the following: doxycycline 100 mg by mouth twice a day for 21 days; tetracycline 500 mg by mouth 4 times a day for 14 days; erythromycin 500 mg by mouth 4 times a day for 21 days; or sulfadiazine 1 gm by mouth 4 times a day for 14 days. Patients should avoid all sexual contact until the sores are healed, as the infection is easily spread.

### Pelvic inflammatory disease (PID)

Pelvic inflammatory disease is an infection of a woman's fallopian tubes, uterus, and areas around them. The infection is sexually transmitted and is usually caused by *N. gonorrhoeae*, *Chlamydia*, or other bacteria. PID is more common and may be more serious in women with advanced HIV disease. PID can lead to severe problems such as sterility, long-term pain, and ectopic pregnancy. Ectopic pregnancies often occur in the fallopian tubes, which can rupture and cause life-threatening bleeding and infection. Women with PID usually have pelvic pain, inflammation of the cervix, or tenderness with movement of the cervix on pelvic exam. They may have an increased white blood cell count and an increased erythrocyte sedimentation rate (ESR). A pregnancy test can be used to see if a woman with PID is pregnant. If she is, an ultrasound of the pelvis can look for a pregnancy or abscess in the fallopian tubes. Surgery is necessary to treat ectopic pregnancies. If the pregnancy test is not positive, she can be treated for PID without surgery.

If a woman has an intrauterine device (IUD) in place to prevent pregnancy, it should be removed or the infection will be much more difficult to treat. Women who are not hospitalized can be treated for possible *N. gonorrhoeae* infection with cefoxitin 2 gm IM once plus probenecid 1 gm by mouth once, or ceftriaxone 250 mg IM once. Either of these treatments should be followed with doxycycline 100 mg by mouth twice a day, or tetracycline 500 mg by mouth 4 times a day, for 10–14 days to treat *Chlamydia*. To make sure most of the possible causes of PID are treated, some people also add metronidazole 500 mg by mouth 3 times a day for 10 days to treat infections by anaerobic bacteria.

Ill patients who need to stay in the hospital can be given ceftriaxone 250 mg IM twice a day for 4 days, along with doxycycline 100 mg by mouth or IV twice a day for 10–14 days. Another treatment is ciprofloxacin 500 mg by mouth twice a day, doxycycline 100 mg by mouth twice a day, and metronidazole 500 mg by mouth twice a day, for 4 days, and then doxycycline 100 mg by mouth twice a day for an additional 6–10 days. Severely ill patients should receive gentamicin 1.5 mg/kg IV every 8 hours and clindamycin 900 mg by mouth 3 times a day for at least 4 days, followed by doxycycline or tetracycline for 10 days.

## Syphilis

Syphilis is caused by the bacterium *Treponema pallidum*, which is almost always spread through sex. Occasionally syphilis can be spread from a pregnant woman to her fetus or through blood transfusions. Syphilis has three stages. The first stage occurs 2–12 weeks after a person has sex with someone who has syphilis. A *painless* sore, or chancre, appears on the penis or in the mouth, vagina, or anus. It can look like a pimple, a blister, or an open sore. Syphilis chancres are infectious and can easily spread the disease. The sore heals on its own, but the bacteria are still in the person's body.

The second stage of syphilis happens weeks to months after a person is first infected. Someone with second-stage syphilis may get a sore throat, fever, mouth sores, swollen joints and lymph nodes, eye problems, inflammation of the meninges, or a skin rash. The rash is usually painful or itchy, with macules and papules on the trunk, palms, and bottoms of the feet. These skin signs, just like the first sore, will often go away by themselves, but the person still has syphilis.

The third stage of syphilis occurs months to years after the second stage. *Treponema pallidum* infects many organs and can cause stroke, meningitis, heart disease, paralysis, insanity, and death. People with HIV can have unusual forms of syphilis disease, including eye problems (retinitis, uveitis, and optic neuritis), hearing loss, and quick changes from one stage of syphilis to the next.

Syphilis can be diagnosed by using dark-field microscopy to look for *Treponema* in samples from a chancre or tissue biopsy. This is especially useful during the first or second stages, when skin lesions are often present. Blood tests for syphilis are also available: the rapid plasma reagin test (RPR), the venereal disease research laboratory (VDRL) test, and specific treponemal tests (fluorescent antibody absorbed test [FTA-Abs] and hemagglutination assays [MHA-TP, TPHA]). They do not become positive for at least two weeks after the chancre appears. RPR and VDRL are usually used as screening tests. People with HIV who have neurologic symptoms, have had syphilis for over one year, or who are having a lumbar puncture for another reason should be checked for neurosyphilis by testing CSF with a VDRL. Sometimes serum RPR and VDRL tests are positive even if the person does not have syphilis. This is called a false positive. A treponemal test can be used to be sure of the diagnosis. The treponemal tests are important in people with HIV, who have a higher chance of having a false-positive RPR than people without HIV.

With good treatment, VDRL and RPR results may become negative within a year. The treponemal tests usually remain positive for life, even if a person has been treated for syphilis, although a titer of 1:4 or less probably means the

person is currently infected and should be treated. If a person who has been treated for syphilis in the past has a fourfold increase in the titer of VDRL or RPR or has had sexual contact with someone who has syphilis, then she should be re-treated for syphilis.

Pregnant women should be tested for syphilis by VDRL or RPR, and women who test positive should be treated. This not only cures them, but prevents spread of the infection to the fetus. As with other STDs, if someone has syphilis, all of her or his sexual partners should be tested and treated. This will prevent new infections in your patient as well as curing the sexual partners of a serious disease.

Treatment for the first and second stages of syphilis differs from treatment for the third.

**First and second stages:** Benzathine penicillin G 2.4 million units IM, usually split in two and given as two shots at different sites because of the large volume of fluid. Alternatives that have not been well tested are doxycycline 100 mg by mouth twice a day for 14 days or erythromycin 500 mg by mouth 4 times a day for 14 days.

**Third stage with a normal CSF examination (latent syphilis):** Benzathine penicillin G 2.4 million units IM once a week for 3 weeks, or procaine penicillin G 1.2 million units IM once a day for 3 weeks. Alternative treatments are doxycycline 100 mg by mouth twice a day for 28 days, or tetracycline 500 mg by mouth four times a day for 28 days.

**Any stage with neurologic symptoms or an abnormal CSF**

**examination:** Aqueous crystalline penicillin G 3–4 million units IV every 4 hours for 14 days; or aqueous procaine penicillin G 2.4 million units IM once a day for 14 days and probenecid 500 mg by mouth 4 times a day for 10–14 days, followed by one shot of benzathine penicillin G 2.4 million units IM.

**Alternative regimens for patients with neurologic symptoms:** Amoxicillin 2 gm by mouth twice a day and probenecid 500 mg by mouth 3 times a day for 14 days; doxycycline 200 mg by mouth twice a day for 21 days; ceftriazone 1 gm IM once a day for 5–14 days; or benzathine penicillin G 2.4 million units IM once a week and doxycycline 200 mg by mouth twice a day, both for 3 weeks. Some doctors recommend using higher doses and longer treatments for people with HIV than for others.

**Treatment of infants:** Infants with syphilis should be given at least one shot of benzathine penicillin G 50,000 units/kg IM (maximum 2.4 million units). If the CSF is abnormal, then benzathine penicillin G or procaine penicillin G 50,000 units/kg should be given IM or IV once a day for 10 days. Some doctors recommend this longer 10-day course for all infants with syphilis.

### Prevention of vaginal infections

Avoid cleaning the inside of the vagina (douching). Douching lowers the amount of acid in the vagina, which in turn increases the likelihood of infection.

Use condoms during sex. This helps prevent the spreading of infections. Diaphragms should not be left in place longer than 24 hours.

Wear cotton underwear. Avoid tight pants that do not allow air exchange.

After urinating or defecating, always wipe from front to back to avoid moving bacteria in stool from the rectum into the vagina.

## Vaginal infections

A small amount of vaginal discharge or fluid is normal. The amount and character of the discharge normally changes during the month and also during a woman's lifetime. Most of the time the discharge is clear or slightly milky and has a mild odor. Women with a vaginal infection may have itching and a discharge with an unusual or bad smell.

### Bacterial vaginosis

Bacterial vaginosis is the growth of bacteria that cause vaginal discharge and odor. The vaginal fluid is less acidic than normal (with a pH greater than 4.5); a sample of it will give off a fishy odor when a drop of 5–10% potassium hydroxide is added. The cause of vaginosis is not known, but the bacteria *Gardnerella vaginalis* and *Mycoplasma hominis* are suspected to play a role. A sample of the vaginal discharge viewed under the microscope may reveal “clue cells,” white blood cells that are coated with bacteria.

Bacterial vaginosis can be treated with metronidazole 2 gm by mouth once, or 500 mg by mouth twice a day for 7 days, or with clindamycin 300 mg by mouth twice a day for 7 days. Ideally, treatment should be avoided during pregnancy. However, if the symptoms are severe, the 2 gm dose of metronidazole may be given after the first trimester. People taking metronidazole should not drink alcohol because it will cause vomiting and abdominal pain. Sexual partners need not be treated, as bacterial vaginosis is not spread sexually.

### Trichomoniasis

*Trichomonas vaginalis*, a parasite, causes vaginal and penile infections. Women and men may have no symptoms yet still spread the infection through sex. In women, *Trichomonas* causes itching and a thin, foamy, greenish-yellow, foul-smelling vaginal discharge. Women often feel itching and burning

when trying to urinate. Sometimes the vagina becomes red and sore. Men usually have no symptoms. An exam of the vaginal fluid or urethral discharge mixed with a drop of saline under the microscope shows small, swimming *Trichomonas* organisms.

Metronidazole 2 gm by mouth once, or 500 mg by mouth twice a day for 7 days, can be used to treat trichomoniasis. As with bacterial vaginosis, treatment should ideally be avoided during pregnancy. However, if the symptoms are severe, a single 2 gm dose of metronidazole may be given after the first trimester. People taking metronidazole should not drink alcohol because it will cause vomiting and abdominal pain. Sexual partners need to be treated as well, or the infection will return.

*Trichomonas* infects infants at the time of birth and usually goes away in a few weeks without treatment. If an infection remains 4 weeks after birth, give metronidazole 5 mg/kg by mouth 3 times a day for 5 days.

#### Vaginal candidiasis

Vaginal candidiasis, or yeast infection, is a common problem in women. It is caused by the fungus *Candida albicans*, which also causes oral thrush. It is especially common in women with HIV and is often the first HIV-related disease in women. Women who have frequent candidiasis, or infections that do not get better with treatment, should consider having an HIV test.

Candidiasis causes the vaginal wall to be covered by a thick, white, creamy fluid. When the white patch is scraped off it leaves a red, irritated area behind. *Candida* grows more rapidly when the vagina is free of bacteria, when it has less acid, or when there is a lot of sugar in the blood (such as in people with diabetes). Frequently, women taking antibiotics will get yeast infections; antibiotics kill both bad and good bacteria, leaving more room for the fungus to grow rapidly. Yeast infections are also common during menses and pregnancy, and after douching.

You can test for candida by adding a drop of 5–10% potassium hydroxide solution to a sample of the vaginal fluid. Then look under a microscope for spores and branches of yeast.

It may be difficult to treat a yeast infection while a woman is taking antibiotics. Topical butoconazole, clotrimazole, miconazole, nystatin, terconazole, or tioconazole cream or suppositories can be used for 3–7 days to clear the fungus. Sometimes treatment for up to 2 weeks is needed. In severe cases, ketoconazole 150 mg by mouth once, fluconazole 150 by mouth once, or itraconazole 200 mg by mouth once can be used. They are very effective but expensive. Sometimes medicines need to be given regularly for months to prevent infections from returning.

# HIV and pregnancy

Women with HIV but no symptoms have no more difficulty with pregnancy than other women. However, opportunistic infection and some medicines used to treat them can affect a fetus. For this reason, infections in pregnant women are often difficult to treat. The health of both the fetus and the mother must be taken into account before giving a pregnant mother medicines. In some cases it may be best not to treat an infection.

Pregnant women with HIV will be confronted with several decisions. You can guide them through some of the most difficult ones.

**Counseling about reproductive choices.** This includes discussing ways to avoid unplanned pregnancies. Abortion may be an option for women who decide that they do not want to have a child or take the risk of having a child with HIV.

**Testing.** Tests for syphilis, gonorrhea, chlamydia, hepatitis B, and TB are a good idea for pregnant women with HIV.

**Vaccines.** Vaccinate against hepatitis B, *Streptococcus pneumoniae*, and influenza.

**HIV prevention.** If available, ART should be given to the mother during pregnancy and to the infant after delivery to lower the chances that the infant will get HIV. (See the section on ART early in this appendix. See also Chapter 10, “Family counseling,” for a further discussion of pregnancy in women with HIV.)

# Pain

Some opportunistic infections, and HIV infection itself, can cause pain in a person’s body. When people are in severe pain, it can be difficult for them to work, to care for themselves or others, or even to focus on basic activities. Besides treating the infection that is causing the pain, you may need to give medicines to stop the pain directly. No one needs to suffer with pain.

There are several common, easily available medicines that reduce pain, such as acetaminophen (or paracetamol, panadol, or Tylenol) or aspirin-like drugs (such as ibuprofen). However, severe pain may need opiates (such as codeine and morphine) and they are hard to get in many places because they often need a doctor’s prescription. Opiates are very effective medicines, and can make a person’s life much better. In many places, laws about who can give

medicines are being changed so that nurses and other health workers can help treat pain with opiates. Talk to a doctor, nurse, or pharmacist about how to treat pain in a person with HIV.

## Vaccines

Almost all of the vaccines given adults and children without HIV are recommended for people with HIV and for their household or family members. The exceptions are vaccines made with “live” viruses, which can cause disease in people with weak immune systems. Oral polio vaccine and bacillus Calmette-Guérin (BCG), both live vaccines, should generally not be given to people with AIDS or symptoms of HIV disease. In areas where TB is prevalent, however, BCG is recommended for infants who have no symptoms of HIV disease. Polio can spread from someone who has been vaccinated with the live virus to someone with HIV disease. For this reason, inactivated polio vaccine (IPV) is recommended not only for people with HIV but for their household members. Measles-mumps-rubella (MMR), although a live vaccine, should be given, as it has been shown not to cause any more problems in people with HIV than those without HIV. With a few exceptions, then, children and adults with HIV should be given the usual vaccines to protect them from illness.

<b>Recommended vaccines for people with HIV</b>	
<b>Vaccine</b>	<b>Give to people with HIV?</b>
Diphtheria-tetanus-pertussis (DTP)	yes
Oral polio vaccine (OPV)	no
Inactivated polio vaccine (IPV)	yes
Measles-mumps-rubella (MMR)	yes
Hemophilus influenzae type b conjugate	yes
Pneumococcal polysaccharide	yes
Influenza	yes
Bacillus Calmette-Guérin (BCG)*	no
Hepatitis B	yes

\*Do not give to adults or children, or infants with symptoms of HIV infection. In areas of high prevalence of TB, infants may be vaccinated if they do not have symptoms of HIV disease.