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HIV testing

Jean-Patrice's story

Jean-Patrice is nineteen years old and lives in Cayenne, the capital of French Guiana. He moved to Cayenne six months ago from his village in the southern rainforest, where he was a farmer. Now he works in a hotel near the center of Cayenne. He enjoys living in the city and has had several girlfriends, but he wants to earn enough money to go back to his village and start a family. Jean-Patrice has not visited his village since he moved to Cayenne. Next weekend he will return there to bring medicines to his sick mother. He is looking forward to spending time with Michelle, his girlfriend in the village, but he is worried: his doctor warned him that he may have gotten something from his last girlfriend. A friend of his has AIDS and is now very sick. Jean-Patrice comes to your clinic and asks, "Can I get tested for AIDS? How good is the test? If I am negative, does that mean I am immune?"

The HIV test

The HIV test will tell if the HIV virus is in a person's body. It does not tell that a person has AIDS. It is important to know if a person is infected with HIV so:

1. People who know they are infected can begin to take more care with nutrition, clean water, and other ways of staying healthy right away. They may also start taking certain medicines. These steps will keep people with HIV healthier for longer.
2. People who know they are infected can access care and support services available to people with HIV.
3. People who are infected can protect others and avoid passing the virus.
4. People who are infected can protect themselves so they do not get re-infected in the future.

People who wait until they are sick to get tested will have more difficulty treating their sicknesses and living healthy and positive lives.

Types of HIV tests

When a virus, bacteria, or parasite enters a person's body, the immune system begins to make antibodies that try to fight off the virus or other invader. The most common HIV tests—the rapid test, the ELISA (enzyme-linked immunosorbent assay) and the Western Blot—work by looking for antibodies to HIV.

The tests are used millions of times each year. Each has its benefits and drawbacks; because of this, the tests may be used together.

Not all tests look for antibodies. Some tests look for the virus itself. For example, one type of test involves trying to grow HIV in the laboratory from a sample of a person's blood. If the virus grows from the blood, it means the person has HIV. This type of test is difficult and expensive, and it does not always find the virus in people who are infected. Other tests, such as the nucleic acid test and the polymerase chain reaction (PCR), which look for HIV RNA or DNA, are also expensive and are rarely used.

The **CD4 T-cell count** is not an HIV test. It does not check for HIV. This test counts the number of CD4 T-cells in one microliter of blood. The CD4 cells are white blood cells that are part of the immune system. These cells help the body find and fight bacteria and viruses. When the immune system has many CD4 cells it is more able to fight off infection. CD4 cells are also

Antibodies and vaccines

Vaccines use antibodies to prevent illness. They help a person make antibodies to fight diseases that she may come into contact with later. For example, the injected polio vaccine is made of pieces of the polio virus. These pieces are not harmful to people because they are not the whole virus. When given this vaccine, a person's body makes antibodies to the virus. If the person is infected later with the real polio virus, the antibodies will attach themselves to the virus and make it easier for the body to get rid of it. Unfortunately, there is no vaccine for HIV.

attacked and destroyed by HIV. When the number of CD4 cells in the body decreases, the immune system is less able to fight infections. The CD4 count measures how strong the immune system is.

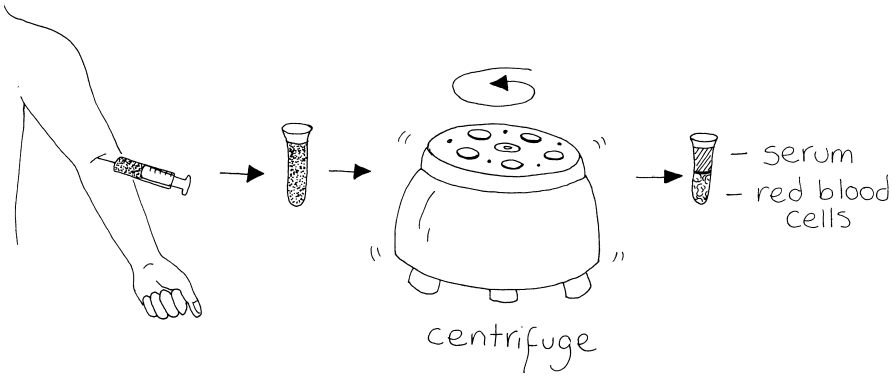
How HIV tests work

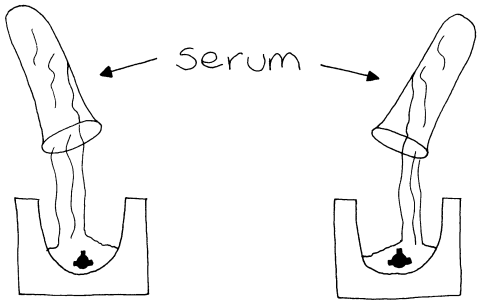
For a rapid test, a little blood is mixed with a chemical solution. A test stick is dipped into the mixture. If the blood contains HIV antibodies, a mark on the stick will indicate that the person has HIV. This test is simple and inexpensive. They are quite accurate and the results are usually available within an hour.

There are several different types of ELISA tests. We will discuss an ELISA test that uses beads. Laboratories in your country may use a slightly different test. However, all ELISA tests are based on the same idea; they look for antibodies, and if you understand how one works you can understand the others.

A small sample of blood is separated into serum (yellow liquid) and red blood cells. Antibodies are found in the serum.

Serum is placed in a container with a round bead that has bits of HIV attached to it. If there are antibodies to HIV in the serum, they will recognize





serum is placed in the container
with a round bead that has pieces
of the virus attached to it

The beads are washed
If there are antibodies to HIV in
the serum they will recognize the
HIV and attach themselves to the bead

Goat antibodies are added;
they will only stick if antibodies
to HIV are present

A chemical is added and
color appears if goat and HIV
antibodies are present

the test
is
positive

the test
is
negative

the HIV and attach themselves to the bead. Then the bead is washed. After washing, only antibodies to HIV will stick to the bead; antibodies to other viruses will be washed away.

Special antibodies taken from goat blood are then added. These antibodies attach themselves to any human antibodies that are on the virus-coated bead. The bead is washed again, and a chemical is added that brings out color in any goat antibodies that are still attached to the bead. If color appears, it means there were HIV antibodies in the person's serum. This is a positive test. If a person does not have HIV, there would be no human antibodies for the goat antibodies to attach themselves to. The goat antibodies would have been washed away and there would be no color. This is a negative test.

ELISA tests are excellent at finding antibodies against HIV. This ability to detect antibodies is called "sensitivity"; it is a basic quality of any medical test. The ELISA test for HIV is not too expensive compared to other medical tests (each test costs US$5–10). Clinics and blood banks usually use the ELISA test as a first round for testing blood.

Fingerstick and oral swab tests

The most common way to test for HIV is to examine a person's blood. People do not like to give blood, however, and collecting it can be expensive. Because of this there are now accurate tests that use a finger stick to get a little blood. Also, there is an HIV test has been made that uses a small sample from the inside of the mouth. This test is painless and is safer than a blood test because no needles are used. Unfortunately, the test is expensive and may not be available in your area.

The problem with rapid and ELISA tests is that they can make mistakes. Because they are so sensitive, they can give a positive result for blood that does not actually have HIV. This is known as a "false positive." To avoid this, most clinics and blood banks run a second test on blood that is positive on rapid and ELISA tests. They use another ELISA test or a test like the Western blot. The Western blot also looks for antibodies to HIV; it is not as sensitive, but it is able to look more closely at *what kind of* antibodies are present. It will almost never show a blood sample to be positive if it does not contain antibodies to HIV. Thus, when a Western blot is positive, a person almost always has HIV. This ability to be right when a test is positive is called "specificity," because the test is finding antibodies to a specific disease. The problem with the Western blot is that it is expensive (each test costs US$25–50). In summary, the rapid and ELISA tests have excellent sensitivity but not very good specificity, whereas the Western blot has excellent specificity but not very good sensitivity.

When to test and when not to test

When people come to you for testing, it is important to talk to them first about their individual situations. In some areas of the world, HIV infection is so common there are very few false positives. In these areas, the test is useful for most people who want to be tested. In other areas, HIV infection is rare, and it is important to ask a few questions about risk factors before testing people. If a person is at very low risk for having HIV, it might be better not to test her. There are several reasons for this. First, it may be better to use money and other resources to test people who are at high risk, not low risk. Second, if a person is at very low risk, a positive test is likely to be a false positive. To find out for sure if he has HIV, you will need to test the person a second time, with a more expensive test. Finally, getting a positive test result can make a person frightened and upset; if the result is a false positive, the person will have been frightened and upset for no reason.

What does a test result mean?

Because the body takes a couple of weeks to produce antibodies to HIV, an HIV test may be negative for up to 3 weeks after a person becomes infected. So a negative result from an ELISA test means that a person does not have HIV—*if*, in the several weeks before testing, he did not do anything that would put him at risk (for example, he did not have unsafe sex or share needles). A negative test does *not* mean that a person cannot get HIV in the future. A positive result from *both* a rapid or ELISA *and* Western blot means that a person most likely has HIV.

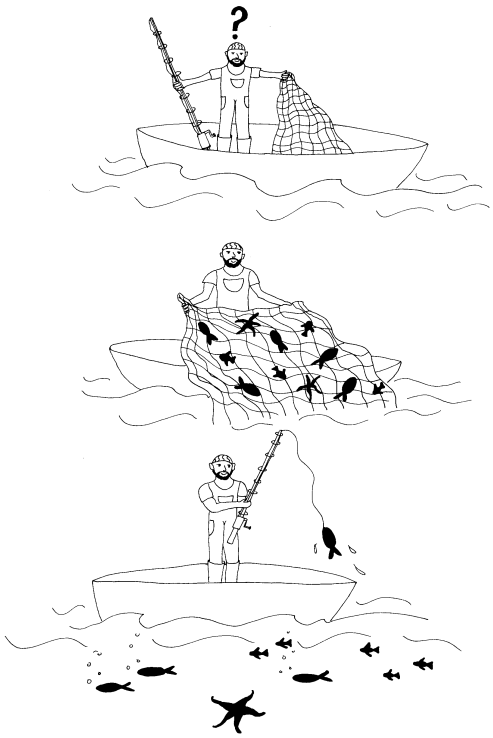
Sometimes the Western blot gives an answer that is not positive or negative but "indeterminate" (unclear or uncertain). Someone with an indeterminate Western blot is more likely to have HIV than someone with a negative Western blot, but less likely to have HIV than someone with a positive Western blot. Sometimes a Western blot is indeterminate because a person has only just begun to produce antibodies to HIV. But the Western blot can also be indeterminate for people who are not infected with HIV, especially if they have certain other diseases. The sensitivity and specificity of a Western blot also depend on the skills of the people performing the test. People with indeterminate tests should take another test in one month to determine if they have HIV.

Why there are different types of HIV tests

A fisherman in a boat on a small lake is trying to catch tilapia. He can use either a net or a fishing pole. What he catches will depend on which tool he uses.

The net would catch all the tilapia, but it would also catch many other fish that the fisherman does not want. The net has high sensitivity because it catches all the tilapia. The net, however, has low specificity because the fisherman catches many fish in the net that are not tilapia.

The same fisherman may choose to use a fishing pole to catch tilapia. With a pole he can use bait that is only eaten by tilapia. The pole has high specificity because it only catches the kind of fish the fisherman wants. Unfortunately, the fishing pole has low sensitivity; it cannot catch all the tilapia in the lake.



The HIV test is trying to "catch" antibodies to identify if a person has the HIV virus.

Like the net, rapid serological tests and the ELISA test for HIV have high sensitivity. They identify almost everyone who has antibodies to HIV. But these tests have low specificity which means sometimes results are positive for people who do not have HIV antibodies. If a person has a positive rapid or ELISA test but does not truly have HIV, the test is called a false positive.

Like the fishing pole, the Western blot test has high specificity because almost everyone it identifies really has antibodies to HIV. With good specificity, there are few false positives. Tests with good specificity usually have low sensitivity. They do not catch everyone who has HIV. If a person has a negative test but really does have HIV, the test is called a false negative.

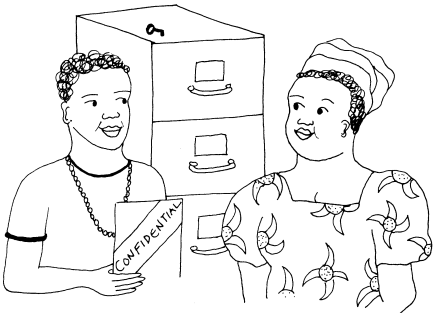
It is best to have a test with both high sensitivity and high specificity, but this is not always possible. This trade-off between sensitivity and specificity in a medical test is common. Rapid serological tests and ELISA tests have good sensitivity and are used as a first test to identify all the people who have HIV antibodies-along with a few who do not. Blood samples with positive ELISA results can then be tested with a Western blot, which has good specificity. The Western blot screens out the false positives — those that are not truly infected with HIV.

The HIV test and babies

The ELISA and Western blot tests do not work for babies younger than fifteen months. This is because antibodies against HIV pass from the mother to the baby and stay in the baby's blood for about fifteen months. This means a baby can have antibodies to HIV even if she does not have the virus. If a baby being tested is at least fifteen months old, then a positive HIV test is likely to be a true positive. By the time the baby is this age, any antibodies in her blood are her own, not her mother's. For babies less than 15 months old a negative HIV test is accurate. To be sure that a positive test is correct, a test called a polymerase chain reaction (PCR) must be used.

Confidential and anonymous testing

Most people want the results of their HIV tests to be private. Telling supportive people that you have HIV can be very helpful. The right people can offer support, love, or vital services. But if a person's HIV results are shared without her consent or knowledge, this information can be used to harm her. A woman may be beaten or kicked out of her home. She may be fired from her job or shunned by her community.



To protect a person's privacy, HIV tests should be anonymous or confidential. The test is the same for a confidential or anonymous test. The only difference is in the records kept about the results.

Confidential testing is done by a health worker who knows the name of the person being tested and the test results. The health worker keeps both private, so that other people do not know the results. Records are kept of the results and may be shared with other health workers who are involved with the person's health care.

Anonymous testing is when a health worker does not know the name of the person being tested. A number or a fake name is given to the person being tested, and the same number or name is attached to the blood sample. The person then gives their number or fake name to get the results.

Confidential testing helps limit the number of people who know about a test result. One good thing about confidential testing is that because the

HIV, blood, and pregnancy

Before a baby is born, the baby shares the mother's blood. Before the mother's blood passes to the baby, it is filtered (cleaned) by the placenta. The placenta is sometimes able to filter out HIV. This is why some babies born to mothers with HIV do not have the virus. However, the placenta is not able to filter out antibodies. This means that if a pregnant woman has HIV, she will pass her HIV antibodies to her baby. This will not hurt the baby, but it will make it difficult to test the baby for HIV infection. Over time, the antibodies in the baby fade away. If a baby still has HIV antibodies after fifteen months of age, then he is probably truly infected.

name of the person is known, a health worker can contact a person who is positive and offer further advice and treatment, even if the person does not come for a return appointment.

One problem with confidential testing is that it does not always keep information from being shared. This is why anonymous testing is sometimes used instead. If no one knows the person being tested, then it is impossible for anyone except that person to find out the results.

Mandatory testing

In some countries all people, or certain groups of people, are forced to be tested for HIV. This is called mandatory testing. Groups of people sometimes tested without their consent include factory workers, workers in the tourism industry, soldiers, sex workers, prisoners, immigrants, and pregnant women.

Mandatory HIV testing violates a person's right to privacy and the right to make her own decisions about her medical care. Mandatory testing often means the government or an employer unfairly controls what happens to the person after the testing. People may lose their jobs or their family support or suffer from other discrimination. People afraid of mandatory testing may avoid seeking needed health care.

There are ways to make testing both voluntary and more routine, such as offering testing in more places — hospitals, primary care clinics and people's homes, for example.

Mandatory screening

Many countries use HIV tests to screen donated blood, blood products, and organs for transplants. This is one kind of mandatory testing that is important, because it helps make sure that blood transfusions and transplants will not spread HIV.

Behavior change

There are many reasons why people think they might have HIV. These can range from knowing for sure that they are at risk because a sexual partner has AIDS to thinking they got the virus from a public toilet. When people are concerned enough to ask to be tested for HIV, they are usually eager to learn more about the virus.

The decision to be tested for HIV is often difficult (for more about counseling people who are being tested, see Chapter 8). People may be afraid of the test result, worried about who might find out the result, and concerned about how the result might change their life. The time spent waiting for test results can cause anxiety. People may think seriously about changing their behavior in order to avoid HIV. A good counseling session before the test can give a person important knowledge and tools that he will need to be safe. For example, if someone drinks alcohol, gets drunk, and then has unsafe sex with different partners, you can help her understand the link between alcohol and

unsafe sex. The pre-test session is very important; some people will not come back for their test result, and this may be your only chance to talk with them.

If an HIV test is positive, then the person must face new decisions. You can help people tell their sexual partners and their family, and you can help them get health care. When people find out that they have HIV, they will probably want to know about the symptoms of AIDS (see Chapter 2). Some people whose tests are positive may be so shocked that they do not hear or understand what you say. Ask them to come back later to continue talking.

What it means to have HIV

If a person has HIV, it means

1. HIV is in her body, even though she may not be sick or have AIDS.
2. She may pass the virus to others, including babies she may have in the future.
3. She should never donate blood.
4. She may stay healthy for a long time, especially if she takes good care of herself.
5. She needs advice and follow-up counseling.

If an HIV test is negative, it is still important to counsel the person after the test. A negative test does not mean that a person is immune to HIV; the person can still get it later. Talk to the person about the effectiveness of the test and how to prevent HIV infection in the future. A negative test result can give a person hope and a new view of life; if a person took risks in the past, it can help change that behavior.

HIV testing and pregnancy

If a man and woman are thinking of having a child, they should talk with each other about the risks of giving HIV to their baby. A man with HIV can pass the virus to his partner, who can in turn pass it to their baby. Pregnant women with HIV should know that pregnancy can make HIV disease worse.

Many times a woman will already be pregnant when she finds out she has HIV.

In some places, drugs that prevent the spread of HIV from mothers to babies will be available (see "Medicines that work against HIV" on page 185). The laws and feelings in her community about abortion and HIV may also play a part in her decision about her pregnancy. Some people feel that having an abortion is not ethical. Families may pressure women to have children at any cost. Other people feel that having children when you have HIV is not moral or responsible. Issues surrounding HIV and women are complex, and people being tested will need support (see Chapter 8).

Answering Jean-Patrice's questions

"Can I get tested for AIDS? How good is the test? If I am negative, does that mean I am immune?"

Jean-Patrice is worried about whether he has AIDS. He is also worried about giving HIV to his girlfriend in his home village. He has other girlfriends in Cayenne and does not know if they have the virus. You can explain to him that he can be tested for HIV. Most people who have AIDS are very ill; usually a test is not necessary to know that they have the disease. The HIV test can be useful, however, for finding out if someone who does not seem ill has HIV.

The HIV test looks for HIV antibodies. Sometimes it takes up to three months for a person's body to make HIV antibodies. If Jean-Patrice has a negative HIV test, there is a small chance that he may still have the virus; he should get tested again in three months. A negative test does not mean that Jean-Patrice is immune to HIV. He can still get the virus from one of his girlfriends if she has HIV. Jean-Patrice should protect himself and his girlfriends by having safe sex.