HPV Vaccine Shows Good Activity in Trials of HIV-Positive Women

People With HIV Get Serious non-AIDS Diseases 5 Years Earlier Than Normal

Almost 30% of US Group in Care for HIV Don’t Use Condoms Regularly

Heart Artery Wall Thicker in Young People With HIV Than in HIV-Negatives

Stroke More Common at Younger Age in People With Than Without HIV

HIV-Positive Gay Men Break Bones at Earlier Age Than HIV-Negative Gays

Protease Inhibitors and Stomach Acid Drugs Linked to Fractures in HIV+ Veterans

People With HIV Have Higher Hospital Return Rate Than General Population

Diabetes Raises Risk of Worse Mental Function in Adults With HIV

More Frequent HIV Risk Behaviors in New Generation of Injection Drug Users

Liver Cancer Risk Up, AIDS Cancer Risk Down in US/Canadian HIV Group

Undetectable HIV Load Rates Climbing at San Francisco Hospital

Definitions

Board and staff
MISSION
The Center for AIDS Information & Advocacy empowers people living with HIV to make informed decisions about their health care by providing the latest research and treatment information and by advocating for accessible, affordable, and effective treatment options until there’s a cure.

About HIV Treatment Alerts!

*HIV Treatment Alerts!* is a publication of The Center for AIDS Information & Advocacy (The CFA). This newsletter is intended for those affected by HIV and their caregivers. The statements and opinions expressed in this newsletter do not imply recommendations or endorsement. Always consult your doctor before altering a prescribed drug regimen or taking any drug or supplement.

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This issue of *HIV Treatment ALERTS!* reports results of 12 top studies from the 19th International AIDS Conference, held July 22-27, 2012, in Washington, DC.

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A vaccine against human papillomavirus (HPV), the most common sexually transmitted virus in the United States, showed strong activity in the first two trials testing it in HIV-positive women. The Centers for Disease Control and Prevention (CDC) already recommends the vaccine for adolescent girls and young women, as well as for teenage boys and young men. The new findings offer strong evidence that the vaccine will also work in girls and women with HIV infection.

HPV infection can lead to cervical cancer in women, to anal cancer in women and men, and to several other cancers and diseases of the anal and genital regions. Women and men with HIV are more likely to get HPV infection than people without HIV, and harmful effects of the virus develop more rapidly in HIV-positive people. HPV-related cancers are more aggressive and harder to treat in people with HIV than in HIV-negative people.

There are several types of HPV, and certain types carry a high risk of causing cancer. A vaccine available in the United States and elsewhere protects against four of these high-risk HPV types: HPV-6, HPV-11, HPV-16, and HPV-18. Studies in the general population show that this vaccine can lower the risk of (1) genital warts, (2) most cervical cancers in women, and (3) cancers of the anus, vagina, and vulva. The vaccine is called Gardasil or the quadrivalent vaccine.

Studies showing that Gardasil can prevent cancers in women did not try to determine whether study participants had HIV and how they responded to the vaccine. There was concern that HPV vaccines may be less effective in HIV-positive people because of the weakened infection-fighting system in people with HIV.

To begin to address this concern, two groups conducted studies of Gardasil in HIV-positive women. These trials were not designed to determine whether the HPV vaccine prevents cancers in these women. Rather, they aimed to see whether the vaccine is safe in women with HIV, and whether it has activity against the four high-risk HPV types: 6, 11, 16, and 18. These are important steps in determining whether the vaccine should be recommended for girls and women with HIV.

How the studies worked. Separate studies tested Gardasil, an HPV vaccine, in two separate groups of women and girls with HIV. Both studies had two major goals: (1) to see if the vaccine is safe in HIV-positive women and girls, and (2) to see if the vaccine has activity against HPV types 6, 11, 16, and 18 in HIV-positive women and girls. Both studies evaluated the activity of Gardasil in two ways—by measuring geometric mean titer antibody activity produced by the vaccine against the four HPV types, and by measuring seroconversion rates for HPV-6, 11, 16, and 18.

Antibodies are proteins that immune system cells produce to identify and control bacteria and viruses (like HPV). An antibody titer is the level of antibodies produced. For these studies, researchers defined seroconversion as geometric mean titers at or above 20 mMU/mL for HPV-6, at or above 16 mMU/mL for HPV-11, at or above 20 mMU/mL for HPV-16, and at or above 24 mMU/mL for HPV-18 when measured 4 weeks after the last of three vaccine doses. Both studies measured geometric mean titer antibodies and seroconversion rates for each HPV type only in women and girls who did not already test positive for that type.

The studies differed primarily in the ages of the participants (Table 1). A study by the Adolescent Trials Network for HIV/AIDS Interventions (ATN) enrolled HIV-positive 16- to 23-year-old women infected with HIV through risk behavior (not by acquiring HIV from their mothers). AIDS Clinical Trials Group (ACTG) study 5240 enrolled HIV-positive girls and women from 13 to 45 years old. Participants in both studies got one vaccination dose on day 1, a second dose at week 8, and the final dose at week 24.

ATN investigators divided women into two groups—69 women who had never taken antiretrovirals or had not taken antiretrovirals for the past 6 months, and 30 women taking antiretrovirals for at least 6 months and having a viral load below 400 copies. ACTG investigators divided study participants into three groups—130 women with a CD4 count above 350, 95 women with a CD4 count between 201 and 350, and 94 women with a CD4 count of 200 or lower. Findings presented at the International AIDS Conference involved only the first two groups in the ACTG study.

*Words in bold are defined in the Technical Word List at the end of this issue of HIV Treatment Alerts!
Table 1. Two studies of an HPV vaccine in HIV-positive women and girls

<table>
<thead>
<tr>
<th>Vaccine doses on day 1, at week 8, and at week 24. Responses measured 4 weeks after the third dose.</th>
<th>ATN trial</th>
<th>ACTG trial</th>
</tr>
</thead>
<tbody>
<tr>
<td>16- to 23-year-old women</td>
<td>13- to 45-year-old girls and women</td>
<td></td>
</tr>
<tr>
<td>• 69 women who had never taken antiretrovirals</td>
<td>• 130 women with a CD4 count above 350</td>
<td></td>
</tr>
<tr>
<td>• 30 women taking antiretrovirals for at least 6 months and having a viral load below 400 copies</td>
<td>• 95 women with a CD4 count between 201 and 350</td>
<td></td>
</tr>
<tr>
<td>• 94 women with a CD4 count of 200 or lower*</td>
<td>• 94 women with a CD4 count of 200 or lower*</td>
<td></td>
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</table>

Main outcomes: safety, geometric mean titer antibody response,* seroconversion rate†

*Results on these women not presented at International AIDS Conference.
†See text for definitions.

What the studies found. In the ATN trial, 56% of women were negative in blood and HPV DNA-negative for HPV-16, and 74% were negative in blood and HPV DNA-negative for HPV-18. In the ACTG trial, proportions negative in blood for each type were 59% for HPV-6, 79% for HPV-11, 65% for HPV-16, and 81% for HPV-18. Thus most of the women in both studies could benefit from the vaccine if it protected them from some or all of these four HPV types.

Both trials found that the vaccine was generally safe and well-tolerated. Only 3 of 222 women and girls in the ACTG trial (1.4%) had a problem possibly or definitely related to the vaccine; those three problems were chest pain, back pain, and rash.

Table 2. Geometric mean titer antibody responses to HPV vaccine in HIV-positive women in two trials

<table>
<thead>
<tr>
<th>Geometric mean titer (mMU/mL)</th>
<th>ACTG 201-350*</th>
<th>ACTG over 350*</th>
<th>ATN off ART</th>
<th>ATN on ART</th>
<th>HIV-negative women†</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPV-6</td>
<td>327</td>
<td>425</td>
<td>547</td>
<td>1139</td>
<td>582</td>
</tr>
<tr>
<td>HPV-11</td>
<td>388</td>
<td>461</td>
<td>655</td>
<td>1454</td>
<td>697</td>
</tr>
<tr>
<td>HPV-16</td>
<td>1077</td>
<td>1120</td>
<td>2176</td>
<td>5037</td>
<td>3892</td>
</tr>
<tr>
<td>HPV-18</td>
<td>166</td>
<td>164</td>
<td>445</td>
<td>963</td>
<td>801</td>
</tr>
</tbody>
</table>

*CD4 count. †Comparison group used in the ATN trial. ART, antiretroviral therapy.
Notably, in the ACTG trial geometric mean titers were higher (better) in girls and women with a CD4 count above 350 than in those with 201 to 350 CD4s. In the ATN trial both geometric mean titers and seroconversion rates were higher in women taking antiretroviral therapy than in women not taking antiretrovirals.

**What the results mean for you.** These trials show that a vaccine designed to protect against four HPV types that may cause cancer is safe in HIV-positive women. At the same time, the studies show for the first time that this vaccine produces good anti-HPV responses in HIV-positive women. The results do not prove this vaccine, Gardasil, will protect HIV-positive women from HPV-related cancers and other HPV-related diseases, as the vaccine does in the general population. But a vaccine that produces strong antibody responses against HPV and high seroconversion rates seems likely to prevent diseases caused by HPV.

It is noteworthy that women taking antiretrovirals in the ATN trial and women with higher CD4 counts in the ACTG trial had slightly better responses to the HPV vaccine. Whether those slightly better responses will mean stronger protection against HPV-related disease remains uncertain. ACTG investigators still have to analyze results on women and girls who entered the trial with a CD4 count under 200. Those findings could tell health experts more about how the vaccine might be used in women with HIV.

The ACTG researchers proposed that low rates of HPV-6, 11, 16, and 18 when HIV-positive women entered the study suggest that most women with HIV would benefit from vaccination. Some experts in this field suggest that 11- and 12-year-old girls should get the HPV vaccine, before they are likely to become infected with HIV through sex.

The CDC already recommends HPV vaccination for all teenage girls and women through age 26 who did not already get all three doses of the vaccine. The CDC also recommends the vaccine for all teenage boys and men through age 21 who did not already get all three doses of the vaccine. That recommendation also includes HIV-positive men and gay or bisexual men up to age 26. But the CDC has not issued a specific recommendation for HIV-positive girls or women.

### Table 3. HPV type seroconversion rates in HIV-positive women in two HPV vaccine trials

<table>
<thead>
<tr>
<th>Seroconversion rate (defined in text)</th>
<th>ACTG 201-350*</th>
<th>ACTG over 350*</th>
<th>ATN off ART</th>
<th>ATN on ART</th>
<th>HIV-negative women†</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPV-6</td>
<td>100%</td>
<td>96%</td>
<td>96.3%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>HPV-11</td>
<td>98.3%</td>
<td>97.6%</td>
<td>95.5%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>HPV-16</td>
<td>98.2%</td>
<td>98.4%</td>
<td>94.6%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>HPV-18</td>
<td>84.3%</td>
<td>90.7%</td>
<td>90.0%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

*CD4 count. †Comparison group used in the ATN trial. ART, antiretroviral therapy.

### References

Serious non-AIDS diseases developed in older HIV-positive people about 5 years earlier than in a comparison group of HIV-negative people studied in the Netherlands.\(^1\) HIV infection doubled chances of getting one of these non-AIDS diseases, and every additional 5 years of age raised chances 50%.

Although combination antiretroviral therapy greatly prolongs the lives of people with HIV, life expectancy is still somewhat shorter in HIV-positive people than in the general population.\(^2\) The higher death rate in HIV-positive people can be partly explained by higher rates of serious age-related non-AIDS diseases in people with HIV than in people without HIV.\(^3\) Diabetes, heart disease, and certain non-AIDS cancers are examples of these non-AIDS diseases.

To get a better understanding of how often age-related non-AIDS illnesses develop in people with HIV—and if they develop at an earlier age than in HIV-negative people—researchers in the Netherlands conducted this study.

**How the study worked.** The HIV-positive study group consisted of people 45 years old or older who were receiving care at a large HIV medical clinic in Amsterdam. An HIV-negative comparison group included people in care at the Amsterdam public sexually transmitted disease clinic or people in an ongoing Amsterdam study group.

The age-associated diseases studied were high blood pressure, angina pectoris (heart-related chest pain), heart attack, peripheral arterial insufficiency (narrowing and hardening of arteries supplying the legs and feet), cerebrovascular disease (like stroke), adult-onset diabetes, chronic obstructive lung disease, chronic liver disease, reduced kidney function, cancer, and osteoporosis (severe loss of bone mineral density) or fractures not caused by severe trauma.

The researchers used standard statistical methods to analyze the impact of HIV infection and other risk factors on occurrence of these non-AIDS diseases. These analyses weighed the impact of age, gender, ethnic background, smoking amount and duration, alcohol abuse, substance abuse, body mass index, sexual orientation, and HIV status (positive or negative).

**What the study found.** The study included 489 people with HIV and 452 without HIV. HIV-positive study participants were slightly older than HIV-negative participants (median 52.9 versus 51.4 years). The HIV group had a somewhat higher proportion of men (89.4% versus 83.8%), a moderately higher proportion of gay or bisexual men (68.5% versus 63.5%), and a lower proportion of Dutch people (75.1% versus 82.1%).

HIV-positive people had been infected for a median of 12.2 years, and their median CD4 count stood at 573. Almost all HIV-positive people (91.2%) were taking combination antiretroviral therapy, and 85% had an undetectable viral load during the year before entering the study. The HIV group had been taking antiretrovirals for a median of 11.2 years.

Looking at risk factors for age-related non-AIDS diseases, the researchers found a statistically significantly higher proportion of current smokers in the HIV group (31.9% versus 23.9%) and significantly more smoking in the HIV group (7.6 versus 3.0 pack-years). (A statistically significant difference is a difference that cannot be explained by chance alone.) Blood pressure was slightly but significantly higher among people with HIV (135/82 versus 133/79 mm Hg). A significantly higher proportion of HIV-negative people drank heavily daily (6.9% versus 3.5%).

The proportion of people with 1 or more age-related non-AIDS diseases was significantly higher in the HIV group than in the HIV-negative group (74.4% versus 60.4%), and the average number of these diseases was significantly greater in the HIV group (1.4 versus 0.9). Rates of 8 age-related non-AIDS diseases were significantly higher in HIV-positive people than in HIV-negative people (Figure 1). None of the non-AIDS diseases studied occurred more often in HIV-negative people.

The researchers divided study participants into five age groups: 45 to 50, 50 to 55, 55 to 60, 60 to 65, and over 65. Similar numbers of total age-related non-AIDS diseases occurred about 5 years earlier in HIV-positive people than in HIV-negative people (Figure 2). And average numbers of non-AIDS diseases were higher among HIV-positive people in each of the 5 age groups (Figure 2).
Statistical analysis that weighed the impact of age, gender, and smoking determined that HIV infection doubled chances of an age-related non-AIDS disease. Every 5 years of age raised chances about 50%. And every 5 pack-years of smoking boosted chances about 10%.

When the researchers added length of HIV infection to the statistical analysis, every additional 5 years of HIV infection raised chances of a serious age-related non-AIDS disease 16%. This change in the statistical analysis did not affect the impact of smoking pack-years or age on non-AIDS disease risk.

The researchers also figured how a measurement called AGE affects risk of age-related non-AIDS diseases. AGE stands for advanced glycation endpoints, which involve glycation of proteins, lipids (cholesterol and triglycerides), and DNA. Glycation is the chemical reaction that occurs when simple sugar molecules become attached to proteins or lipid fats (see http://www.wisegeek.com/what-is-glycation.htm). Researchers believe that age, smoking, inflammation, kidney function, and diabetes affect AGE. AGE increases as a person grows older. In this study, every 10% higher than expected AGE value in HIV-positive people raised the risk of an age-related non-AIDS disease 8%.

What the results mean for you. This large comparison of HIV-positive and negative people in the Netherlands found that a significantly higher proportion of the HIV-positive group had one or more serious age-related non-AIDS diseases. Eight of the non-AIDS diseases studied were significantly more common in HIV-positive people than HIV-negative people (Figure 1); none of these diseases was more common in the HIV-negative group than the HIV-positive group.

Statistical analysis determined that HIV infection doubled chances of having one of these non-AIDS diseases, regardless of whatever other risk factors a person had. Every additional 5 years that a person had HIV infection raised chances of a serious non-AIDS disease 16%.

All of the 8 non-AIDS diseases that occurred more frequently in people with HIV can often be avoided or controlled
by adopting healthy living habits like avoiding or quitting smoking, maintaining a healthy weight, exercising, and having sex with a condom to avoid getting sexually transmitted infections. In this study a significantly higher proportion of HIV-positive people smoked, and heavier smoking independently raised chances of having a serious non-AIDS disease.

Most HIV-positive people in the United States and countries with similar HIV epidemics, like the Netherlands, can reach an undetectable \textit{viral load} with antiretroviral therapy and boost their \textit{CD4 count}. As a result, AIDS diseases are much easier to avoid today than they were 15 or 20 years ago. But this study and many others show that HIV-positive people run a higher risk of age-related non-AIDS diseases than do people without HIV. A healthy lifestyle and safer sex can lower the risk of these diseases.

\textbf{References}


**Article 3**

**Almost 30% of US Group in Care for HIV Don’t Use Condoms Regularly**

Nearly 30% of 5411 people in care for HIV in the United States reported not using condoms regularly during sex. Many people not using condoms had a detectable **viral load** in blood, meaning they might pass their HIV to a sex partner.

Effective **antiretroviral therapy** lowers a person’s viral load, often to a level that cannot be detected by standard tests. A person with a low or undetectable viral load has a much lower chance of passing HIV to a sex partner than does a person with a high viral load. In 2011 an international trial found that treating HIV-positive men and women promptly rather than waiting greatly lowered the risk of HIV transmission between sex partners.

But a person with an undetectable viral load in blood may still pass HIV to a sex partner. For example, two recent studies showed that some gay men with an undetectable viral load in blood still had detectable HIV in semen. If those men had sex without a condom (Figure 1), they could transmit HIV to a sex partner.

To estimate HIV transmission risk in HIV-positive people who had begun regular care for their infection in the United States, researchers planned this study. They also aimed to see what factors raised the risk of inconsistent condom use while having a detectable viral load in blood.

### How the study worked.

The study involved HIV-positive adults in the CFAR Network of Integrated Clinical Systems (CNICS) group in five US cities—Birmingham, Boston, San Diego, San Francisco, and Seattle. The CNICS study regularly collects data on health-related measurements, on medications people take, and on behavior related to HIV transmission risk.

The researchers used standard tests to assess HIV risk behavior, alcohol and substance use, antiretroviral adherence, and other factors.

The main goal of the study was to identify HIV-positive people in care who had a risk of transmitting their HIV to a sex partner. The researchers defined being at risk of transmitting HIV as (1) being sexually active, (2) not using condoms consistently in the past 6 months, and (3) having a detectable viral load (above 50 copies). To identify predictors of HIV transmission risk, the researchers used standard statistical analysis that factored in the impact of age, race, gender, and study site.

### What the study found.

This analysis involved 5411 people with an average age of 44 years and an average CD4 count of 284. Of those 5411 people, 1200 (22%) reported incomplete condom use in the past 6 months. Another 356 people (7% of 5411) ran a risk of transmitting HIV to sex partners because of incomplete condom use in the past 6 months and a detectable viral load.

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**Figure 1.** How to put on a condom.

1. Put on a condom with a partial or full erection.
2. Squeeze the tip of the condom with your fingertips to leave some extra space in the tip.
3. Be sure that the rolled-up condom is on the outside. Roll the entire condom down to the base of the penis, still pinching the top.
4. If a condom rolls up during sex, roll it back into place immediately. (Text from [http://www.condomman.com/how-to-put-on-a-condom-s/1890.htm](http://www.condomman.com/how-to-put-on-a-condom-s/1890.htm).

(Drawings from Selipics made by Warbler, via Wikipedia Commons.)
Women were significantly less likely to be at risk of HIV transmission than men, and people over 50 years old were significantly less likely to be at risk of HIV transmission than younger people. (In this study summary, significance means that the difference described cannot be explained by chance alone.) People between 40 and 49 made up the largest proportion in the group at risk of HIV transmission (35%), followed by 50- to-69-year-olds (29%), and people under 30 (25%).

Gay and bisexual men made up two thirds of the transmission-risk group (66%), while heterosexuals made up 16% and injection drug users made up another 16%. People with a CD4 count at or below 350 made up almost two thirds of the transmission-risk group (65%), while people with a CD4 count of 351 to 500 made up 18% and people with a count above 500 made up 17%.

People reporting current use of amphetamines or crystal meth made up 28% of the at-risk group, compared with 16% of the group with inconsistent condom use but an undetectable viral load and 4% of people with consistent condom use. The proportion of current cocaine or crack cocaine users was higher in the at-risk group (15%) than in the group with inconsistent condom use but an undetectable viral load (9%) and the group with consistent condom use (6%). People at risk of HIV transmission were also more likely to use any drug or to use alcohol than people in the other two groups.

People at risk of HIV transmission were significantly more likely than others to have 2 or more sex partners in the past 6 months (54% vs. 19%) and to report having sex after alcohol or drug use in the past 6 months (46% vs. 17%).

Statistical analysis that weighed the impact of age, race, gender, and study site identified four factors that made it more likely to be in the group at risk of HIV transmission, regardless of whatever other risk factors a person had: current amphetamine use, past amphetamine use, current cocaine use, and alcohol use (Figure 2).

What the results mean for you. This 5-city US study involving more than 5400 people in care for HIV infection found that almost one third of them used condoms inconsistently in the past 6 months. More than 350 people in this study group (7%) used condoms inconsistently when they had a detectable viral load. As a result, that 7% risked passing HIV to a sex partner.

Effective antiretroviral therapy lowers a person’s viral load below the level at which it can be detected in blood. People with a low or undetectable viral load have a very low chance of passing HIV to a sex partner.

But that risk is not zero. Studies show that men can have an undetectable viral load in blood and still have detectable HIV in semen.3,4 HIV in semen can be transmitted to a sex partner. Also, viral load can be undetectable at one clinic visit and become detectable before it is measured again. Viral load may become detectable if a person misses a few antiretroviral doses. Sometimes getting another infection or getting a routine vaccine can make the viral load climb, even if a person keeps taking all antiretrovirals on schedule. For all these reasons, HIV-positive people should wear a condom during sex.

This study also found that people using amphetamines, cocaine, crack cocaine, or alcohol were more likely to use condoms inconsistently while having a detectable viral load. People who are using drugs or drinking before or during sex often don’t take the time to put on a condom. HIV-positive people and their sex partners should try hard to remember condoms when having vaginal, anal, or oral sex, especially if they use drugs or drink.
References


Right coronary artery walls were thicker in young people infected with HIV early in life than in a comparison group of HIV-negative people. The study used a new method to measure coronary artery wall thickness; this method may have advantages over other techniques used to estimate heart disease risk in people with and without HIV.

HIV-positive people have a higher risk of blood vessel disease, including heart attacks and stroke,* than do people without HIV. Even young HIV-positive adults may have this higher risk of blood vessel problems than people without HIV, especially if they got infected with HIV early in life and so have been infected for many years. A study of heart vessels in 15 HIV-positive people who died between 23 to 32 years of age showed thicker than normal heart vessel walls and other abnormalities in these young adults.2

*See the next article in this issue of HIV Treatment Alerts! for a study of stroke in HIV-positive people.

To learn more about heart vessel health in young HIV-positive people, researchers at the National Institutes of Health (NIH) conducted this study. They used a novel “black-blood” magnetic resonance (MR) technique that makes images of heart blood vessel walls. This method may have three advantages over other imaging methods used to look at blood vessels: (1) It focuses on the blood vessel wall rather than on the width of the open space in the middle of a blood vessel. For this reason, it may be more accurate. (2) Wall-thickness results are automatically measured rather than estimated by the person who reads the scan. (3) The new technique does not require radiation.

**How the study worked.** The NIH team studied 20 HIV-positive young adults who became infected early in life, comparing them with 12 healthy people without HIV. No one in either group already had heart or blood vessel disease, and no one had signs or symptoms of those diseases.

All of these people had “black-blood” MR imaging (explained above) as part of a larger study. The scans all focused on the same part of the right coronary artery (Figure 1). Then the researchers compared coronary artery wall thickness in people with and without HIV. Finally, they used standard statistical methods to see if they could identify factors that made thicker artery walls more likely.

![Figure 1. Using a new type of scan to measure thickness of the right coronary artery wall, researchers found that young people with HIV had thicker walls than a comparison group of people without HIV. (Image by Servier Medical Art, http://www.servier.co.uk/medical-art-gallery/.)](image)
What the study found. Age averaged 21 years and ranged from 15 to 29 in the 20 people with HIV. In the 12-person HIV-negative comparison group, age averaged 29 years and ranged from 23 to 47. Ten of the HIV-positive people (50%) were men, and 5 HIV-negative people (42%) were men. Eleven people (55%) in the HIV group were black, 5 (25%) were white, and 4 (20%) were Native American, Hispanic, or mixed race.

Fourteen HIV-positive people (70%) were taking antiretrovirals at the time of the study, and these people had taken antiretrovirals for an average 15 years. Eight people (40%) had an undetectable viral load, and current CD4 count averaged 559. One person with HIV was taking medication to control high blood pressure, and no one was taking medication for cholesterol or triglycerides. Only 2 people with HIV (10%) smoked.

Right coronary artery wall thickness averaged 1.31 millimeters in people with HIV and 1.07 millimeters in people without HIV. This difference was statistically significant, meaning the difference was highly unlikely to result from chance alone. (There are 25.4 millimeters in an inch.) The thicker coronary artery walls in the HIV group are particularly striking because they were on average 8 years younger than the HIV-negative group. Older age is a risk factor for heart disease and blood vessel disease.

Average coronary artery wall thickness was greater in people with a viral load below 50 copies than in those with a higher viral load (1.4 versus 1.2 millimeters), and this difference was statistically significant. People taking antiretrovirals for a longer time tended to have thicker coronary artery walls. However, statistical analysis that considered several risk factors found no factor that—by itself—made thicker coronary artery walls more likely. Factors in this analysis included duration of HIV infection, current or lowest-ever CD4 count, and cholesterol and triglyceride levels.

What the results mean for you. This is a small study in which the researchers could not closely match the HIV-positive group with an HIV-negative group according to factors that may affect blood vessel disease risk. Still, the results raise concern because they confirm that even young people with HIV may run a higher risk of blood vessel disease and heart disease than people without HIV.

The thicker coronary artery walls in these young adults with HIV do not necessarily mean they will get heart disease more often or at a younger age than the HIV-negative group. But thicker artery walls are not a good sign, especially in young people. Many studies found that HIV-positive people have a higher risk of blood vessel disease than people without HIV, for example, heart attacks and stroke. But the HIV-positive people in these studies and most similar studies were much older than the young adults in the artery-wall study.

Researchers are working to figure out why HIV-positive people have a higher risk of blood vessel disease than people without HIV. Certain antiretrovirals make cholesterol and triglycerides rise, and higher levels of these blood fats increase the risk of heart disease. At the same time, HIV infection itself causes inflammation, and inflammation also contributes to heart disease risk.

This study found that young people taking antiretroviral therapy tended to have thicker artery walls. But this does not mean antiretrovirals should be avoided or stopped because of any threat to heart arteries. Successful antiretroviral therapy appears to have an overall positive impact on heart health. For example, a large trial that compared steady antiretroviral therapy with off-and-on therapy found a higher rate of major heart disease and other non-AIDS diseases in the off-and-on group.

Everyone with HIV—young, middle-aged, and older—should know the risk factors for heart disease. And everyone should take steps to avoid those risk factors or limit their impact. The Centers for Disease Control and Prevention (CDC) offers several online pages of advice about heart risk factors and prevention, summarized in the box “Heart Disease Risk Factors and Prevention.” Reference below has a link to the CDC pages.
Heart Disease Risk Factors and Prevention

### Risk Factors

- **Conditions**
  - Abnormal blood cholesterol levels
  - High blood pressure
  - Diabetes

- **Behavior**
  - Smoking
  - Unhealthy diet
  - Too little physical activity
  - Overweight and obesity
  - Too much alcohol

- Heart disease in a close family member

### Prevention

- Eat a healthy diet
- Maintain a healthy weight
- Exercise regularly
- Don’t smoke
- Limit alcohol use
- Get checked for cholesterol, blood pressure, and diabetes
- If you have high cholesterol, high blood pressure, or diabetes, follow your provider’s treatment advice

From the Centers for Disease Control and Prevention.⁶

### References


HIV-positive people admitted to a New York City hospital with acute stroke were an average 15 years younger than a comparison group of HIV-negative people admitted to the same hospital with acute stroke. A much higher proportion of HIV-positive stroke patients smoked.

A stroke occurs when blood stops flowing to part of the brain. If blood flow stops because of a blood clot, the stroke is called an ischemic stroke (Figure 1). If blood flow stops because a blood vessel becomes weak and bursts, the stroke is called a hemorrhagic stroke. If blood flow to part of the brain stops for more than a few seconds, brain cells can die and permanent damage can result.

The proportion of US stroke patients with HIV infection grew from 0.09% in 1997 to 0.15% in 2006. During those years the number of HIV-positive stroke patients admitted to the hospital jumped from 888 to 1425, a 60% spurt. In contrast, the overall number of US patients admitted to the hospital with stroke fell 7%. A US study published in 2012 found a higher stroke diagnosis rate in HIV-positive people than in HIV-negative people in the same healthcare system: 5.27 versus 3.75 per 1000 person-years.

Researchers at Beth Israel Medical Center in New York City conducted this study to compare HIV-positive and HIV-negative stroke patients admitted to that hospital in recent years.

How the study worked. Researchers reviewed medical records to find all HIV-positive people admitted to the hospital with acute stroke from January 2005 to June 2011. From the same hospital records, the researchers randomly selected 101 HIV-negative people admitted with acute stroke in the same period. The study did not include anyone with a so-called mini-stroke (a transient ischemic attack).

The researchers used the National Institutes of Health Stroke Scale to grade the severity of stroke. They classified strokes as ischemic or hemorrhagic (defined in second paragraph above).

The study team used standard statistical methods to compare general life details (like age, gender, and race) and health-related factors in stroke patients with HIV and in those without HIV.

What the study found. Among 1679 people admitted to the hospital with acute stroke from January 2005 through June 2011, 41 (2.4%) had HIV infection. For comparison with the 2.4% HIV rate in these 1679 stroke patients, the HIV rate in New York City in 2010 was 1.4%.

Figure 1. An ischemic stroke occurs when a clot stops blood flow to part of the brain. (Images by Servier Medical Art, http://www.servier.co.uk/medical-art-gallery/.)
Among the 38 HIV-positive stroke patients with a recorded antiretroviral treatment status, 31 (82%) were taking antiretrovirals. Slightly more than half (54%) were taking a protease inhibitor, while 6% were taking the integrase inhibitor Isentress (raltegravir), 3% were taking the CCR5 inhibitor Selzentry (maraviroc), and 2% were taking a nonnucleoside. CD4 count averaged 321 and ranged from 8 to 1034 in these people with HIV.

HIV-positive stroke patients differed from HIV-negative stroke patients in several ways (Figure 2). Perhaps most importantly, the HIV group was an average 15 years younger than the HIV-negative group. Age averaged 57.2 when HIV-positive people had an acute stroke, compared with 72.4 when HIV-negative people had an acute stroke.

Compared with HIV-negative stroke patients, a significantly higher proportion of HIV-positive people with stroke were men, and a significantly lower proportion of the HIV group was white (Figure 2).

Looking at traditional stroke risk factors, the researchers found that the HIV group included a significantly higher proportion of current smokers and a significantly lower proportion of people who never smoked (Figure 2). But a lower proportion of stroke patients with HIV than without HIV had atrial fibrillation, an abnormally rapid and irregular heart beat.

Systolic blood pressure was significantly lower (better) in the HIV-positive stroke group (Figure 2). But the proportion of people with high blood pressure did not differ significantly between the HIV group and the HIV-negative group. “Good” high-density lipoprotein (HDL) cholesterol was significantly lower in stroke patients with HIV. But overall abnormal cholesterol or triglyceride rates did not differ significantly between people with and without HIV.

Other factors that did not differ significantly between the HIV group and the HIV-negative group included proportions with diabetes or a previous stroke.

Average National Institutes of Health Stroke Scale score was significantly lower in people with than without HIV (5.19 versus 9.54). This difference indicates that strokes were less severe in the younger HIV group. Significantly more strokes in HIV-positive people were ischemic strokes (defined in Figure 1): 95% versus 82%.

What the results mean for you. This study from a single hospital1 adds to earlier evidence3,4 that people with HIV appear to run a higher risk of stroke than people without HIV. In this study HIV-positive people admitted to the hospital with acute stroke were an average 15 years younger than HIV-negative people with acute stroke.

This study and the earlier stroke studies did not determine why HIV-positive people appear to have a higher stroke risk than the general population. The researchers who ran this study suggested three reasons: (1) faster development of artery hardening in people with HIV, (2) greater tendency toward development of blood clots in HIV-positive people, and (3) ongoing inflammation...
caused by HIV infection. These same factors may con-tribute to the higher rate of heart disease in HIV-positive people than in the general population.

The Centers for Disease Control and Prevention (CDC) lists several factors that raise the risk of stroke in people with and without HIV (see “Stroke risk factors”).

People with HIV infection can lower their risk of stroke and other blood vessel disease, including heart attacks, by understanding these risk factors and following CDC advice to minimize these risks: (1) Eat a healthy diet, (2) maintain a healthy weight, (3) be active, (4) don’t smoke, and (5) limit alcohol use.

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**Stroke risk factors**

**Conditions**
- Older age
- High blood pressure
- High blood cholesterol
- Common heart problems, including atrial fibrillation (fast, unsteady heart beat)
- Diabetes
- Overweight and obesity
- Previous stroke or mini-stroke (transient ischemic attack)
- Sickle-cell disease

**Behavior**
- Smoking
- Too much alcohol
- Physical inactivity

**Heredity**
- Close family member who had a stroke
- Male gender
- Blacks, American Indian/Alaska Natives, Hispanics (compared with whites or Asians)

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**References**

Fractures related to osteoporosis (severe loss of bone mineral density) occurred in gay and bisexual HIV-positive men at a younger age than in a comparison group of HIV-negative gays and bisexuals.\(^1\) Fracture risk rose faster with age in HIV-positive men than in HIV-negative men in this US study.

Studies comparing large groups of HIV-positive people show that those with HIV have higher rates of fractures (broken bones) than do people in the general population.\(^2\) Researchers are still working to pin down all the reasons for this higher fracture rate. For example, another study presented at the International AIDS Conference found that several traditional fracture risk factors and two HIV-specific factors make fractures more likely (see the next article in this issue of HIV Treatment Alerts!\(^3\)).

HIV-positive men and women run a higher than normal risk of osteoporosis—a severe loss of bone mineral density that can be identified by a DEXA scan. People with osteoporosis have a high risk of fragility fractures, which are fractures that occur from slight trauma (for example, not in a car accident) and generally result from low bone density. This new study aimed to determine whether osteoporosis-related fractures of the hip, upper arm, forearm, or spine occur more often in HIV-positive men than in HIV-negative men in the Multicenter AIDS Cohort Study (MACS).

The MACS is an ongoing US study of HIV-positive gays and HIV-negative gays who are at risk for HIV infection. All men participating in MACS have regular check-ups, and HIV-negative men get tested regularly for HIV infection. As a result, MACS researchers can compare changes in health—like fracture rates—over time in HIV-positive men and similar HIV-negative men.

**How the study worked.** MACS researchers checked their records from 1996 through 2011 to see how many new fractures were reported or recalled during twice-yearly visits among men at least 30 years old. They focused on osteoporosis-related fractures—those involving the hip, upper arm, forearm, or spine.

The investigators compared fracture rates in men with and without HIV according to age at the time of the fracture. They used a standard statistical method to account for the impact of low body mass index and race on fracture risk. (Low body mass index and white race raise the risk of fracture.)

**What the study found.** The study involved 5106 men who made 73,548 visits over the study period. Average age was somewhat younger in men with HIV than in men without HIV; 45.2 versus 47.5. (Fracture risk increases with age.) The HIV group also had a moderately lower body mass index than the HIV-negative group: 25.0 versus 26.5 kg/m\(^2\). (Lower body mass index raises the fracture risk.) Proportions of current smokers, former smokers, and never smokers were similar in the HIV-positive and negative groups. (Smoking makes fractures more likely.)

Fracture incidence (the new fracture rate) rose with age in men with and without HIV. Among the 5106 men studied, there were 103 osteoporosis-related fractures—53 in men with HIV and 50 in men without HIV.

The overall fracture incidence (which did not take into account fracture risk factors) was 0.15 fractures per 100 person-years in men with HIV and 0.13 fractures per 100 person-years in men without HIV. In the HIV-positive and negative groups combined, fracture incidence rose from 0.12 per 100 person-years in 30- to 49-year-olds to 0.15 in 50- to 64-year-olds and to 0.36 in men 65 years old and older.

Statistical analysis that accounted for two key fracture risk factors (body mass index and race) revealed a striking age-related difference in fracture incidence in men with versus without HIV (Figure 1). Compared with men 30 to 49 years old, HIV-positive men had much higher fracture incidence than HIV-negative men in the 50-to-64 age group and in the 65-and-older group. These results indicated that HIV-positive men were having osteoporosis-related fractures at a younger age than HIV-negative men.

**What the results mean for you.** This large study of US gay and bisexual men from 1996 through 2011 found that HIV-positive men had a higher risk of osteoporosis-related fractures at a younger age than HIV-negative men in the same study group. The finding is
important because the HIV-negative men in this MACS study group have lifestyle habits and fracture risk factors similar to HIV-positive men. Thus these findings suggest that HIV itself and factors related to HIV infection (for example, low CD4 counts or treatment with antiretrovirals) could contribute to the higher fracture risk in gay men with HIV. This study did not try to identify specific fracture risk factors, but that will be a focus of further analyses.

Experts on bone disease in people with HIV believe HIV infection itself should be considered a risk factor for bone disease. They recommend bone mineral density screening for three groups of HIV-positive people: (1) anyone with a fragility fracture (like the fractures in this MACS study), (2) all HIV-positive postmenopausal women, and (3) all HIV-positive men over 49 years old.

The MACS researchers agreed that their findings “provide support for recommendations for osteoporosis screening in HIV-infected men between the ages of 50 and 70.”

Because everyone in this study was a gay or bisexual man, the findings may not apply to heterosexual men or to women with HIV.

The US National Library of Medicine has an easy-to-understand guide to osteoporosis online at the link following reference 6. Among the risk factors for osteoporosis are older age, white race, osteoporosis in a close family member, low weight, smoking, heavy alcohol drinking, vitamin D deficiency, too little calcium in diet, rheumatoid arthritis, thyroid problems, absence of menstrual periods, frequent use of corticosteroid medications (like prednisone), frequent use of some antiseizure drugs, and hormone treatment for prostate cancer or breast cancer. For a useful fact sheet on preventing osteoporosis, go to http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0004996/.

References


**Figure 1.** Compared with US gay and bisexual men from 30 to 49 years old, risk of new osteoporosis-related fractures was higher in HIV-positive men than in HIV-negative men from 50 to 64 years old or 65 and older.
Taking a protease inhibitor or a proton pump inhibitor (a drug that controls stomach acid) was linked to a higher risk of hip, spine, or upper arm fractures in a large study of HIV-positive US male veterans. Men who had a stroke or cerebrovascular disease also had a higher fracture risk in this study of 40,115 HIV-positive veterans. (Cerebrovascular disease is disease of the blood vessels supplying the brain.) It is important to note that these findings do not necessarily mean that protease inhibitors cause fractures. For example, protease inhibitor treatment may simply indicate longer HIV infection, and longer HIV infection may explain the fractures.

Previous research in the United States found that HIV-positive people had higher fracture rates than people without HIV, including a study of 119,318 members of the US Veterans Aging Cohort Study (VACS). In that earlier VACS study, lower weight among HIV-positive veterans compared with HIV-negative veterans partly explained the higher fracture risk in the HIV group. (Lower weight is a recognized fracture risk factor in the general population.) The earlier study also found a link between protease inhibitor use and greater fracture risk.

VACS researchers planned this new study to further assess the impact of HIV and other, traditional risk factors on fractures of the hip, vertebrae (spine), and upper arm. These types of fractures are often “fragility fractures,” meaning they do not result from trauma, but rather may be a marker of frailty.

This study also assessed the potential impact of the VACS Index on fracture risk. The VACS Index is a score that accounts for HIV-related factors (like CD4 count and viral load) and non-HIV factors (like hemoglobin, liver and kidney status, and hepatitis C virus status; see http://www.vacohort.org/welcome/vacindexinfo.aspx). Earlier research showed that a higher VACS Index predicts death and admission to the intensive care unit; thus the index may reflect illness severity in people with HIV.

How the study worked. VACS researchers focused on 40,115 HIV-positive male veterans who entered the VACS study group from 1997 through 2009. Using hospital records, the researchers determined which veterans had a fracture of the hip, vertebrae (spine), or upper arm during the study period and which veterans did not. The VACS team used standard statistical methods to determine which individual factors raised the risk of fractures, regardless of what other risk factors a person had. The risk factors considered included the VACS Index (explained above), age, race or ethnicity, body mass index, past or current smoking, medical and psychiatric conditions, corticosteroid use, proton pump inhibitor use, Viread (tenofovir) use, and protease inhibitor use.

What the study found. The 40,115 HIV-positive men studied averaged 46 years in age when they entered the VACS study group. Their median CD4 count stood at 280, their median viral load was 9932 copies, and their median body mass index was 25 mg/kg². (A body mass
index of 18.5 to 24.9 is normal, 25 to 29.9 is overweight, and 30 or more is obese.) Most cohort members (63%) were nonwhite, 75% smoked, 19% had a record of drug use or abuse, and 16% had an alcohol-related diagnosis at some point.

About one quarter of these men had a positive hepatitis C virus (HCV) test. Almost two thirds of these veterans (64%) had taken a protease inhibitor, 41% had taken Viread, 36% had taken a proton pump inhibitor, and 21% had used a corticosteroid (like prednisone). All of these drugs have been linked to lower bone mineral density in previous studies.

During an average follow-up of 6 years, there were 588 fractures of the hip, vertebrae, or upper arm in these 40,115 HIV-positive men (267 upper arm fractures, 210 hip fractures, and 111 vertebrae fractures). Fracture incidence (the new diagnosis rate) was 2.5 per 1000 person-years, meaning there were 2.5 fractures per year in every 1000 men. Median age at the time of the fracture was 53 years.

Statistical analysis that weighed the impact of numerous fracture risk factors identified 7 that were independently associated with higher fracture risk regardless of whatever other risk factors a person had—white race, cerebrovascular disease or stroke, alcohol-related diagnoses, current proton pump inhibitor use, current protease inhibitor use, higher VACS Index score, and lower body mass index when entering the study group (Figure 1).

In this same analysis, factors that had less impact on fracture risk included any corticosteroid use, Viread (tenofovir) use, past or current smoking, and drug use or abuse. (Viread is also part of three combination drugs: Truvada, Atripla, and Complera.)

Figure 1. Seven factors independently affected the risk of a broken hip, upper arm, or spine bone in a study of 40,115 US male veterans with HIV infection. A higher body mass index (BMI) when entering the study group lowered the fracture risk 12%. CVD, cerebrovascular disease; Alcohol Dx, alcohol-related diagnosis; Current PPI, current proton pump inhibitor use; Current PI, current protease inhibitor use.

What the results mean for you. This large and long study of male veterans pinpointed several factors that independently raised the risk of breaking the hip bone, upper arm bone, or spine bones. Some of these factors—like low weight (measured as body mass index), alcohol use, and white race—have long been known as fracture risk factors.

In addition, this study showed for the first time that a higher VACS Index score, possibly indicating more severe overall disease, raised the fracture risk. Cerebrovascular disease or stroke also made breaking a bone more likely. The VA researchers suggested that cerebrovascular disease or stroke may increase fracture risk because of the falls related to these conditions.

The VA study also found a higher risk of fractures in people currently taking a protease inhibitor. It is not clear whether the protease inhibitor was directly related to this increased risk, or if protease inhibitor use is a marker of something else, such as length of HIV infection. You should not stop taking a protease inhibitor—or any medication—unless your provider tells you to.

Many people with HIV use proton pump inhibitors to control stomach acid: More than one third of this study group used a proton pump inhibitor. Examples of proton pump inhibitors are Prilosec, Prevacid, Acrifex, Protonix, and Nexium. You should be careful to use these medications for only very limited periods, as directed by your provider. Other medications, such as calcium-based antacids, do not have this same impact on fracture risk in the general population. HIV-positive people should discuss antacid use with their providers because these drugs can interact with many antiretroviral combinations.
Smoking is a well-established risk factor for bone disease. The VA researchers suggested that the type of analysis they performed (which figured the impact of body mass index, alcohol use, and disease severity) may explain the weak association between smoking and fracture in their study. Because smoking causes many other diseases in people with and without HIV, smokers should get help quitting.

This study involved only men with HIV infection, so the results do not necessarily apply to HIV-positive women. Some women, especially women who have passed the menopause, have a high risk of low bone density and fractures.

Another study presented at the International AIDS Conference (described in the preceding report in this issue of HIV Treatment Alerts!) found a higher risk of fragility fractures in HIV-positive gay men than in HIV-negative gay men.

References


People With HIV Have Higher Hospital Return Rate Than General Population

Almost 1 in 5 HIV-positive people studied in 8 US cities had to return to the hospital within 30 days of an initial hospital stay, according to results of a 19,943-person study. That rate is 58% higher than the hospital-return rate in the general adult US population during the same period.

HIV Research Network investigators presenting the new findings noted that readmission to a hospital within 30 days of discharge is becoming a standard to measure quality of care in hospitals. A high readmission rate could indicate that people admitted to the hospital are not getting the best care possible, are leaving the hospital too soon, or are not receiving or following good advice about how to care for themselves after they leave the hospital.

Social and economic factors may also influence hospital readmission rates. For example, a US study of people admitted to the hospital in 15 states found that, among women admitted to the hospital during pregnancy or childbirth, readmission rates were about 50% higher for women without insurance and women who relied on Medicaid than for privately insured women.

Because little is known about readmission rates among HIV-positive people, HIV Research Network investigators conducted this study.

How the study worked. The HIV Research Network is an ongoing study of HIV-positive people seen at 12 clinics across the United States. The hospital readmission study involved 19,943 HIV-positive people cared for at some point between 2005 and 2010 at one of 9 centers—4 in the Northeast, 2 in the South, 2 in the West, and 1 in the Midwest.

The researchers considered all initial hospital admissions, meaning admissions that were not themselves readmissions within 30 days. The HIV Research Network team then counted which initial admissions were followed by a readmission (for any cause) within 30 days. The researchers identified causes of the initial admissions, and they used standard statistical methods to identify factors that affected chances of readmission.

What the study found. Among 12,048 initial hospital admissions, 2319 (19%) were followed by a readmission within 30 days. In a study of almost 7 million US adults admitted to the hospital in 2008, the readmission rate within 30 days was 12%. Thus the 30-day hospital readmission rate in the HIV group was 58% higher than in the general-population US group.

In the HIV study, 17% of initial admissions that were not followed by a 30-day readmission occurred to people with a CD4 count of 50 or lower, and 24% occurred to people with a CD4 count between 51 and 200. In contrast, 25% of initial admissions followed by readmissions occurred to people with a CD4 count of 50 or lower, and 27% occurred to people with a count of 51 to 200.

HIV-positive people initially admitted to the hospital with cancer had the highest readmission rate (28%), followed by people initially admitted with an AIDS-defining infection (26%). Other frequent illnesses resulting in readmission—all at rates above 20%—were kidney or genitourinary conditions, gut or liver disease, and endocrine or metabolic disease.

Statistical analysis to identify predictors of hospital readmission considered the impact of age, gender, race, US geographic region, calendar year, injection drug use, CD4 count, viral load, length of initial hospital stay, whether an outpatient follow-up visit happened, and primary insurance. In this analysis older age independently raised the risk of hospital admission: Compared with 18-to-34-year-olds, 35-to-44-year-olds had a 19% higher readmission risk, 45-to-54-year-olds had a 17% higher readmission risk, and 55-to-64-year-olds had a 23% higher risk. This same statistical analysis figured that a lower CD4 count at the initial hospital admission and a longer initial hospital stay also independently raised the risk of hospital admission (Figure 1).

In two additional statistical analyses, an initial admission with cancer, an AIDS-defining infection, gut/liver disease, kidney/genitourinary disease, or endocrine/metabolic disease independently raised chances of readmission within 30 days. Heart disease raised the readmission risk in one statistical model but not in the other.
**What the results mean for you.** This large US study found that almost 1 in 5 HIV-positive people admitted to the hospital had to go back to the hospital within 30 days of their initial hospital discharge. This readmission rate was much higher than in a similar study of adults in the general US population. Factors that raised the risk of readmission were older age, a lower CD4 count at the initial admission, and a longer initial hospital stay.

Sometimes readmission to the hospital after a first hospital stay can’t be avoided. Everyone who goes to the hospital has a serious medical condition that can’t be treated at home. So it’s not surprising that some hospital patients don’t recover fully from their illness after they get out of the hospital, and they have to go back for further care.

On the other hand, some hospital readmissions can be prevented. The researchers who conducted this study suggested that HIV providers and hospital officials may be able to lower the readmission rate with better hospital discharge planning. People with HIV may be able to avoid going back to the hospital by (1) carefully following their HIV provider’s advice after getting out of the hospital, (2) calling their provider’s office promptly if problems arise, and (3) keeping all office appointments after hospital discharge.

**References**


HIV-positive people with diabetes were more likely than those without diabetes to perform poorly on tests that measure mental (cognitive) functions such as mental speed, attention, and memory. Results of this study in a large HIV-positive group in France underline the need to detect and control diabetes in HIV-positive people as soon as possible.

Diabetes is a lifelong disease marked by high levels of sugar in the blood (Figure 1). Diabetes cannot be cured, but it can be well controlled with drug therapy, diet, and exercise. People with HIV infection have a high risk of diabetes.

Two earlier studies found high rates of worse mental function in HIV-positive people with diabetes. To further explore possible links between diabetes and mental function in people with HIV, researchers in France conducted this study.

**How the study worked.** The Aquitaine cohort is a large group of HIV-positive people in southwestern France who have regular checkups and tests as part of an ongoing study that began in 1987. The diabetes study focused on 400 people taking part in the Aquitaine study at some point between 2007 and 2009. Of these 400 study participants, 288 had follow-up testing 2 years after their first tests. No one was being treated for an AIDS infection or for cancer.

Study participants took standard tests that rated their performance in 7 mental-function areas: (1) attention and executive function, (2) psychomotor speed, (3) manual dexterity and coordination, (4) visuospatial abilities, (5) working memory, (6) episodic memory, and (7) verbal fluency. Researchers defined diabetes as at least two blood sugar levels above 126 mg/dL (7 mmol/L), or one level above 200 mg/dL (11.1 mmol/L), or use of antidiabetes drug. They defined prediabetes as at least two blood sugar levels between 110 mg/dL (6.1 mmol/L) and 126 mg/dL.

The Aquitaine investigators used standard statistical methods to assess potential links between diabetes or prediabetes and (1) mental test scores and (2) year-to-year change in mental test scores.

**What the study found.** The 400 study participants averaged 47.3 years in age, and 320 (80%) were men. Most study participants (89%) were taking antiretroviral therapy.

**Figure 1.** Type 2 diabetes, which poses a threat to people with HIV, develops when insulin does not work properly to help the body process glucose (sugar) created from the carbohydrates a person eats. Overweight and obese people have a high risk of diabetes. (Figure and figure text from Servier Medical Art. [http://www.servier.co.uk/medical-art-gallery/](http://www.servier.co.uk/medical-art-gallery/).)
HIV, and most (85%) had a viral load below 500 copies. **Median CD4 count** in the group stood at 515. Thirty-eight people (9.5%) had diabetes, and 32 (8%) had prediabetes.

Based on the mental-function tests used, the researchers could classify study participants in one of three groups defining different degrees of mental function (see “Three mental-function groups defined by test scores”). Eighty-four people (21%) had asymptomatic neurocognitive impairment, 126 (32%) had mild neurocognitive impairment, and 27 (7%) had dementia.

Compared with people who had normal blood sugar levels, the 32 people with prediabetes had significantly worse scores on 4 of the 7 mental-function tests. Compared with people who had normal blood sugar levels, the 38 people with diabetes had significantly worse scores on 6 of the 7 mental-function tests.

Statistical analysis that considered the impact of age, gender, education, CD4 count, viral load, and other factors determined that people with diabetes had significantly worse scores on three mental-function tests—those that measured attention and executive function, visuospatial performance, and episodic memory. **Executive function** involves planning, organizing, remembering details, managing time, and other mental activities. **Visuospatial performance** involves understanding the world around you in two and three dimensions, in particular, mental imagery and navigation, and distance and depth perception. **Episodic memory** is long-term memory that involves the recollection of specific events, situations, and experiences.)

Among the 288 people who completed the mental-function tests a second time (2 years after the first time), scores on the tests did not get significantly worse or better.

**What the results mean for you.** This study of 400 HIV-positive adults in France found that people with prediabetes (moderately high blood sugar) or diabetes (high blood sugar) were more likely to have mental-function problems that standard tests could detect. The study did not explain why diabetes and prediabetes had this effect in people with HIV. The researchers pointed out that diabetes may affect blood circulation and inflammation in the brain—both of which could contribute to worse mental function.

A previous 203-person US study found a link between diabetes and dementia, the most severe kind of mental-function problem considered in the French study. In a 130-person US study, diabetes appeared to be associated with poor mental function only in older people. Age did not seem to be a factor in the 203-person US study or in the French study.

The French team believes their findings provide another reason to detect and control diabetes as soon as possible in people with HIV. US guidelines on caring for people with HIV say all HIV-positive people should have their
blood sugar tested when they enter care—before starting antiretroviral therapy.\(^6\) Then blood sugar should be measured every 6 months if it’s normal, and every 3 months if it’s not normal.

The Centers for Disease Control and Prevention (CDC) lists 7 risk factors for diabetes (see “Seven risk factors for diabetes”).\(^7\) Some of these factors—like race and having a close relative with diabetes—cannot be controlled. But most other factors can be prevented or treated. Keeping a healthy weight through sensible eating and exercise may be the most important way to prevent diabetes. People who are overweight or obese should get help to lose weight. High blood pressure, high triglycerides, and low “good” HDL cholesterol can all be prevented or treated with drugs, diet, and exercise. The CDC recommends exercising at least three times a week.

<table>
<thead>
<tr>
<th>Seven risk factors for diabetes</th>
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<tr>
<td>Being overweight or obese.</td>
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<td>Having a parent, brother, or sister with diabetes.</td>
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<tr>
<td>Being African American, American Indian, Asian American, Pacific Islander, or Hispanic American/Latino.</td>
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<td>Having had gestational diabetes (high blood sugar during pregnancy) or giving birth to at least one baby weighing more than 9 pounds.</td>
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<td>Having high blood pressure (140/90 or higher).</td>
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<td>Having “good” HDL cholesterol of 35 or lower or triglycerides of 250 or higher.</td>
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<tr>
<td>Being physically inactive—exercising fewer than three times a week.</td>
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Centers for Disease Control and Prevention.\(^7\)

References


5. UCSF Memory and Aging Center. HIV-related cognitive impairment. [http://memory.ucsf.edu/education/diseases/hiv](http://memory.ucsf.edu/education/diseases/hiv).


US injection drug users (IDUs) under 30 years old practiced risky sexual or injecting behaviors more often than older IDUs, according to results of a 10,000-person study by the Centers for Disease Control and Prevention (CDC). Younger IDUs were more often homeless or had an arrest record than older IDUs, and younger IDUs were more likely to be white or Hispanic, while older IDUs were more likely to be black.

Sharing drug-injecting equipment puts IDUs at high risk of HIV infection, hepatitis virus infection, and other infections carried in blood. In recent years IDUs have accounted for a falling proportion of HIV infections in the United States (Figure 1). But some evidence suggests younger IDUs may have behaviors that put them at higher risk of HIV infection than older IDUs. If that’s true, HIV rates among US IDUs could start climbing again.

To get an up-to-date look at HIV rates, risk behaviors, and racial and ethnic differences in younger versus older IDUs, CDC researchers conducted this study.

**How the study worked.** In 2009 researchers surveyed IDUs in 20 big-city areas across the United States. The survey covered basic characteristics (like age and race), sexual behavior, drug and alcohol use, injection practices, HIV testing, and use of prevention services. The researchers also offered HIV testing to all study participants. All surveyed IDUs were at least 18 years old and had injected drugs in the past 12 months.

The CDC team compared survey answers and HIV rates in younger IDUs (18 to 30 years old) and older IDUs (30 and older). The researchers used standard statistical methods to identify traits and behaviors associated with younger versus older age.

**What the study found.** The study included 10,073 IDUs, 1181 (12%) in the 18-to-30 group and 8892 (88%) in the over-30 group. Among IDUs who got tested for HIV, 4% of younger IDUs and 10% of older IDUs tested positive.

Almost one third of younger IDUs (32%) were women, compared 27% of older IDUs. Blacks accounted for only 10.5% of younger IDUs versus 51% of older IDUs. Whites made up 57% of the younger group and 24% of the older group. Hispanics made up 28% of the younger group and 21% of the older group.

Education levels were similar in the younger and older groups, and the younger IDUs had a lower proportion below the US poverty level (74% versus 81%). But the younger group had a higher proportion who had ever been homeless (72% versus 60%) and a higher proportion who had been arrested in the past 12 months (53% versus 34%).

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**Figure 1.** Injection drug use accounted for a low and falling proportion of new HIV infections in the United States from 2007 through 2010. But a new study found that younger IDUs are adopting sexual and drug-use behaviors that raise their risk of HIV infection.
Younger IDUs were more likely to participate in testing, treatment, and prevention programs than were older IDUs, including HIV testing (52% versus 48%), alcohol or drug treatment programs (46% versus 32%), receiving free condoms (53% versus 51%), receiving free clean needles from exchange programs (49% versus 45%), and buying clean needles from drug stores (59% versus 38%).

On the other hand, several drug use behaviors and sexual behaviors were more frequent among younger IDUs than older IDUs:

**Drug-use behaviors (younger versus older IDUs):**

- Injected daily: 79% versus 74.5%
- Shared others’ syringes to inject: 51% versus 33.5%
- Shared others’ syringes to divide drugs: 42% versus 34%
- Shared others’ cooker, filter, or water: 70.5% versus 57%
- Binge drinking: 62% versus 53.5%
- Noninjected methamphetamine use: 6% versus 4%

**Sexual behaviors (younger versus older IDUs):**

- First sex at 17 years or younger: 91.5% versus 83%
- Vaginal or anal sex without condom: 86.5% versus 69%
- Multiple sex partners: 64% versus 49%
- Traded sex partners: 27% versus 25%
- Last sex partner injected drugs: 56% versus 46%

Statistical analysis identified several factors linked to younger age in this IDU study group: (1) being a woman, (2) being white or Hispanic rather than black, (3) being homeless for less than a year or more than a year (versus never), (4) being arrested in the past 12 months, (5) binge drinking in the past 30 days, (6) first sex at age 17 or younger, (7) vaginal or anal sex without a condom in the past 12 months, (8) sharing others’ syringes to inject in the past 12 months, (9) buying clean needles from pharmacies in past 12 months, and (10) being in an alcohol or drug treatment program in the past 12 months.

*What the results mean for you.* This study shows that traits and behaviors of IDUs 30 or younger in big cities across the United States differ in possibly important ways from traits and behaviors of older IDUs. Sharing injection equipment and other drug-related behaviors puts IDUs at high risk of HIV infection. The differences found in this study could determine whether the younger generation of IDUs will get HIV more often than older IDUs.

Among IDUs in this study who got tested for HIV, 4% of those 30 or younger had HIV, compared with 10% of those over 30. That difference can partly reflect the longer time older IDUs had been injecting drugs and so exposing themselves to HIV. At the same time, younger IDUs adopted certain practices that would lower their risk of HIV infection, such as joining alcohol or drug treatment programs, taking advantage of free condom and clean needle programs, and buying clean needles from drug stores.
However, younger IDUs in this study were also more likely to adopt several drug-use and sexual behaviors that would increase their risk of HIV infection compared with older IDUs. These behaviors include sex at an earlier age, sex without condoms, and binge drinking. The younger IDUs were also more likely to spend part of their life homeless and to spend time in prison—both of which can raise a person’s risk of HIV infection.

Results of a study like this can’t predict whether younger IDUs will eventually get infected with HIV at a higher lifetime rate than IDUs who are now older. But the study findings underline the many drug-related and sex-related risks faced by people who inject drugs.

If you inject drugs, you should get help to stop. Drug-substitution programs—like methadone maintenance and buprenorphine therapy—have helped many IDUs stop. For IDUs who cannot or will not stop injecting, the CDC Website offers this advice on steps that lower the risk of HIV infection:

- Never reuse or share syringes, water, or drug preparation equipment.
- Only use syringes obtained from a reliable source (such as drug stores or needle-exchange programs).
- Use a new, sterile syringe each time to prepare and inject drugs.
- If possible, use sterile water to prepare drugs; otherwise, use clean water from a reliable source (such as fresh tap water).
- Use a new or disinfected container ("cooker") and a new filter ("cotton") to prepare drugs.
- Clean the injection site with a new alcohol swab before injection.
- Safely dispose of syringes after one use.
- IDUs and their sex partners should use condoms consistently.

For more information on HIV prevention for IDUs, go to the CDC HIV prevention page at http://www.cdc.gov/hiv/resources/qa/prevention.htm.

References


Photo from CDC Public Health Image Library (PHIL), by Debora Cartagena
Risk of liver cancer through age 60 rose significantly from 1996 to 2008 in a large US/Canadian HIV group. In contrast, through age 60 risk of two AIDS cancers—Kaposi sarcoma and non-Hodgkin lymphoma—fell significantly over the study period. Risk of 6 other non-AIDS cancers did not change much in the study period. For most cancers analyzed, risk through age 60 varied considerably by gender and race, and by how a person became infected with HIV.

Three cancers are considered AIDS cancers—Kaposi sarcoma, non-Hodgkin lymphoma, and cervical cancer in women. (These cancers are called AIDS cancers because the Centers for Disease Control and Prevention decided that getting one of these cancers means an HIV-positive person has AIDS.) But several studies have found higher risks of certain non-AIDS cancers in people with HIV than in those without HIV, especially cancers caused by viruses. And now that strong antiretroviral combinations are protecting many people from AIDS diseases, they are living longer and running a higher risk of the many cancers that become more frequent with age.

Researchers who study large HIV groups in the United States and Canada often combine findings from their studies to help answer questions about HIV infection and related diseases. This joint group of researchers, called NA-ACCORD, decided to look at trends in new diagnoses of 2 AIDS cancers and 7 common non-AIDS cancers up to age 60 from 1996 through 2008. They also wanted to see how these trends might differ in men versus women, in whites versus blacks and other racial groups, and in three HIV transmission groups—gay or bisexual men, injection drug users (IDUs), and heterosexuals.

How the study worked. Researchers from 12 US HIV study groups and 2 Canadian groups combined their data to analyze trends in 2 AIDS cancers (Kaposi sarcoma and non-Hodgkin lymphoma) and 7 common non-AIDS cancers (anal cancer, lung cancer, Hodgkin lymphoma, liver cancer, malignant melanoma, cancer of the colon and rectum, and cancer of the mouth and throat).

The research team estimated the total incidence (new-diagnosis rate) of each specific cancer overall and during three periods: 1996-1999, 2000-2003, and 2004-2008. They also determined incidence of each cancer by gender, race, and HIV risk (gay sex, heterosexual sex, or injection drug use). Using these results, they calculated the risk of each cancer through age 60.

Then the researchers used standard statistical methods to see if changes in cancer risk over time and risk differences between the groups studied were statistically significant. Statistical significance indicates that some difference of change (like a cancer trend) cannot be explained by chance.

What the study found. The study involved 46,275 HIV-positive adults from 12 US groups and 2 Canadian groups. Age averaged 39 years, 76% were men, 42% white, and 36% black. Almost half of the study group, 49%, got infected during sex between men, 30% got infected during sex between men and women, and 18% got infected while injecting drugs.

Combination antiretroviral therapy first saw wide use in 1996, the first year in this analysis. Over the three study periods (1996-1999, 2000-2003, 2004-2008), the risk of Kaposi sarcoma and non-Hodgkin lymphoma (two AIDS cancers) through age 60 fell significantly (Figure 1). Over the same three periods, risk of liver cancer (a non-AIDS cancer) through age 60 rose significantly (Figure 1). However, the overall risk of Kaposi sarcoma and non-Hodgkin lymphoma remained much higher than the risk of any other cancer studied, including liver cancer (Figure 2).

Risks of Kaposi sarcoma, non-Hodgkin lymphoma, and liver cancer through age 60 were significantly higher in men than in women. Risks of Kaposi sarcoma and non-Hodgkin lymphoma were significantly higher in whites than blacks, but liver cancer risk did not differ by race. In the same way, risks of Kaposi sarcoma and non-Hodgkin lymphoma were significantly higher in gay and bisexual men than in the other two HIV transmission groups, but liver cancer risk did not differ by HIV transmission group.

The US-Canadian researchers tracked trends in 6 other non-AIDS cancers: anal cancer, lung cancer, Hodgkin lymphoma, malignant melanoma (a skin cancer), cancer of the colon and rectum, and cancer of the mouth and throat. Increasing use of stronger antiretroviral
combinations during the 12-year study period had no effect of risk of these cancers through age 60: Risks did not fall or rise much for any of these cancers. But cancer risk through age 60 did differ by gender, race, and HIV transmission group for some of these cancers:

**Non-AIDS cancer risk by gender through age 60:**

- Anal cancer: higher risk in men than women (2.7% versus 0.6%)
- Hodgkin lymphoma: higher risk in men than women (2.2% versus 0.4%)
- Malignant melanoma: higher risk in men than women (0.7% versus 0.1%)

**Non-AIDS cancer risk by race through age 60:**

- Anal cancer: higher risk in whites than blacks or others (2.9% versus 1.5% versus 1.6%)
- Lung cancer: higher risk in whites and blacks than others (2.3% versus 2.4% versus 1.7%)
- Malignant melanoma: higher risk in whites than blacks (1.0% versus 0.0%)

**Non-AIDS cancer risk by HIV transmission group through age 60:**

- Anal cancer: higher risk in gays than IDUs or heterosexuals (3.4% versus 0.7% versus 1.1%)

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**Figure 1.** Risk of two AIDS cancers—Kaposi sarcoma (KS) and non-Hodgkin lymphoma (NHL)—fell steeply in HIV-positive people through age 60 from 1996-1999 to 2004-2008. In contrast, risk of a non-AIDS cancer, liver cancer, rose significantly over those years in the same study groups. But overall risk of Kaposi sarcoma and non-Hodgkin lymphoma remained far higher than risk of any non-AIDS cancer (see **Figure 2**).

**Figure 2.** From 1996-1999 through 2004-2008, overall risk of two AIDS cancers—Kaposi sarcoma (KS) and non-Hodgkin lymphoma (NHL)—remained higher in HIV-positive people through age 60 than did risk of 7 non-AIDS cancers. Hodgkin, Hodgkin lymphoma.
HIV-positive people can take steps to protect themselves from some cancers. Most importantly, quitting smoking—or never starting—will greatly lower the risk of lung cancer and mouth cancer. Malignant melanoma can be avoided by protecting yourself from too much sun or tanning salon exposure. Liver cancer risk can be limited by not drinking too much alcohol and by avoiding infection with hepatitis viruses transmitted sexually or by needle sharing.

Your HIV provider can tell you which cancers can be avoided or detected early by regular testing. Because colonoscopy can spot signals of colon cancer early, regular colonoscopy for men and women is recommended from age 50, or earlier for people with a higher risk of colon cancer.² Because of the high risk of anal cancer in gay and bisexual men, US guidelines for HIV care suggest providers should consider an anal Pap test for HIV-positive gay men every 6 months, and then every year if the first two tests are normal.³

The National Cancer Institute Website (www.cancer.gov) has detailed information on preventing and getting tested for most cancers.

References


From 2001 through 2011, a steadily rising proportion of HIV-positive people seen at a San Francisco public hospital HIV clinic had a viral load below 500 copies, according to results of a 2245-person study. In the early years of the decade, viral loads fell faster in the group who began care with a low CD4 count, and more slowly in the group who began care with a high CD4 count. That imbalance reflects the former tendency to hold off treating people with higher CD4 counts, so more of them had a high viral load. But by 2011 most viral loads were below 500 copies regardless of starting CD4 count.

How HIV providers use combination antiretroviral therapy has changed steadily since three-drug combinations became standard in the mid-1990s. Early antiretroviral treatment guidelines advised starting therapy only in people with lower CD4 counts because of concerns about antiretroviral side effects and about scarce alternative antiretrovirals that could control HIV if one or two combinations failed.

But by the later 2000s and early 2010s, there were more antiretrovirals available, and they often had fewer side effects than the first antiretrovirals. Also, newer antiretrovirals were often easier to take because they could be taken once a day and because two or three antiretrovirals were sometimes combined in a single pill. As a result of all these changes, people with HIV were able to take their antiretrovirals consistently, with less temptation to skip doses. Missed doses raise the risk that an antiretroviral combination will fail.

Researchers at San Francisco General Hospital conducted this study to learn what proportion of people seen in the HIV clinic reached a viral load below 500 copies each year from 2001 through 2011. They used a viral load of 500 copies as the cutoff for their analysis because 500 was the lowest level a viral load test could detect in the early years of the study, and the researchers wanted to use the same cutoff throughout the study. Today the goal of treatment is a viral load below 50 copies.

How the study worked. San Francisco General Hospital is a public hospital that accepts any patient who needs care. As a result, the patient population includes a relatively high proportion of poor, uninsured people, people with psychiatric (mood and mental) problems, people who abuse alcohol or drugs, and people with a high burden of life problems. Since the first years of the AIDS epidemic, San Francisco General has had one of the largest HIV clinics in the United States.

Researchers at this hospital conducted this study to chart trends in viral load levels for the whole clinic from January 1, 2001 through December 30, 2011. They considered patients who came to the clinic before they started taking antiretrovirals or who had not
taken antiretrovirals for more than 90 days when they entered the clinic.

The San Francisco General team used the HIV clinic’s electronic records to collect data they wanted to analyze, including patient characteristics (like age and race) and health-related findings (like CD4 count and viral load). They focused particularly on viral loads grouped according to CD4 counts of patients when they entered the clinic. They divided CD4 counts when people entered the clinic into four groups: under 201, 201 to 350, 351 to 500, and over 500.

**What the study found.** The study involved 2245 adults, 1955 of them (87%) men. Median age stood at 39 years. A little more than half of the study group (54%) was white, 26% were black, 14% were Asian, and 16% were Hispanic. About 1 in 5 patients had a history of injecting drugs.

Median CD4 count when people entered care at the HIV clinic stood at 310. While 33% of the study group had an initial CD4 count below 200, 24% had a count of 201 to 350, 20% had a count of 351 to 500, and 24% had a count above 500. Median viral load when people entered the clinic stood at 33,230 copies. During 2001, the first year of this analysis, fewer than 20% of people had a viral load below 500 copies. The proportion with a viral load below 500 copies rose steadily in every study year, reaching almost 40% in 2006 and exceeding 60% in 2011. By 2011 only about 10% of people in the HIV clinic had a viral load above 50,000 copies. (Click on link following Reference 1 below for study charts.)

The proportion of people with a viral load below 500 copies rose steadily from 2001 through 2011 in people who entered the clinic with a CD4 count below 350, which was the CD4 level at which many guidelines recommended starting antiretroviral therapy throughout most of those years.

In contrast, lower proportions of people with an initial CD4 count above 350 had a viral load under 500 copies through 2005. Among people with an initial CD4 count above 500, fewer than 20% had a viral load under 500 copies through 2006. But that proportion jumped to more than 50% by 2011. Those findings reflect the tendency to delay antiretroviral therapy in people with a high CD4 count through the first half of the 2000s, then a gradual shift to starting therapy for people with higher CD4 counts.

Among people who entered the clinic with an initial CD4 count below 350, median viral load was below 1000 copies by 2006. In comparison, median viral load in people with an initial CD4 count above 350 was about 10,000 copies in 2006. Figure 1 shows that median viral loads fell more rapidly across the years in people who entered the clinic with a CD4 count below 350 than in those who came into the clinic with a CD4 count above 350. But by 2011, median viral load was below 500 copies in all four CD4 brackets.

**What the results mean for you.** This large study from a public hospital in San Francisco found that the proportion of HIV-positive people with an undetectable viral load rose sharply from 2001 through 2011. By 2011 median viral load among people in the HIV clinic was below 500 copies, regardless of what CD4 count they had when they entered the clinic.
These findings are impressive because San Francisco General Hospital is a public hospital that accepts all patients, including those with no insurance, those with mental health problems, those with substance abuse problems, and those with other health and living problems that may make medical care more difficult.

The results partly reflect improvements in antiretroviral combinations over the years. Individual antiretrovirals have become stronger and yet have fewer side effects and can often be taken once daily. Many of the newest antiretrovirals can control HIV that has become resistant to older antiretrovirals taken in the late 1990s and early 2000s. Drug makers have combined 2 or 3 antiretrovirals in a single pill to make taking them easier. All of these improvements are making it simpler for HIV-positive people to take their antiretrovirals regularly, which is necessary to control HIV and to prevent development of hard-to-treat resistant virus.

The rising proportion of people with an undetectable viral load in this San Francisco group indicates that (1) more people were starting antiretroviral therapy throughout the decade, regardless of their CD4 count and (2) more people were taking their antiretrovirals every day to achieve and maintain an undetectable viral load.

The results also suggest that in the most recent years people with CD4 counts above 350 and even above 500 were starting antiretroviral therapy and reaching an undetectable viral load. In the United States antiretroviral treatment guidelines now recommend that everyone with a positive HIV test should start therapy, regardless of their CD4 count.2

“Antiretroviral therapy over the last decade has undergone a revolution in effectiveness,” the San Francisco researchers concluded. An undetectable viral load has become “routine for patients in HIV/AIDS care, even in an urban clinic setting where psychiatric and substance abuse comorbidities are common.”

References


Adherence means taking medications, such as antiretrovirals, according to the schedule set by your healthcare provider.

Antibodies are proteins that immune system cells produce to identify and control bacteria and viruses.

Antiretrovirals are drugs used to treat HIV infection.

Atrial fibrillation is an abnormally rapid and irregular heartbeat.

CD4 cells are one type of cell necessary to fight infection. HIV attacks CD4 cells, so CD4 counts fall when a person is not taking antiretrovirals to control HIV or when treatment fails.

CD4 count measures the number of CD4 cells in a cubic millimeter of blood. People with CD4 counts below 500 have a harder time controlling infections. The risk of uncontrolled infection gets higher as the CD4 count gets lower.

Diabetes is a lifelong disease in which there are high levels of sugar in the blood. Diabetes can be caused by too little insulin, resistance to insulin, or both.

The immune system is the network of structures and processes that humans use to protect themselves against disease.

Incidence is the rate at which an event (like infection with a virus) occurs over a defined period of time.

A median is the number above which half of all the numbers recorded lie, and below which half of all the numbers recorded lie. The median number differs from the average (or mean) number. For example, in the series 1, 3, 8, 9, and 14, the median is 8 because half of the other numbers lie above it and the remaining half lie below. But the average of 1, 3, 8, 9, and 14 is 7.

Osteoporosis is “a condition characterized by progressive loss of bone density, thinning of bone tissue and increased vulnerability to fractures,” according to the National Institutes of Health.

One pack-year of smoking means smoking 1 pack per day for 1 year, or 365 packs.

A person-year is a measure of time used in medical studies. A single person-year is 1 year lived by 1 person. An HIV rate of 2 per 100 person-years means 2 of 100 people are infected within a year.

Prevalence is a rate measured at a single point in time, for example, at the beginning of a study.

A stroke occurs when blood stops flowing to part of the brain.

Viral load is the number of HIV particles in a milliliter of blood or another body fluid, such as semen or cerebrospinal fluid.
If you have HIV, what are the **25** most important things to know? **And do!**

The Center for AIDS Information & Advocacy (a program of Legacy Community Health Services) answers those questions in an easy-to-read booklet prepared with the help of some of the best HIV providers working today.

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