

## Heart attack rate twice higher with HIV among veterans at low risk

Among veterans without major heart disease risk factors, veterans with HIV had a twice higher risk of acute **myocardial infarction\*** (heart attack) than veterans without HIV in a 6-year study.<sup>1</sup> Among veterans who did have cardiovascular risk factors, veterans with HIV had a higher heart attack risk in every risk category analyzed.

In the early years of the HIV epidemic, before strong antiretroviral drugs became available, most HIV-positive people died of AIDS at an early age. Now that people are taking potent antiretroviral combinations, they are living to an older age and acquiring diseases common to old age, such as **cardiovascular** disease, **diabetes**, and bone disease. Finding ways to prevent and control those chronic diseases in people with HIV infection has become a research priority.

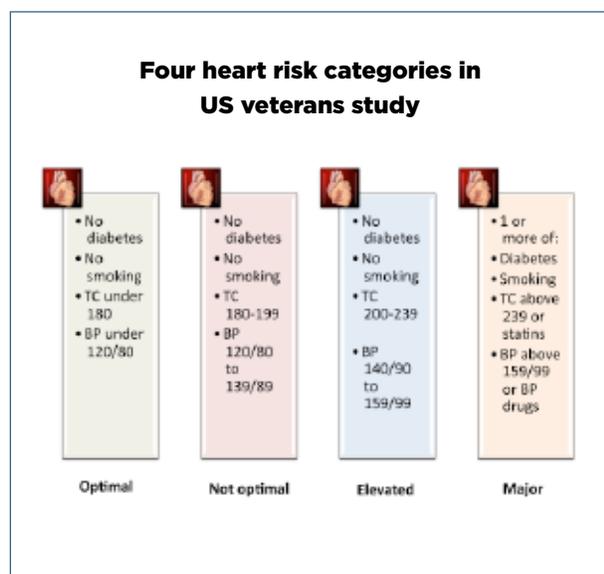
Many factors can contribute to a higher heart disease risk, starting with traditional risk factors like smoking, high cholesterol, high blood pressure, and diabetes. HIV-positive people also have cardiovascular risk factors seen only in HIV populations, such as certain **antiretroviral** drugs and HIV itself, which causes inflammation that can damage blood vessels.

Many studies of cardiovascular risk in people with HIV assess these risk factors one at a time. But research indicates that risk factors occur in clusters.<sup>2,3</sup> Investigators working with the US Veterans Aging Cohort Study Virtual Cohort (VACS-VC) decided to compare heart attack rates in HIV-positive veterans with rates in HIV-negative veterans according to clusters of cardiovascular risk factors.

Understanding how much traditional heart risk factors contribute to acute myocardial infarction in people with HIV, the researchers noted, is essential for determining how much HIV and its treatment contribute to myocardial infarction risk.

■ **How the study worked.** This analysis involved US veterans who entered the VACS-VC study during or after 2003. VACS-VC compares HIV-positive veterans with HIV-negative veterans matched by age, gender, race or ethnicity, and study site. For the heart attack analysis, the researchers did not include anyone with current cardiovascular disease or cardiovascular disease in the past. People with abnormally low blood pressure (below 90/60) were also excluded from this analysis.

Researchers determined how many veterans had a myocardial infarction (heart attack) during the study period. The study period started at a veteran's first study visit in 2003 or later and lasted until the veteran had a heart attack or died, until a veteran's last study visit, or until the end of 2009.



**Figure 1.** Using six cardiovascular risk factors, researchers created four risk factor categories to analyze cardiovascular risk in veterans with or without HIV infection. The categories are diabetes, smoking, total cholesterol (TC), statin drugs for high cholesterol, blood pressure (BP), and blood pressure drugs. (Heart image from Wikipedia Commons.)

\*Words in **bold** are defined in the Technical Word List at the end of this issue of *HIV Treatment Alerts*.

The study team created a cardiovascular risk profile that included diabetes, current smoking, total cholesterol, statin drug use for high cholesterol, blood pressure, and blood pressure drug use. With different combinations of these factors, the researchers created four heart risk factor categories: optimal, not optimal, elevated, and major (**Figure 1**). They defined these four categories in such a way that a veteran could be in only one category.

The VACS-VC investigators used medical records to determine basic personal information (like age, gender, and race or ethnicity), several health-related factors (like body mass index and kidney disease), and HIV-related factors (like **CD4 count**, **viral load**, antiretroviral use, and type of antiretrovirals used).

With standard statistical methods, the researchers determined the effect of (1) the cardiovascular risk profile and (2) HIV infection on the risk of a new heart attack. This type of analysis figures the risk associated with the risk profile or HIV infection regardless of whatever other risk factors a person might have.

■ **What the study found.** The study included 81,322 veterans, one third of them with HIV infection. Men made up more than 95% of the study group. Age averaged about 50 years. About 50% of study participants were black, nearly 40% were white, and most of the rest were Hispanic.

During a **median** follow-up period of 5.9 years, 858 veterans had a myocardial infarction (heart attack). Of the heart attacks recorded, 42% occurred in veterans with HIV, even though they made up only 33% of the study group.

Fewer than 2% of these veterans had optimal cardiac health (as defined in **Figure 1**), and only 12% of the study group had no major cardiovascular risk factors. Almost half of these veterans, 46%, had one major cardiovascular risk factor, 20% had two major cardiovascular risk factors, and 7% had three. Among veterans with only one major cardiovascular risk factor, that factor was usually smoking. Among veterans with two major factors, those factors tended to be smoking and diabetes.

And among veterans with three major factors, those factors tended to be smoking, diabetes, and taking statins for high cholesterol.

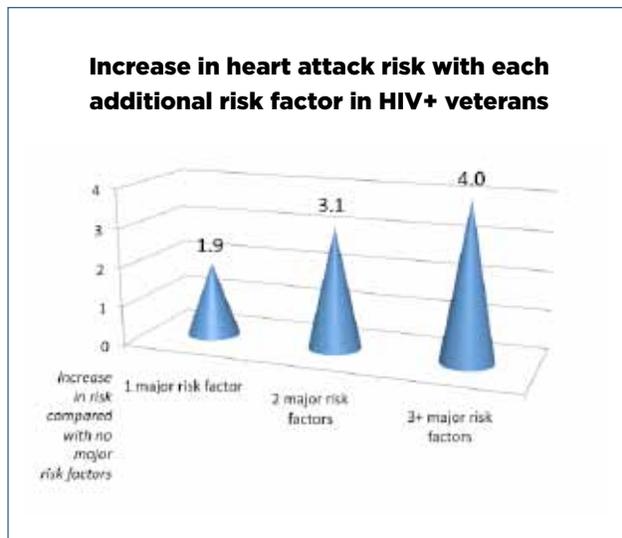
Among veterans with HIV, 2.4% had optimal cardiac health, 7.1% fell into the nonoptimal group, 5.4% had elevated cardiac risk, and the rest had one, two, or three major cardiovascular risk factors as defined in this study.

Compared with veterans who had optimal cardiovascular health, those with one of more cardiovascular risk factors were more likely (1) to be older, (2) to be black, (3) to be obese, (4) to have a low-density lipoprotein (LDL) cholesterol (“bad cholesterol”) at or above 160, (5) to have triglycerides at or above 150, (6) to have kidney disease, (7) to have a history of cocaine use, and (8) to have a history of alcohol abuse.

Veterans with optimal cardiovascular health (**Figure 1**) had a low heart attack rate during the study period, 6.0 per 10,000 person-years. That rate means 6 of every 10,000 veterans had a heart attack each year. The heart attack rate climbed with each higher number of major cardiovascular risk factors: 18.5 per 10,000 with one major cardiovascular risk factor, 34.5 per 10,000 with two, and 42.5 per 10,000 with three.

Compared with HIV-negative veterans, HIV-positive veterans who fit in the same cardiovascular risk bracket had higher heart attack rates in each of the risk brackets. That analysis factored in the impact of age, race, and ethnicity on heart attack risk. Compared with HIV-negative veterans with no major risk factors, HIV-positive veterans with no major risk factors had a twice higher heart attack risk.

Compared with HIV-positive veterans with no major cardiovascular risk factors, (1) HIV-positive veterans with one major risk factor had almost a doubled heart attack risk, (2) HIV-positive veterans with two major risk factors had a 3 times higher heart attack risk, and (3) HIV-positive veterans with three or more major risk factors had a 4 times higher risk (**Figure 2**). This statistical analysis accounted for all risk factors considered in this study, including HIV-related factors.



**Figure 2.** Each additional major cardiovascular risk factor further raised the heart attack risk in HIV-positive veterans when compared with no major risk factors. Major risk factors in this study were diabetes, smoking, total cholesterol, statin drugs for high cholesterol, high blood pressure, and blood pressure drugs.

■ **What the results mean for you.** Previous studies found higher rates of heart attacks and other cardiovascular disease in people with HIV than in comparison groups without HIV.<sup>4-6</sup> This new study in US veterans<sup>1</sup> differs from previous studies because it compared HIV-positive and negative people according to how many cardiovascular risk factors they had. HIV-positive veterans with no major cardiovascular risk factors had a twice higher heart attack risk than HIV-negative veterans without risk factors. And HIV-positive veterans in every other risk group analyzed—with one, two, or three major risk factors—had a higher heart attack risk than HIV-negative veterans with the same number of risk factors.

Another notable finding of this study is that a tiny proportion of veterans with and without HIV—under 2%—had good heart health. In this study that meant they did not smoke, have diabetes, have high cholesterol (or take drugs for high cholesterol), or have high blood pressure (or take drugs for high blood pressure). This group of veterans—and many other people in the United States—clearly have lots of room for improvement in heart health.

Stopping smoking is one decisive step smokers can take to protect their heart—and to protect themselves from several cancers and lung diseases. Among veterans with one major cardiovascular risk factor in this study, that factor was usually smoking. Another study reviewed in this issue of *HIV Treatment Alerts* found

that HIV-positive people responding well to antiretroviral therapy lose more years of life from smoking than from HIV infection (see page 3).<sup>7</sup>

If you smoke, work with your HIV provider to find the best way to quit. That may involve nicotine replacement strategies or drug therapies. The Centers for Disease Control and Prevention has plenty of online advice about quitting smoking, including tips from former smokers, other quitting pointers, and quit-smoking resources. Visit the link at reference 8 below.

The veterans study is limited in that almost all of these veterans were men. Thus it is not clear whether the results apply equally to women. However, other studies comparing HIV-positive women with HIV-negative women confirm higher heart attack risk in women with HIV.<sup>4,5</sup>

The researchers concluded that preventing heart attack risk factors or lowering their number “may result in a substantial reduction in acute myocardial infarction risk among HIV-infected people.”<sup>1</sup> Besides the risk factors considered in this study, other major heart disease risk factors are obesity, heavy alcohol drinking, physical inactivity, and diets high in saturated fats, cholesterol, or salt.<sup>9</sup> Having a father, mother, brother, or sister with heart disease is another major risk factor. People with a close relative who has or had heart disease should work especially hard to control other risk factors.

## References

1. Paisible AL, Chang CCH, So-Armah KA, et al. HIV infection, cardiovascular disease risk factor profile, and risk for acute myocardial infarction. *J Acquir Immune Defic Syndr*. 2015;68:209-216.
2. Genest J, Cohn JS. Clustering of cardiovascular risk factors: targeting high-risk individuals. *Am J Cardiol*. 1995;76:8A-20A.
3. Bøg-Hansen E, Lindblad U, Bengtsson K, et al. Risk factor clustering in patients with hypertension and non-insulin-dependent diabetes mellitus. The Skaraborg Hypertension Project. *J Intern Med*. 1998;243:223-232.
4. Triant VA, Lee H, Hadigan C, Grinspoon SK. Increased acute myocardial infarction rates and cardiovascular risk factors among patients with human immunodeficiency virus disease. *J Clin Endocrinol Metab*. 2007;92:2506-2512.
5. Lang S, Mary-Krause M, Cotte L, et al. Increased risk of myocardial infarction in HIV-infected patients in France, relative to the general population. *AIDS*. 2010;24:1228-1230.
6. Islam FM, Wu J, Jansson J, Wilson DP. Relative risk of cardiovascular disease among people living with HIV: a systematic review and meta-analysis. *HIV Med*. 2012;13:453-468.
7. Helleberg M, May MT, Ingle SM, et al. Smoking and life expectancy among HIV-infected individuals on antiretroviral therapy in Europe and North America. *AIDS*. 2015;29:221-229.
8. Centers for Disease Control and Prevention. Smoking and tobacco use. How to quit. [http://www.cdc.gov/tobacco/quit\\_smoking/how\\_to\\_quit/index.htm](http://www.cdc.gov/tobacco/quit_smoking/how_to_quit/index.htm)
9. Centers for Disease Control and Prevention. Heart disease risk factors. [http://www.cdc.gov/heartdisease/risk\\_factors.htm](http://www.cdc.gov/heartdisease/risk_factors.htm)

