

HIV Infection and Cancer Risk

Key Points

- People infected with human immunodeficiency virus (HIV) have a higher risk of some types of cancer than uninfected people (see Question 1).
- A weakened immune system caused by infection with HIV, infection with other viruses, and traditional risk factors such as smoking all contribute to this higher cancer risk (see Question 2).
- Highly active antiretroviral therapy and lifestyle changes may reduce the risk of some types of cancer in people infected with HIV (see Questions 3 and 4).
- The National Cancer Institute (NCI) conducts and supports a number of research programs aimed at understanding, preventing, and treating HIV infection, acquired immunodeficiency syndrome-related cancers, and cancer-associated viral diseases (see Question 5).

1. Do people infected with human immunodeficiency virus (HIV) have an increased risk of cancer?

Yes. People infected with HIV have a substantially higher risk of some types of cancer compared with uninfected people of the same age (1). Three of these cancers are known as “acquired immunodeficiency syndrome (AIDS)-defining cancers” or “AIDS-defining malignancies”: Kaposi sarcoma, non-Hodgkin lymphoma, and cervical cancer. A diagnosis of any one of these cancers marks the point at which HIV infection has progressed to AIDS.

People infected with HIV are several thousand times more likely than uninfected people to be diagnosed with Kaposi sarcoma, at least 70 times more likely to be diagnosed with non-Hodgkin lymphoma, and, among women, at least 5 times more likely to be diagnosed with cervical cancer (1).

In addition, people infected with HIV are at higher risk of several other types of cancer (1). These other malignancies include anal, liver, and lung cancer, and Hodgkin lymphoma.

People infected with HIV are at least 25 times more likely to be diagnosed with anal cancer than uninfected people, 5 times as likely to be diagnosed with liver cancer, 3 times as likely to be diagnosed with lung cancer, and at least 10 times more likely to be diagnosed with Hodgkin lymphoma (1).

People infected with HIV do not have increased risks of breast, colorectal, prostate, or many other common types of cancer (1). Screening for these cancers in HIV-infected people should follow current guidelines for the general population.

2. Why do people infected with HIV have a higher risk of cancer?

Infection with HIV weakens the immune system and reduces the body's ability to fight infections that may lead to cancer (2, 3). Many people infected with HIV are also infected with other viruses that cause certain cancers (2–8). The following are the most important of these cancer-related viruses:

- Human herpesvirus 8 (HHV-8), also known as Kaposi sarcoma-associated herpesvirus (KSHV), is the cause of Kaposi sarcoma.
- Epstein Barr virus (EBV) causes some subtypes of non-Hodgkin and Hodgkin lymphoma.



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- Human papillomavirus (HPV) causes cervical cancer and some types of anal, penile, vaginal, vulvar, and head and neck cancer.
- Hepatitis B virus (HBV) and hepatitis C virus (HCV) both can cause liver cancer.

Infection with most of these viruses is more common among people infected with HIV than among uninfected people.

In addition, the prevalence of some traditional risk factors for cancer, especially smoking (a known cause of lung cancer) and heavy alcohol use (which can increase the risk of liver cancer), is higher among people infected with HIV (2, 7).

3. Has the introduction of antiretroviral therapy changed the cancer risk of people infected with HIV?

The introduction of highly active antiretroviral therapy (HAART) in the mid-1990s greatly reduced the incidence of Kaposi sarcoma and non-Hodgkin lymphoma among people infected with HIV (2, 5). HAART lowers the amount of HIV circulating in the blood, thereby allowing partial restoration of immune system function.

Although lower than before, the risk of these two cancers is still much higher among people infected with HIV than among people in the general population. This persistently high risk may be due, at least in part, to the fact that immune system function remains substantially impaired in people treated with HAART. In addition, over time HIV can develop resistance to the drugs used in HAART. Many people infected with HIV have had difficulty in accessing medical care or taking their medication as prescribed (5).

Although HAART has led to reductions in the incidence of Kaposi sarcoma and non-Hodgkin lymphoma among HIV-infected individuals, it has not reduced the incidence of cervical cancer, which has essentially remained unchanged (2, 5, 6). Moreover, the incidence of several other cancers, particularly Hodgkin lymphoma and anal cancer, has been increasing among HIV-infected individuals since the introduction of HAART (5, 6, 9). The influence of HAART on the risk of these other cancer types is not well understood.

As HAART has reduced the number of deaths from AIDS, the HIV-infected population has grown in size and become older. The fastest growing proportion of HIV-infected individuals is the over-40 age group. These individuals are now developing cancers common in older age. In 2003, the proportion of these other cancers exceeded the number of AIDS-defining malignancies (6). However, HIV-infected people do not develop most cancers at a younger age than is typically seen in the general population (10, 11).

4. What can people infected with HIV do to reduce their risk of cancer or to find cancer early?

Taking HAART as indicated based on current HIV treatment guidelines lowers the risk of Kaposi sarcoma and non-Hodgkin lymphoma and increases overall survival.

The risk of lung cancer can be reduced by quitting smoking. Because HIV-infected people have a higher risk of lung cancer, it is especially important that they do not smoke. Help with quitting smoking is available through the National Cancer Institute's (NCI) smoking quitline at 1-877-448-7848 (1-877-44U-QUIT) and other NCI resources, which are listed on the Smoking Home Page at <http://www.cancer.gov/cancertopics/tobacco/smoking>.

The higher incidence of liver cancer among HIV-infected people appears to be related to more frequent infection with hepatitis virus (particularly HCV) and alcohol abuse or dependence than among uninfected people (7, 13). Therefore, HIV-infected individuals should know their hepatitis status. If blood tests show that they have previously been infected with HBV or HCV, they should consider reducing their alcohol consumption.

In addition, if they currently have viral hepatitis, they should discuss with their health care provider whether HBV- or HCV-suppressing therapy is an option for them (13, 14). Some drugs may be used for both HBV-suppressing therapy and HAART (13).

Because HIV-infected women have a higher risk of cervical cancer, it is important that they be screened regularly for this disease. Studies have suggested that Pap test abnormalities are more common among HIV-infected women and that HPV DNA tests may not be as effective as Pap tests in screening these women for cervical cancer (12, 15).

Some researchers recommend anal Pap test screening to detect and treat early lesions before they progress to anal cancer (16). This type of screening may be most beneficial for men who have had sexual intercourse with other men. HIV-infected patients should discuss such screening with their medical providers.

5. How does NCI support research on HIV/AIDS-related cancers?

The Office of HIV and AIDS Malignancy (OHAM) coordinates and oversees NCI-sponsored research on AIDS-related cancers and HIV/AIDS. OHAM also acts as a point of contact for the National Institutes of Health (NIH) Office of AIDS Research (OAR). The OHAM Web site can be found at <http://oham.cancer.gov>. The OAR Web site is located at <http://www.oar.nih.gov>.

OHAM has two main programs:

- The AIDS Malignancy Program, which has primary responsibility for identifying new initiatives; for sponsoring international activities, such as the Strengthening Capacity for Research for HIV-Associated Malignancies in Africa initiative (http://oham.cancer.gov/oham_research/programs/research_africa/); and for overseeing programs that NCI comanages with other NIH institutes, such as the Centers for AIDS Research (<http://www.niaid.nih.gov/labsandresources/resources/cfar/Pages/default.aspx>), the Multicenter AIDS Cohort Study (<http://www.statepi.jhsph.edu/mac/mac.html>), and the Women's Interagency HIV Study (<https://statepiaps.jhsph.edu/wihs/>).
- The AIDS Cancer Clinical Program, which has primary responsibility for overseeing clinical programs in OHAM, including the AIDS Malignancy Consortium (http://oham.cancer.gov/oham_research/programs/consortium/) and the AIDS and Cancer Specimen Resource (http://oham.cancer.gov/oham_research/programs/specimen_resource/).

In addition, the Center for Cancer Research (CCR) and the Division of Cancer Epidemiology and Genetics (DCEG), within NCI's intramural research program, conduct research on HIV and cancer. CCR and DCEG have established the NCI Center of Excellence in HIV/AIDS and Cancer Virology (CEHCV) (<https://ccrod.cancer.gov/confluence/display/CEHCV/Home>).

CEHCV's mission is to facilitate and rapidly communicate information about advances in antiviral and immunologic methods for preventing and treating HIV infection, AIDS-related cancers, and cancer-associated viral diseases. CEHCV supports several programs, including the AIDS and Cancer Virus Program (<http://web.ncifcrf.gov/Programs/Science/Acvp/Default.aspx>) and an HIV Drug Resistance Program (<http://home.ncifcrf.gov/hivdrp/>). DCEG also performs research into the risk of HIV/AIDS-associated malignancies through its Infections and Immunoepidemiology Branch (<http://dceg.cancer.gov/iib>).

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Related NCI materials and Web pages:

- *Human Papillomaviruses and Cancer* Fact Sheet (<http://www.cancer.gov/cancertopics/factsheet/Risk/HPV>)
- AIDS-Related Cancers Home Page (<http://www.cancer.gov/cancertopics/types/AIDS>)
- Anal Cancer Home Page (<http://www.cancer.gov/cancertopics/types/anal>)
- Cervical Cancer Home Page (<http://www.cancer.gov/cancertopics/types/cervical>)
- Head and Neck Cancer Home Page (<http://www.cancer.gov/cancertopics/types/head-and-neck>)
- Hodgkin Lymphoma Home Page (<http://www.cancer.gov/cancertopics/types/hodgkin>)
- Liver Cancer Home Page (<http://www.cancer.gov/cancertopics/types/liver>)
- Lung Cancer Home Page (<http://www.cancer.gov/cancertopics/types/lung>)
- Non-Hodgkin Lymphoma Home Page (<http://www.cancer.gov/cancertopics/types/non-hodgkin>)
- Smoking Home Page (<http://www.cancer.gov/cancertopics/tobacco/smoking>)

How can we help?

We offer comprehensive research-based information for patients and their families, health professionals, cancer researchers, advocates, and the public.

- **Call** NCI's Cancer Information Service at 1–800–4–CANCER (1–800–422–6237)
- **Visit** us at <http://www.cancer.gov> or <http://www.cancer.gov/espanol>
- **Chat** using LiveHelp, NCI's instant messaging service, at <http://www.cancer.gov/livehelp>
- **E-mail** us at cancergovstaff@mail.nih.gov
- **Order** publications at <http://www.cancer.gov/publications> or by calling 1–800–4–CANCER

- **Get help** with quitting smoking at 1-877-44U-QUIT (1-877-448-7848)

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