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Epidemiology, Screening, Diagnosis, and Prognosis for Cancer in HIV/AIDS
Cindy Hou, DO, MBA, Garden State Infectious Diseases Associates

LEARNING OBJECTIVES:

By the end of this activity participants will be able to:

1. **Recognize** the changing epidemiology of cancer in people with HIV, including the decline in AIDS-defining cancers as well as the rise in non-AIDS defining cancers.

2. **Seek** opportunities to screen for and diagnose cancer in people with HIV/AIDS.

3. **Ensure** that all patients with HIV/AIDS are provided with cancer prevention education.

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Epidemiology, Screening, Diagnosis, and Prognosis for Cancer in HIV/AIDS

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STATEMENT OF NEED:
With the advent of antiretroviral therapy (ART), the number of individuals living with HIV and AIDS has increased compared to the pre-ART era. In the era of ART, the population with HIV is aging; they are less likely to die of AIDS-related conditions and more likely to experience the chronic conditions experienced by the general population, including cancers. While the incidence of AIDS-defining cancers has decreased, non-AIDS defining cancers has climbed. Not only do people with HIV tend to develop these cancers earlier (e.g., in one study those with HIV developed lung cancer at a median age of 50, whereas the median age in the general population was 54), but they tend to be diagnosed in later stages, typically stage III or IV. For example, in one study of non-small cell squamous cell carcinoma of the lung, 74% of individuals with HIV were diagnosed with stage IIIb and IV disease. Survival at stage IIb/IV were 25% at 1 year and 0% at 3 years. Both examples illustrate the lack of awareness of the prevalence of non-AIDS defining cancers in people with HIV, leading to a paucity of education and support to prevent these cancers, late screening and untimely diagnosis.

TARGET AUDIENCE:
This activity is designed for physicians, nurses, social workers, health educators, and other health care professionals in New Jersey who are involved in the care of people with HIV.

METHOD OF PARTICIPATION:
Participants should read the learning objectives, review the activity in its entirety, and then complete the self-assessment test, which consists of a series of multiple-choice questions. Upon completing this activity as designed and achieving a passing score of 70% or more on the self-assessment test, participants will receive a letter of credit and the test answer key four (4) weeks after receipt of the self-assessment test, registration, and evaluation materials. This activity may also be completed online at http://ccoe.umdnj.edu/catalog/. Estimated time to complete this activity as designed is 1.03 hours for nurses, and 1.0 hour for physicians.

LEARNING OBJECTIVES:
Following completion of this activity, participants should be able to:
1. Recognize the changing epidemiology of cancer in people with HIV, including the decline in AIDS-defining cancers as well as the rise in non-AIDS defining cancers.
2. Seek opportunities to screen for and diagnose cancer in people with HIV/AIDS.
3. Ensure that all patients with HIV/AIDS are provided with cancer prevention education.

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Introduction

With the advent of antiretroviral therapy (ART), the number of individuals living with human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS) has increased compared to the pre-ART era. The US AIDS population increased four-fold from 1991–2005. At the end of 2009, the estimated number of people age 13 and older living with HIV in the United States was 1,148,200. This figure included an estimated 476,186 people with an AIDS diagnosis. In the era of ART, the population with HIV is aging; they are less likely to die of AIDS-related conditions and more likely to experience the chronic conditions experienced by the general population, including cancers. While HIV survival rates have improved, the morbidity and mortality associated with cancers in these patients is an area that deserves heightened attention.

When reviewing cancers in people with HIV/AIDS, it is helpful to distinguish between those that are AIDS-defining and those that are non-AIDS defining cancers. According to the Center for Disease Control and Prevention (CDC), the AIDS-defining cancers include Kaposi sarcoma, Burkitt’s lymphoma, immunoblastic lymphoma, primary central nervous system lymphoma, and invasive cervical cancer. All the other cancers are designated as non-AIDS defining (see Table 1).

Epidemiology

Researchers have examined age at the time of cancer diagnosis, and certain trends have been noted. While the general population was diagnosed with lung cancer at a median age of 54 years, AIDS patients were diagnosed with lung cancer at an earlier age of 50. For anal cancer, AIDS patients were diagnosed at a median age of 42 compared to 45 in the non-HIV infected population. Conversely, people with AIDS were diagnosed with Hodgkin disease at a slightly later age: 42 compared with 40. For most cancers, diagnoses were established at similar ages for those with AIDS when compared with the general population.

Over the past two decades, the AIDS-defining cancers have decreased by more than three-fold and the non-AIDS defining cancers increased three-fold.

Of the many non-AIDS defining cancers, this article will describe cancers of the liver, hepatobiliary tract, colon, anus and Hodgkin disease along with a discussion of the AIDS-defining cancers.

Figures 1 illustrates the estimated counts and standardized rates of AIDS-defining cancers among people living with AIDS in the United States by calendar year and age group. Figure 2 shows the estimated counts and standardized rates of non-AIDS defining cancers among people living with AIDS in the United States by calendar year and age group. The bars for 0–12 year olds in panels in both figures are difficult to see because of small numbers of cancers in this age group (122 AIDS-defining cancers and 25 non-AIDS-defining cancers, total for the 15 year time period). Bars depict the estimated number of cancers in people with AIDS, and points connected by lines depict incidence rates standardized to the 2000 US AIDS population by age group, race, and sex.

Table 1: AIDS-defining and non-AIDS defining cancers

<table>
<thead>
<tr>
<th>AIDS-defining cancers</th>
<th>Non-AIDS defining cancers with increased incidence in people with HIV^5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaposi sarcoma</td>
<td>Anal</td>
</tr>
<tr>
<td>Burkitt’s lymphoma</td>
<td>Angiosarcoma</td>
</tr>
<tr>
<td>Immunoblastic lymphoma</td>
<td>Brain and CNS</td>
</tr>
<tr>
<td>Primary central nervous system lymphoma</td>
<td>Colorectal</td>
</tr>
<tr>
<td>Invasive cervical cancer</td>
<td>Esophagus</td>
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<tr>
<td></td>
<td>Heart</td>
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<tr>
<td></td>
<td>Hodgkin disease</td>
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<tr>
<td></td>
<td>Kidney</td>
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<td></td>
<td>Larynx</td>
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<td></td>
<td>Leukemia</td>
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<td></td>
<td>Leiomyosarcoma</td>
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<tr>
<td></td>
<td>Lip</td>
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<tr>
<td></td>
<td>Liver</td>
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<tr>
<td></td>
<td>Lung</td>
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<tr>
<td></td>
<td>Multiple myeloma</td>
</tr>
<tr>
<td></td>
<td>Pancreas</td>
</tr>
<tr>
<td></td>
<td>Penile</td>
</tr>
<tr>
<td></td>
<td>Pharynx</td>
</tr>
<tr>
<td></td>
<td>Skin cancer</td>
</tr>
<tr>
<td></td>
<td>Stomach</td>
</tr>
<tr>
<td></td>
<td>Testicular</td>
</tr>
<tr>
<td></td>
<td>Tongue</td>
</tr>
<tr>
<td></td>
<td>Vulva/vagina</td>
</tr>
</tbody>
</table>

Over the past two decades, the AIDS-defining cancers have decreased by more than three-fold and the non-AIDS defining cancers increased three-fold. Although ART has lowered the rates of Kaposi sarcoma and non-Hodgkin lymphoma, there has been no significant improvement in the incidence of those impacted by invasive cervical cancer.
Epidemiology, Screening, Diagnosis, and Prognosis for Cancer in HIV/AIDS

HIV and cancer risk

Cancer is a significant cause of mortality and morbidity in people infected with HIV; 30–40% will develop a malignancy during their lifetime. Not only do the AIDS-defining cancers occur with greater frequency in people with HIV than in unaffected individuals, people with HIV also experience an increased risk for numerous non-AIDS defining cancers (see Table 1). The increased risk of cancer in HIV is likely multifactorial. Infected individuals have weakened immune systems. In comparison with the general population, they tend to have a higher prevalence of co-infection with cancer-related viruses such as human herpes virus-8 (HHV-8), Epstein-Barr virus (EBV), human papillomavirus (HPV), as well as hepatitis B and C (see Table 2). People with HIV have a higher prevalence of smoking and excessive alcohol intake, which are known risk factors for cancer. Tobacco use has been linked with cancers of the bladder, cervix, esophagus, kidney, mouth, nasal cavity, lung, pancreas, stomach, and throat. Alcohol abuse has been implicated in cancers of the breast, esophagus, larynx, liver, and pharynx. It is important that clinicians inquire about tobacco and alcohol intake, as both are potentially modifiable risk factors.

Table 2: Cancer-related viruses and their associated cancers

<table>
<thead>
<tr>
<th>Virus</th>
<th>Associated cancers</th>
</tr>
</thead>
<tbody>
<tr>
<td>HHV-8</td>
<td>Kaposi sarcoma</td>
</tr>
<tr>
<td>EBV</td>
<td>Non-Hodgkin lymphoma, Hodgkin lymphoma</td>
</tr>
<tr>
<td>HPV</td>
<td>Cervical, anal, penile, vaginal, vulvar, head, oropharynx (back of the throat, including the base of the tongue and tonsils), and neck cancers</td>
</tr>
<tr>
<td>Hepatitis B and C</td>
<td>Liver cancer</td>
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</table>

AIDS-defining cancers

Kaposi sarcoma (KS)

This AIDS-defining cancer has been referred to as epidemic KS. Widespread use of ART led to a decrease in incidence from 15.2 per 1000 patient-years to 4.9 per 1000 patient-years. The standardized incidence ratio in people with HIV is 3.640 times that of the general population (i.e., people with HIV are 3,640 times more likely to develop KS than the general population).

The etiologic agent is HHV-8, a type of human herpes virus, which may be transmitted by saliva. HHV-8 has also been implicated in lymphoproliferative diseases like Castleman’s disease and primary effusion or body cavity lymphoma, all of which can be seen in HIV.

KS can involve the skin, oral mucosa, lymph nodes, gastrointestinal tract, liver, lung, and spleen. In most initial presentations, the skin alone is involved. The cutaneous lesions can be firm, papular, or even nodular, but they generally do not cause pain. A classic appearance in fair-skinned individuals is violaceous, but in dark-skinned individuals, the lesions can be brown or even black. Common sites affected include the face, oral cavity, legs and feet. Aside from the skin, gastrointestinal involvement is also common. Pulmonary involvement usually represents progression or advanced disease and can even cause death. Pulmonary KS tends to occur in persons with AIDS who have CD4 cell counts less than 100; the patient typically has more than 50 skin lesions although the number may be far fewer or even absent.
**Non-Hodgkin lymphoma**

Like KS, ART has led to decreases in the incidence of systemic non-Hodgkin lymphoma (the AIDS-defining non-Hodgkin lymphomas include Burkitt’s lymphoma and Immunoblastic lymphoma). Compared to the general population, the risk of non-Hodgkin lymphoma is 77 times greater in persons with HIV. Prognosis is influenced by a number of factors. ART is associated with improved prognosis, whereas other factors such as age older than 35, extent of tumor burden, CD4 cell count less than 100, and a history of intravenous drug use are poor prognostic predictors.

Systemic non-Hodgkin lymphoma is categorized histologically: diffuse large B-cell lymphoma, B-cell immunoblastic lymphoma, and small non-cleaved cell lymphoma. Cases can also be grouped by severity: indolent or low grade, intermediate-grade, and high-grade. The intermediate and high-grade lymphomas are more closely associated with persons who have progressed to AIDS.

EBV has been identified in up to 40% of cases in patients coinfected with HIV and non-Hodgkin lymphoma. Both EBV and HHV-8 have been seen in primary effusion or body cavity lymphoma, a variant of a non-Hodgkin lymphoma.

Within the first year of an HIV diagnosis, experts recommend two Pap smear tests and cervical cytology screenings. The tests can be performed six months apart. If both of these are normal, then testing can be modified to just once a year.

**Primary central nervous system lymphoma (PCNSL)**

Whereas the previous lymphomas were systemic diseases, PCNSL—another AIDS-defining cancer—is restricted to the central nervous system. As in systemic non-Hodgkin disease, the Epstein-Barr virus has also been implicated in PCNSL, which occurs 1,000 times more often in persons with HIV than in uninfected individuals. It is commonly seen in advanced AIDS; mean CD4 cell count at time of diagnosis is approximately 33% of patients. Non-Hodgkin lymphoma of the gastrointestinal tract is also common. Less common sites include the bone-marrow disease in 33% of patients. Non-Hodgkin lymphoma of the CNS occurs 1,000 times more often in persons with HIV than in general population, the risk of non-Hodgkin lymphoma is 77 times greater in persons with HIV. Prognosis is influenced by a number of factors. ART is associated with improved prognosis, whereas other factors such as age older than 35, extent of tumor burden, CD4 cell count less than 100, and a history of intravenous drug use are poor prognostic predictors.

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**Invasive cervical cancer (ICC)**

Squamous intraepithelial lesions (SIL), precursors to ICC, occur five times more often in people with HIV than in the general population. Fortunately, early detection of cervical dysplasia is possible through Pap smears and targeted human papillomavirus (HPV) testing. HPV can lead to SIL or even ICC. Table 3 reviews additional recommendations for prevention of cervical cancer.

Because there is a higher prevalence of SIL in HIV, the recommendations for screening are different than in the general population. Within the first year of an HIV diagnosis, experts recommend two Pap smear tests and cervical cytology screenings. The tests can be performed six months apart. If both of these are normal, then testing can be modified to just once a year. If testing shows ASC-H (atypical squamous cells—cannot rule out high-grade squamous intraepithelial lesion), LSIL (low-grade squamous intraepithelial lesion), or HSIL (high-grade squamous intraepithelial lesion), then some experts suggest that a colposcopy should be performed.

**Table 3: Prevention of cervical cancer in people with HIV**

| HPV vaccine: | in non-vaccinated* men and women with HIV through the age of 26, give 3 doses (at 0, 1 and 6 months). In patients uninfected with HPV, the vaccine prevents cervical cancer. In patients already infected with an HPV type (e.g., HPV type 16), the vaccine does not protect against the development of cervical cancer caused by that HPV type, but can protect against cervical cancer caused by other HPV types (e.g., HPV type 18). |
| **Routine gynecology evaluations:** | including Pap smears to detect HPV as well as cervical dysplasia. |
| **Primary prevention:** | consistent use of barrier protection during sexual intercourse and reduction in the number of sexual partners. |

Even after ICC is diagnosed, ART should be considered in the treatment of patients with HIV or AIDS. Although ART has not made an enormous impact in the incidence of cervical cancer—unlike non-Hodgkin lymphoma and Kaposi sarcoma—it may have a role in preventing the development of cervical dysplasia and decreasing recurrence of disease when combined with standard therapy, and possibly even converting lesions from high to low grade.
Non-AIDS defining cancers

The cancers that are not considered AIDS-defining cancers are referred to as non-AIDS defining cancers. In the United States, the aging and growth of the population with HIV afforded by ART has resulted in an increase in non-AIDS defining cancers. In 1991–1995, less than 10% of cancers in people with HIV were non-AIDS defining, and in 2001–2005, this increased to 48.3%. About half of the cases were attributed to cancers of the anus, liver, lung, and Hodgkin lymphoma.¹

Lung cancer

Of all of the non-AIDS defining cancers, the one that causes the highest mortality is lung cancer. Compared to the general population, people with HIV have a 2–4 fold greater risk of developing lung cancer.²³ A meta-analysis comparing the incidence rates of lung cancer in the pre-ART and post-ART eras found a dramatic increase in disease. Before ART was introduced, the incidence of lung cancer in people living with HIV was 0.8 per 10,000 patient-years. The incidence increased to 6.7 per 10,000 patient-years following the introduction of ART—8.93 times higher.¹⁸

Smoking cessation website resources

- American Heart Association, HIV and Smoking Cessation: [http://www.americanheart.org/HEARTORG/Conditions/More/HIVandYourHeart/HIV-and-Smoking-Cessation_UCM_315431_Article.jsp](http://www.americanheart.org/HEARTORG/Conditions/More/HIVandYourHeart/HIV-and-Smoking-Cessation_UCM_315431_Article.jsp)
- CDC Quit Smoking: [http://www.cdc.gov/tobacco/quit_smoking/](http://www.cdc.gov/tobacco/quit_smoking/)
- NJ QuitLine: [http://www.njquitline.org/treatment.html](http://www.njquitline.org/treatment.html)

A Swiss cohort study found a high prevalence of tobacco abuse in patients with HIV (73%), as compared with matched controls. Amongst heavy smokers, there was a higher risk for lung cancer. Patients with HIV who quit were still at risk for lung cancer, but the likelihood was far lower than for active smokers—emphasizing the importance of smoking cessation efforts to curtail lung cancer in HIV.¹⁹

When lung cancer is diagnosed in those with HIV, it tends to present at an earlier age than in the general population. Additionally, by the time lung cancer is diagnosed, the stage and extent of disease is likely to be very advanced. In one study of non-small cell squamous cell carcinoma of the lung, 74% of individuals with HIV were diagnosed with stage IIIb and even stage IV disease out of a scale of severity between IA and IV. Survival rates for stage IIIb/IV were 25% at 1 year and 0% at 3 years. At the time of cancer diagnosis, patients had a mean CD4 cell count of 304 cells (range = 3–1,361) and only 27% of patients had undetectable viral loads.₁⁷

Case study 1

History

- A 56 year old Hispanic man diagnosed with HIV two years ago.
- His current antiretroviral regimen includes raltegravir (Isentress) and emtricitabine/tenofovir (Truvada). Approximately one month ago, he had a CD4 count of 500 and a viral load of < 20.
- The patient was referred to general surgery for further evaluation of a bothersome hernia. In preparation for the hernia surgery the following were ordered: electrocardiogram (EKG), chest radiograph (CXR) and coagulation studies (PT/INR).
- All of these studies were sent to the ordering physician, with copies (on the request of the patient) to his HIV provider.

Pertinent laboratory results

- EKG: normal sinus rhythm without any acute ST or T wave changes
- PT/INR: unremarkable
- CXR: showed a very large left-sided effusion

Initial management

- When the patient was notified of the CXR finding, he incidentally remarked that he had felt more dyspnea on exertion. He had smoked a pack of cigarettes/day for about 30 years, and was still smoking, albeit at a 1/2 pack per day.
- The patient was set up for an interventional radiology-guided aspiration of the left pleural effusion. Fluid was sent for cell count, culture, and review by pathology. Ultimately, the fluid culture did not reveal any bacteria; unfortunately, cytology showed presence of metastatic adenocarcinoma with lung cancer as the primary site.
- He underwent staging CT scans, which were notable for hepatic lesions felt to be malignant in nature and innumerable brain lesions.

Comments

- This case illustrates that by the time lung cancer is diagnosed in patients with HIV, it can be at an advanced stage. There are no specific recommendations to screen for lung cancer, but HIV providers should continue to emphasize the importance of smoking cessation as a potential modifiable risk factor.

Hepatobiliary cancer

Hepatobiliary tract (liver, bile duct, and gallbladder) cancers tend to be aggressive and to recur even after treatment. In one analysis, researchers examined registry linkage data from the United States HIV/AIDS Cancer Match Study. They specifically calculated the standardized incidence ratios (SIRs) on risk of hepatobiliary cancer in HIV and AIDS in comparison with the general population. The study found a higher risk of hepatocellular carcinoma in AIDS as compared with HIV and non-HIV patients as well as an elevated SIR for other types of liver cancers along with tumors of the bile duct.₂⁰
Colon cancer

In the general population, a screening colonoscopy for colon malignancy is recommended at the age of 50, although it may be performed earlier, for example, due to family history. Currently, screening recommendations for patients with HIV are the same as for those who are HIV-negative. There has been little research on the extent to which screening for colorectal cancer occurs in patients with HIV. In one study at a Veterans Administration outpatient clinic, researchers examined colorectal screening measures, including fecal occult blood testing, flexible sigmoidoscopy, air contrast barium enema, and colonoscopy, in HIV-infected versus HIV-uninfected control patients. Compared to their HIV-uninfected cohorts, those with HIV were statistically less likely to have undergone at least one of these tests. In addition, control patients were more up-to-date with the colorectal cancer screening tests than those with HIV.21

Case study 2

History
- A 50 year old Korean-American woman has been living with HIV for the past ten years.
- She has been adherent to her antiretroviral regimen of emtricitabine/tenofovir/efavirenz. A year ago, her CD4 cell count was 650 and viral load was undetectable (<24 copies/ml). Because of her stellar numbers, she had become accustomed to seeing her HIV provider about two times a year, but cancelled her last visit because of a major snowstorm.
- Although she has a family doctor, she did not feel the need to see him on a routine basis. She instead presented to her HIV provider and incidentally was noted to have bloody stools as well as dyspnea on exertion.
- On history, the patient’s mother had a rectal cancer, diagnosed at the age of 35.
- On physical examination, the patient looked more fatigued and less upbeat than normal. A rectal examination revealed no gross abnormalities.

Pertinent laboratory results
- Fecal occult blood: positive
- Historical data: hemoglobin—9.8 g/dl last year
- New laboratory data: hemoglobin—7 g/dl and microcytic anemia

Initial management
- As the patient had bloody stools and dyspnea on exertion, she was admitted to the hospital for further evaluation.
- For symptomatic anemia, she received packed red blood cell transfusions.
- The gastroenterology service evaluated the patient and felt that a diagnostic colonoscopy was necessary. Gross findings on the colonoscopy included polyps, which were biopsied.
- The patient received another transfusion, and was discharged with a hemoglobin of 10 g/dl as well as instructions to follow up with the gastroenterologist for results of the biopsies.
- Unfortunately, the pathology for the polyp came back as adenocarcinoma. As a result, the patient was referred to hematology/oncology for further management.

Comments
- This case demonstrates the utility of a colonoscopy to detect the etiology of bloody stools and to uncover tumors. Even if patients are not symptomatic, it is important to perform screening colonoscopies in all patients starting at the age of 50, as would be considered in the general population. In this particular patient, family history of a tumor at the age of 35 in a first-degree relative should have led to a screening colonoscopy earlier, and potentially, detection and removal of polyps before they became cancerous.

Anal cancer

Anal cancer is not commonly seen but it should be considered in men who have sex with men (MSM), especially those who engage in anal receptive intercourse.9 Researchers studied rates of anal cancer in HIV infected versus uninfected individuals by using data from 10 cohorts in the United States and 3 cohorts in Canada. The highest incidence of anal cancer occurred in HIV-infected men who have sex with men: 131 per 100,000 person-years (the number of years that study participants have been under observation). In comparison, the incidence rate in HIV-infected men (who were not MSM) was 46 per 100,000 person-years and 30 per 100,000 person-years in HIV-infected women. While this study observed rates, there were limitations including lack of analysis on the extent of anal cancer screening, detection of HPV, quantification of tobacco abuse, and analysis of all sexual behaviors.23
Anal cancer screening is one way to screen for anal cancers and precancerous lesions, but it is not widely accepted. Advocates for screening believe that cytology is as effective for detecting anal disease as it is for cervical disease, but opponents point out that treatments for anal intraepithelial neoplasia often fail and there are no data suggesting that such treatment prevents cancer. Currently, national expert groups, including CDC and the Infectious Diseases Society of America, do not recommend routine anal cytology screening. However, some local entities, such as the New York State Department of Health, recommend anal cytology for certain populations.

**Hodgkin disease**

While not an AIDS-defining cancer, Hodgkin disease has been found in individuals with HIV to a greater extent than in the general population. On a histologic basis, Hodgkin disease can be further categorized into subgroups such as nodular sclerosis, mixed cellularity, and lymphocyte depletion. Patients with HIV are more likely to be diagnosed with mixed cellularity and lymphocyte depletion than nodular sclerosis, which is the most frequently seen type in those who are HIV-uninfected. Patients with HIV are more likely to be diagnosed with stage III and IV Hodgkin disease, which are the more advanced forms.

The disease can spread to extranodal sites, such as the bone marrow and liver. Such extranodal involvement, along with poor histologic subtype and advanced stage, are poor prognostic factors. These patients may not respond as well to treatment, or the therapeutic effects may not be as long-lasting.

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**Prevention and screening**

As cancer is too often detected at an advanced stage in people living with HIV, it is critical to ensure that prevention and screening tools are employed by clinicians. All patients with HIV or AIDS should be educated on preventive measures to reduce their risks for cancer. Key steps to prevent cancer or to detect it early include:

1. Every patient should be placed on ART, as this has been shown to decrease the risks of Kaposi sarcoma and non-Hodgkin lymphoma. Guidelines for treatment with ART are comprehensively reviewed in: [http://aidsinfo.nih.gov/guidelines/html/1/adult-and-adolescent-treatment-guidelines/0/](http://aidsinfo.nih.gov/guidelines/html/1/adult-and-adolescent-treatment-guidelines/0/).

2. Every patient should be counseled on the risks of tobacco abuse and provided with advice and support for smoking cessation. Smoking is linked to cancers of the bladder, cervix, esophagus, kidney, mouth, nasal cavity, lung, pancreas, stomach, and throat.

3. Every patient should be counseled on the risks of alcohol abuse and provided with support to reduce alcohol consumption. Excessive alcohol intake has been implicated in cancers of the breast, esophagus, larynx, liver, and pharynx.

4. Every patient should be screened for hepatitis B and C, as these viruses are risk factors for hepatocellular carcinoma. If the patient is positive for hepatitis B and/or C, then staging laboratory studies should be performed. Treatment for hepatitis B and C should be considered. If there is non-immunity to hepatitis B, vaccinate the patient.


5. All HIV-infected men and women up to the age of 26 should receive the 3-shot vaccine series against HPV, as this virus is a risk factor for cancer. Women should receive screening Pap smears and mammograms, as well as annual gynecology evaluations.

6. All patients should be referred for screening colonoscopies by the age of 50, or as indicated by symptoms and family history. All family histories should be reviewed for cancer and age at cancer diagnosis.


Anal cytology screening (anal pap) in HIV infected women and men who have sex with men is not considered standard of care but is performed in some centers. Clinical trials are ongoing.
Prognosis and mortality

Researchers conducted a retrospective study of HIV patients in care at an urban center who were diagnosed with cancer over a ten-year period from 2000–2010. In total, there were 447 patients in whom 470 cancers were diagnosed. The median age at the first cancer diagnosis was 50. The majority of patients were male (79%) and African-American (85%). Most patients (81%) were smokers, while a history of either alcohol or intravenous drug use was common at 49% and 46%, respectively. Forty-three percent of patients were co-infected with hepatitis C. There was a higher prevalence of non-AIDS defining cancers.27

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Conclusions

Clients with HIV are living longer, and like the general population are at risk for age-related problems, including tumors. While AIDS-defining cancers are on the decline, non-AIDS defining malignancies are rising. In certain cancers, the age at diagnosis may be younger than in the non-HIV population, and the disease may be at an aggressive or more advanced stage by the time the tumor is detected. This is why there is such an urgency to educate patients about prevention and early screening. Important cancer prevention measures include complete tobacco cessation, screening colonoscopies, Pap smears, hepatitis B/C screening and treatment, and ART. Lastly, there is a need for better screening methods so that tumors are detected at an earlier stage when prognosis is more optimistic.