Cancer Risk among Adults Living with HIV in Ontario

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Abstract

Cancer is an important comorbidity and healthcare concern for people living with the human immunodeficiency virus (HIV). Researchers have quantified the burden of cancer among people living with HIV in Ontario using administrative and registry-linked data held at ICES. Findings showed that although cancer incidence has declined over time, people living with HIV remain at a greater risk for cancers with infectious causes compared with HIV-negative people. There is a need for comprehensive HIV care that includes cancer prevention strategies.

The Issue

Antiretroviral therapy (ART) has improved quality of life and increased life expectancy among people living with the human immunodeficiency virus (HIV). Because of this, patterns of morbidity and mortality are changing among people living with HIV who are receiving ART. The focus of care has shifted away from immunodeficiency-related opportunistic infections, such as pneumocystis pneumonia, which are more frequent or severe in people with weakened immune systems. Instead, HIV care today places more emphasis on the prevention and management of chronic comorbidities.

In 2020, there were an estimated 62,790 people aging with HIV in Canada, with 23,380 living in Ontario (PHAC 2022). A study examining cause-specific deaths among people living with HIV in Ontario from 1995 to 2014 found a shift in the leading causes of death. Death was increasingly due to common chronic conditions – predominantly cancer and cardiovascular disease – rather than due to an HIV infection itself (Burchell et al. 2019). In fact, the highest proportional increases from 1995 to 2014 for other causes of death were first for cancer (4.0% to 18.0%), and then for cardiovascular disease (3.0% to 12.2%) and other non-communicable diseases (4.3% to 15.7%) (Burchell et al. 2019).

As these changes in cause-specific mortality suggest, cancer is a significant comorbidity and healthcare concern for people living with HIV. Internationally, longitudinal studies have demonstrated higher rates of cancer among people living with HIV, compared with the general population (Yuan et al. 2022). This higher risk is largely driven by infection with oncogenic pathogens. HIV is classified by the International Agency for Research on Cancer as an oncogenic virus that induces immunosuppression and reduces immune surveillance – that is, the ability of the immune system to detect and destroy other oncogenic viruses, bacteria and pre-cancerous cells (Bouvard et al. 2009). A higher prevalence of known cancer risk factors, such as smoking, among people living with HIV is also a contributor (Bekele et al. 2017).

Cancer patterns observed in one HIV population or setting may or may not apply to another because the local epidemiology of HIV, other oncogenic infections, other cancer risk factors and cancer screening coverage vary substantially between countries and populations. In this report, we highlight two recent population-based studies conducted at ICES that characterized trends in the incidence of cancers in people living with HIV in Ontario. The studies used data from linked administrative healthcare databases, the Ontario cancer registry and an administrative registry of individuals diagnosed with HIV according to a validated case-finding algorithm of three physician billing claims for an HIV-related visit within the past three years (Antoniou et al. 2011).

Cancer incidence trends among people living with HIV in Ontario

A recent study examined trends in the burden of cancer among adults with HIV in Ontario from 1997 to 2020 and found that there were 1,275 newly diagnosed cancers, about half of which were cancers with known infectious causes (Nicolau et al. 2022).

The most diagnosed cancers were non-Hodgkin lymphoma, Kaposi sarcoma and prostate, lung, anal and colorectal cancers; these cancers accounted for about half of all cancers diagnosed in people living with HIV in Ontario. There was an overall decrease in the incidence of any cancer over the 24-year study

period (Figure 1). However, this overall decrease in cancer incidence was driven by a considerable decrease in the incidence of cancers more likely to occur with the onset of acquired immunodeficiency syndrome (AIDS), or "AIDS-defining cancers," which are Kaposi sarcoma, non-Hodgkin lymphoma and invasive cervical cancer. The incidence of cancers that do not have an infectious cause remained stable over the study follow-up and contributed to the greatest burden of disease.

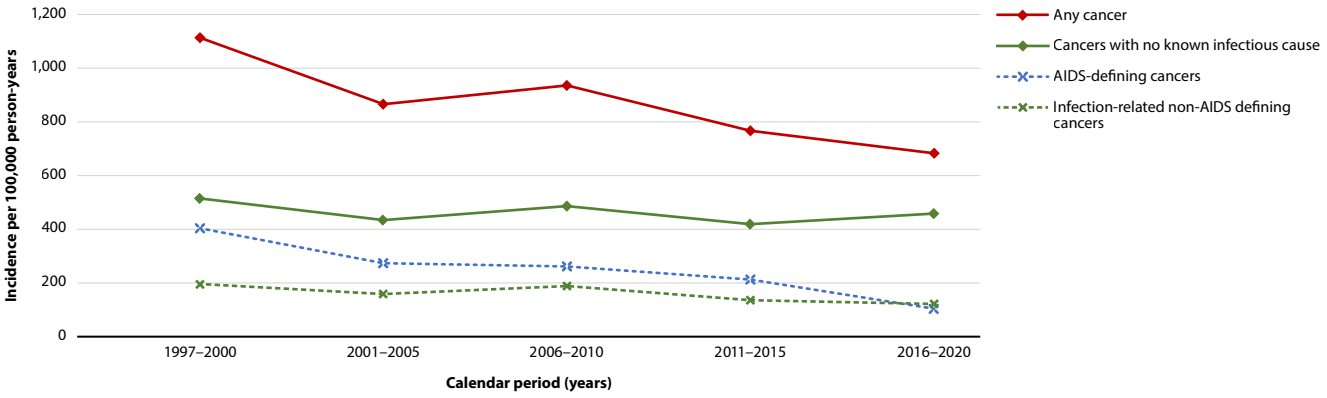
Comparing cancer burden among people with and without HIV

A follow-up study compared trends in the burden of cancer among people living with and without HIV in Ontario from 1996 to 2020 (Nicolau et al. 2023). The study investigated whether people living with HIV were at a greater risk for certain cancers than people without HIV. Findings revealed a significantly higher risk of infection-related cancers, but not infection-unrelated cancers, among people living with HIV compared to people without HIV (Figure 2), particularly for anal and liver cancers. The elevated rate of infection-related cancers by 2020 highlighted the importance of early and sustained ART along with cancer screening and prevention measures.

Implications

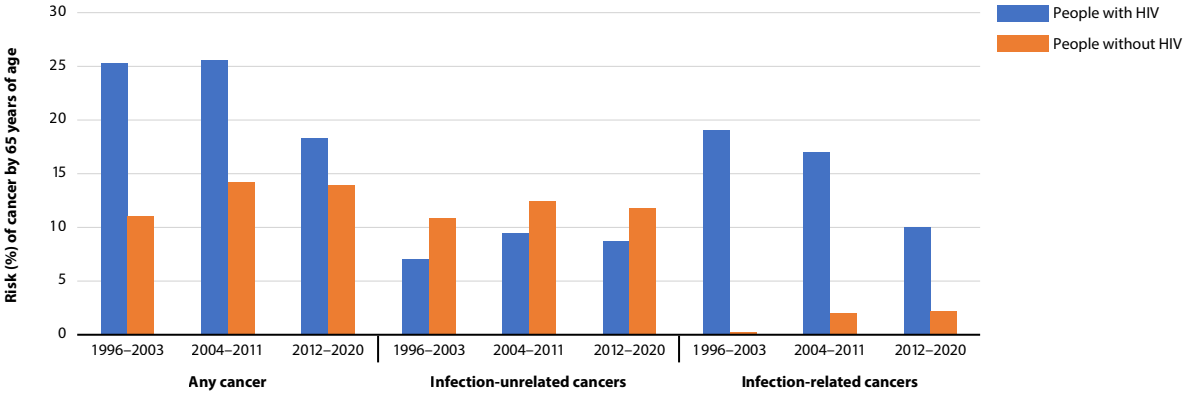
Timely HIV diagnosis, linkage to medical care and engagement in care are important elements of the HIV care pathway for HIV prevention and ART adherence. Successful ART can dramatically improve health, reduce the risk of transmission and improve immune function. Improved immune function and immune surveillance may decrease the risk of cancers that are caused by oncogenic viruses. Unfortunately, long delays

FIGURE 1.
Age-standardized incidence rate (per 100,000 person-years) of first primary cancers among people living with HIV, by calendar period and cancer category, Ontario, 1997–2020



Source: Figure reprinted with permission from Nicolau et al. (2022).
AIDS = acquired immunodeficiency syndrome; HIV = human immunodeficiency virus.

FIGURE 2:
Cumulative incidence risk (%) of cancer by 65 years of age for people living with and without HIV, by calendar period



Source: Figure reprinted with permission from Nicolau et al. (2022).
HIV = human immunodeficiency virus.

from HIV infection to diagnosis are common. In a study of people newly diagnosed with HIV in Ontario between 1999 and 2013, 53% were diagnosed late (Wilton et al. 2019); risk factors included older age, heterosexual orientation (among men) and identifying as a racialized person and/or being an immigrant to Canada.

Although engagement in care has improved over time among people diagnosed with HIV in Ontario, there remain gaps where improvement is needed. In 2020, 11% of people diagnosed with HIV were not in care, 13% were in care but not on ART and 15% were on ART but not virally suppressed (OHESI 2022). In addition, 14% were not linked to care within three months of diagnosis and 27% did not achieve viral suppression within six months.

As more people living with HIV age, there is an opportunity for HIV care to incorporate upstream prevention of cancer. Strategies include vaccinating against human papillomavirus (HPV) and hepatitis B virus, treating hepatitis B and hepatitis C virus infections, encouraging smoking cessation and cancer screening. The primary care setting would be the natural location for such preventive care, and evidence suggests that many living with HIV in Ontario have such access. Between 2009 and 2012, most individuals living with HIV had a family physician, and over half (55%) had most, if not all, of their HIV care visits with their family physician (Kendall et al. 2015).

That said, there are opportunities to improve cancer screening uptake. In Ontario, there is a lower uptake of breast, colorectal and cervical cancer screening – all of which have formalized screening programs – among people living with HIV compared to the general population (Antoniou et al. 2015; Burchell et al. 2018; Kendall et al. 2017). Many living with HIV will be eligible for the new lung cancer-screening program as histories of tobacco smoking are common in this population (Bekele et al. 2017).

Conclusion

Efforts to expand cancer prevention for people living with HIV will need to overcome barriers at the person, provider and system levels. HIV-specific primary care services may receive greater emphasis over routine non-HIV–specific health screening, suggesting that quality improvement initiatives may be helpful in increasing cancer-screening uptake. In addition, there are known disparities by race, immigration status and socioeconomic factors for cancer screening that may be exacerbated among people living with HIV (Buchman et al. 2016; Lofters et al. 2011; Nnorom et al. 2019). The identification of these disparities points to a larger issue regarding health equity and results in broader implications for cancer outcomes and the burden of disease. HQ

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