

## Uganda Cancer Institute

### The interaction between tuberculosis (TB), HIV and cancer

**T**uberculosis (TB), HIV, and cancer are three of the most significant health challenges affecting Uganda today. Each disease presents a heavy burden on its own, but their interaction makes prevention, diagnosis, and treatment far more complex, especially for vulnerable populations. Understanding how these conditions influence one another is essential for building stronger health systems and saving lives.

HIV weakens the immune system, reducing the body's ability to fight infections and control abnormal cell growth. As a result, people living with HIV are more vulnerable to both TB and certain cancers.

TB remains the leading cause of death among people living with HIV.

Uganda is a high TB-burden country, and HIV accelerates the progression from latent to active TB. When the immune system is compromised, the body struggles to contain TB bacteria, leading to severe or recurrent illness.

HIV also increases the risk of both Aids-defining and non-Aids-defining cancers. These include Kaposi sarcoma, cervical cancer, non-Hodgkin lymphoma, liver cancer, especially among individuals co-infected with hepatitis B or C, and anal cancer associated with human papillomavirus (HPV). By weaken-

ing immunity, HIV allows persistent viral infections to thrive, many of which are key drivers of cancer development.

#### Common risk factors

TB, HIV, and cancer frequently overlap because they are driven by similar underlying risk factors. Weak immunity plays a central role, as both HIV infection and cancer treatments, such as chemotherapy, suppress the immune system. This leaves individuals more vulnerable to TB infection, with some cancer patients developing TB during or after treatment.

Viral co-infections further increase risk. Viruses such as HPV, hepatitis B and C, Epstein-Barr virus, and Kaposi sarcoma-associated herpesvirus tend to be more aggressive in people living with HIV and significantly raise the likelihood of cancer.

Socioeconomic factors also contribute to the overlap. Poverty and overcrowded living conditions increase TB transmission and limit access to early screening and treatment for HIV and cancer. In addi-

tion, tobacco and alcohol use worsen outcomes. Smoking increases the risk of TB, lung cancer, and faster HIV disease progression, while alcohol weakens immunity and contributes to behaviours that increase HIV transmission.

Cancer care often involves treatments that suppress the immune system, making patients more vulnerable to infections such as TB. Individuals with leukaemia or lymphoma are particularly susceptible because of severe immune suppression. Chemotherapy and radiotherapy further reduce the body's ability to detect and fight infections.

When cancer patients also have untreated HIV, treatment outcomes are poorer and the risk of mortality is significantly higher. Managing these overlapping conditions requires careful coordination and close clinical monitoring.

#### Clinical challenges

When a patient is affected by two or all three conditions, healthcare becomes considerably more complicated. Symptoms such as weight loss, fatigue, night sweats, and persistent cough are common to TB, HIV, and cancer, making accurate diagnosis difficult.

Treatment is also challenging due to potential drug interactions between anti-TB medicines, antiretroviral therapy, and chemotherapy. Side effects may increase toxicity or reduce drug effectiveness, while severe immunosuppression raises the risk of infection and poor recovery. These challenges highlight the need for integrated and well-coordinated care.

Uganda has made notable progress in HIV control and cancer care, particularly through the Uganda Cancer Institute. However, the growing overlap between TB, HIV, and cancer demands stronger integration across health services.

Routine TB screening for HIV and cancer patients, integrating cancer screening into HIV clinics—especially cervical cancer screening for women—strengthening laboratory capacity, ensuring uninterrupted access to medicines, expanding community education, improving healthcare worker training, and strengthening referral systems are all essential steps toward effective integration.

#### A unified approach

TB, HIV, and cancer represent three intersecting epidemics that can no longer be addressed in isolation. A unified approach that combines strong community education, robust screening programmes, and integrated clinical services is essential to ensure timely, effective, and compassionate care.

Uganda has already taken important steps in this direction. With sustained investment, innovation, and public awareness, the country can significantly reduce illness, improve survival, and save thousands of lives.



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