Age and Cancer Incidence in 5.2 Million People Living With HIV in South Africa

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BACKGROUND

- Older age is a main risk factor for developing cancer due to accumulation of somatic mutations, extended exposure to carcinogenic factors, weakening of the immune system, and changes in the tissue environment.
- Yet, some cancer types tend to occur at an earlier age.
- We analyzed cancer incidence rates as a function of age in a large cohort of people living with HIV (PLWH) in South Africa.

METHODS

- The South African HIV Cancer Match (SAM) study is a linkage study of HIV-related laboratory records from the National Health Laboratory Service and cancer diagnoses from the National Cancer Registry, covering the period 2004-2014.
- We included PLWH who had at least two HIV-related laboratory records. Follow-up time started from an individual's first HIV-related test and ended at database closure or 6 months after their last HIV-related test.
- We calculated cancer incidence rates per 100,000 person-years for specific cancers and modelled them as a function of age, using flexible survival models and natural cubic splines.

Cancer type	N	Female (%)	Median age (years) [IQR]
Kaposi sarcoma	6380	48.6	35 [30-42]
Non-Hodgkin lymphoma	2590	53.6	39 [32-46]
Cervical cancer	7418	100	43 [36-50]
Conjunctival cancer	1080	65.3	38 [33-44]
Breast cancer	2748	98.5	45 [38-52]
Leukemia	359	52.1	37 [28-46]
Prostate cancer	652	0	59 [54-64]
Lung cancer	734	28.3	53 [47-58]

Table: Sex and age distribution of individuals diagnosed with cancer, for some of the most common cancer types.

Overall cancer incidence increased with older age, but rates of Kaposi sarcoma and conjunctival cancer peaked in middle-aged people living with HIV.

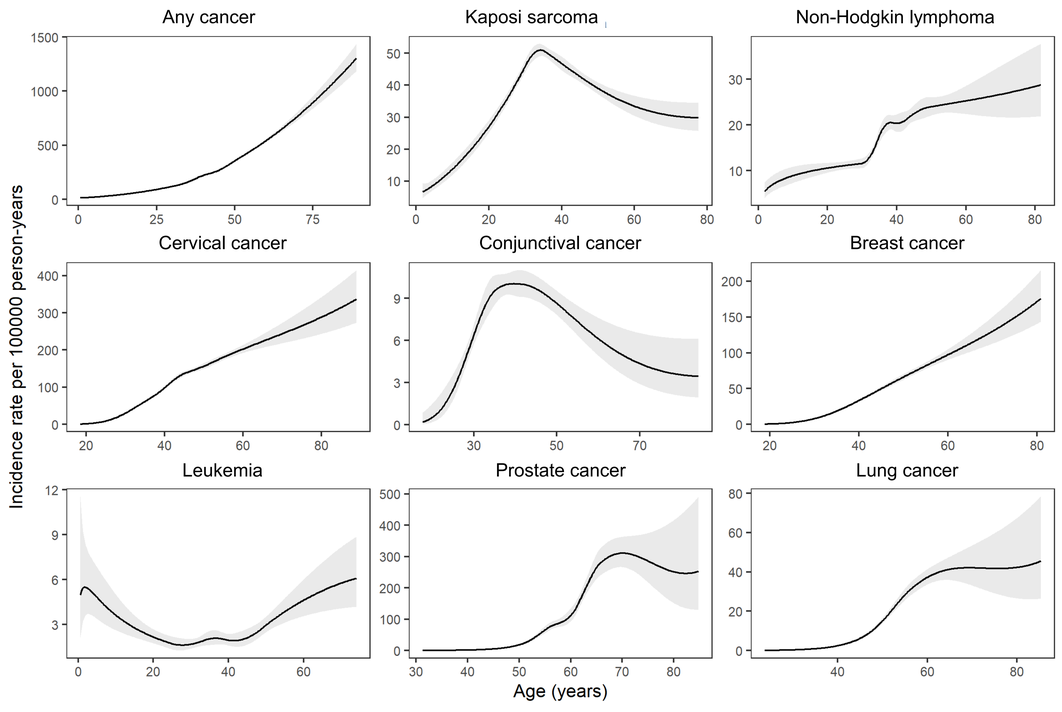


Figure: Cancer incidence rates per 100,000 person-years, as a function of age.

RESULTS

- We included 5,222,827 PLWH (69% female) with a median age of 33 years (interquartile range [IQR] 26-41) at the first HIV-related laboratory record.
- Over 15.4 million person-years, 29,580 PLWH (63% female) developed cancer.
- The most common cancer was cervical cancer (N=7,418) followed by Kaposi sarcoma (N=6,380) and breast cancer (N=2,748).
- Median age at cancer diagnosis ranged from 35 years for Kaposi sarcoma to 59 years for prostate cancer (Table).
- The incidence rate per 100,000 person-years for any cancer increased from 68 (95% CI 65-71) at age 20 to 222 (95% CI 216-228) at age 40, and 541 (95% CI 528-555) at age 60 (Figure).
- The incidence rate of Kaposi sarcoma and conjunctival cancer peaked at the age of 34 and 40, respectively.

CONCLUSIONS

In this large cohort of PLWH in South Africa, we found that overall cancer incidence increased with older age. However, the rates of Kaposi sarcoma and conjunctival cancer, two cancer types strongly associated with low CD4 cell counts, peaked in middle-aged PLWH. These peaks may be due to complex interactions between age and immunodeficiency, duration of HIV infection, access to antiretroviral therapy, and exposure to underlying oncogenic factors.

ADDITIONAL KEY INFORMATION

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