Cancer versus tuberculosis mortality among HIV-infected Individuals in Botswana

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Background:

A transition from predominantly infectious to non-infectious causes of death for individuals with HIV has occurred in high income countries

- Marked reduction in mortality due to tuberculosis and other infections
- Deaths from cancer have not reduced with antiretroviral therapy (ART) and are now the leading cause of death in context of HIV

Majority of HIV infections occur in low and middle-income countries (LMICs) where trends in mortality during ART era may be different

- Greater population burden of tuberculosis and other infections
- Younger overall population and fewer non-HIV cancer risks
- Lower CD4 cell count at initiation of ART

Understanding relative mortality of cancer versus infection could inform policy and research priorities for HIV-infected populations in LMICs

Objective:

We sought to estimate cancer mortality since availability of ART in Botswana and compare with mortality due to tuberculosis, the leading infectious cause of death among individuals with HIV in the region

Methods:

Cancer incidence estimate

- 8479 incident cases recorded in Botswana National Cancer Registry from 2003 to 2009 were utilized
- Inverse probability weighted Poisson models for cases with known HIV status were used to estimate projected incidence through 2013

Estimated mortality for incident cancers

- Observed survival histories for cases in Botswana Prospective Cancer Cohort (2010 to 2015) were utilized
- Survival probabilities by cancer type were estimated using parametric Weilbull models
- It was assumed that no major changes survival from diagnosis occurred during the study period

Estimated deaths from tuberculosis

- Published estimates from the WHO|Global TB Program

Results:

A total of 850 patients with HIV and cancer were followed

- Median 12.2 months (IQR 6.1 to 24.3 months)
- 1.2% loss to follow-up

Estimated 5-year overall survival was low

- Cervix 5.7% (95% CI 1.3 to 12.9%)
- Head and Neck 5.2% (95% CI 0.0 to 25.8%)
- Breast 20.5% (95% CI 2.1 to 37.8%)
- Non-Hodgkin lymphoma 40.5% (95% CI 13.1 to 53.0%)
- Kaposi sarcoma 52.5% (95%CI 39.0 to 59.9%)
- Combined other sites 17.0% (95% CI 7.9 to 25.9%)

Overall cancer mortality increased, 1.2% annually (95% CI 0.7 to 3.1%), and mortality due to tuberculosis declined markedly

- Cervical cancer mortality increased substantially, 13.3% annually (95%cI 11.7 to 14.9%)
- Kaposi sarcoma mortality decreased, -4.2% annually (95%CI -3.3 to -5.0%)

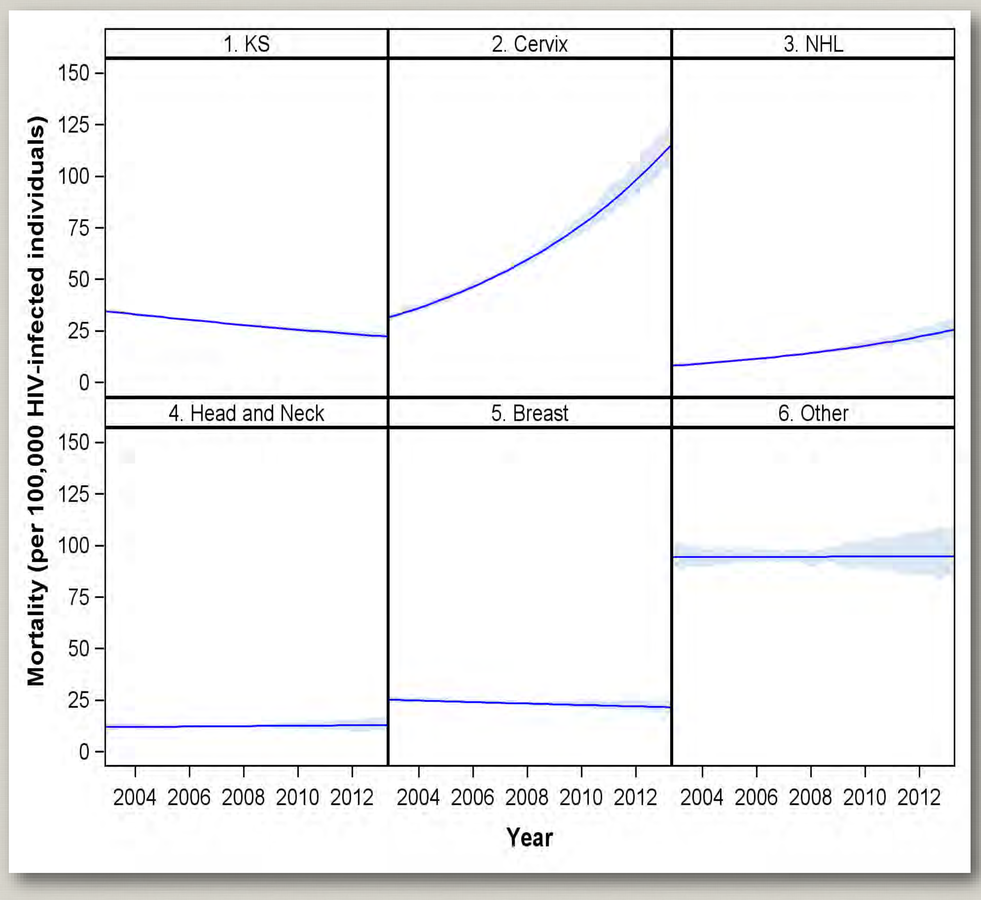

Figure 1: Estimated mortality for leading cancer sites among individuals with HIV

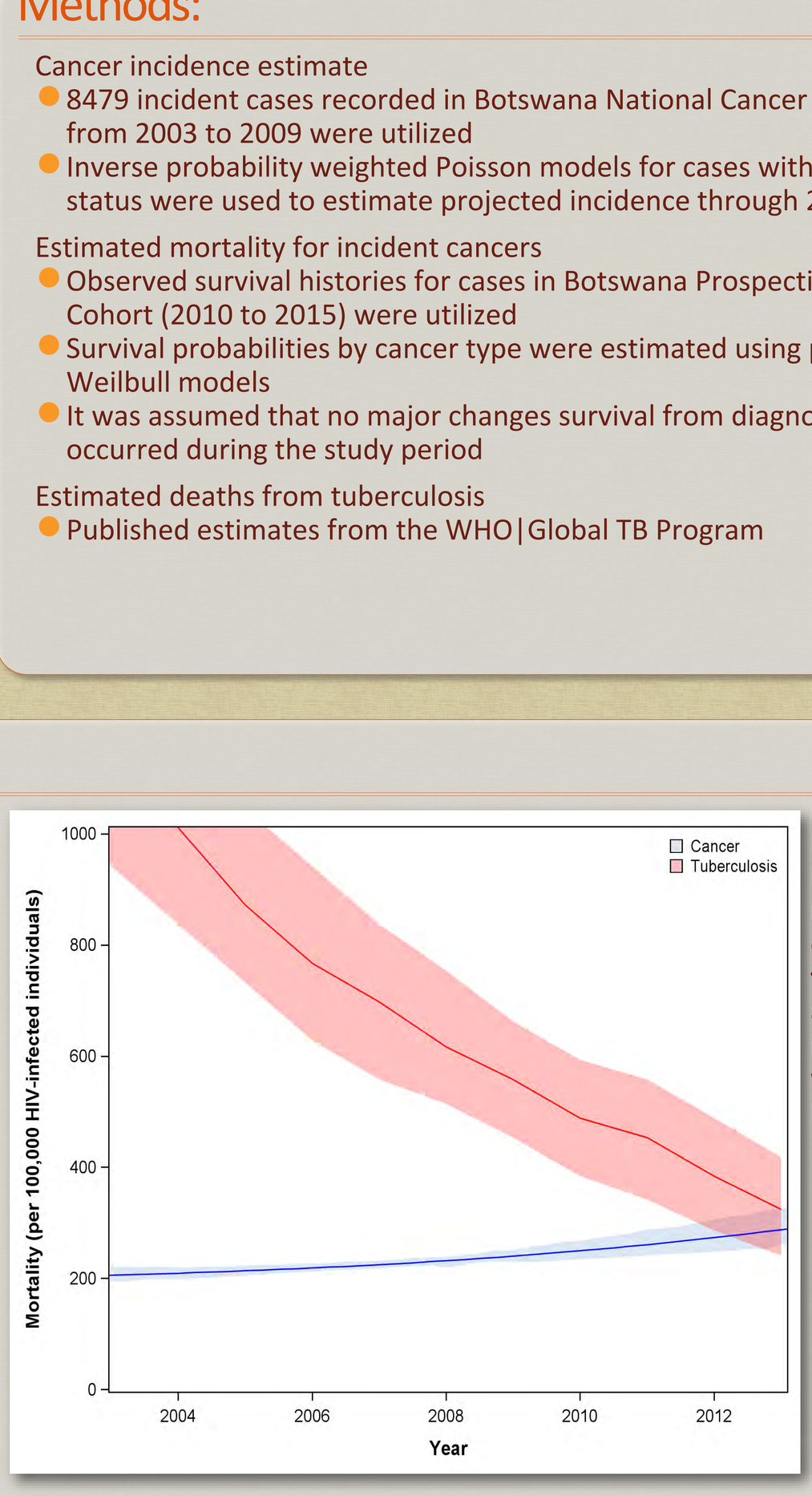

Figure 2: Estimated mortality for cancer and tuberculosis among individuals with HIV in Botswana

Projected mortality in 2013 was similar between cancer and tuberculosis

- Projected cancer mortality 288 per 100,000 (95%CI 259 to 325)
- Projected cancer mortality 324 per 100,000 (range 241 to 419)

Limitations:

Limited follow-up time reduced precision of survival estimates. Lack of contemporaneous incidence data necessitated extrapolation. All deaths among HIV-infected with cancer we assumed to be due to cancer

Conclusions:

- With ART coverage exceeding 90%, mortality due to cancer in HIV-infected individuals has increased in Botswana and now likely exceeds mortality due to tuberculosis
- Cervical cancer morality is rising sharply, tripling from 2003 to 2013
- Interventions to reduce cancer risk, establish screening programs, and improve access to treatment are urgently needed

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