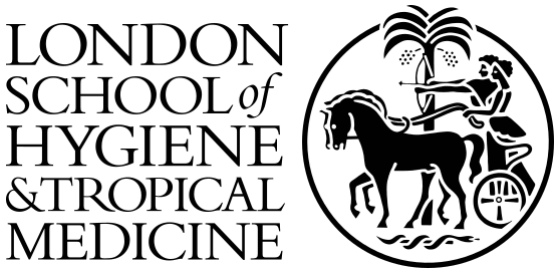

TUPEC331

Estimating latent tuberculosis infection prevalence in the United States: Back-calculation from active TB cases

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Background: Identification and treatment of latent tuberculosis infection (LTBI) is a critical component of the United States national plan for tuberculosis disease (TB) elimination. However, estimating LTBI prevalence has been challenging. In this study, we present a back-calculation model based on reported active TB disease to estimate the prevalence of LTBI within the United States (U.S.), California, and five counties in California with the highest burden of TB.
Methods: Our model incorporates annual TB cases (1993 to 2016) reported to CDC and annual mortality-adjusted reactivation risks for 85 years following infection to "back-calculate" LTBI prevalence. We used Markov Chain Monte Carlo to calibrate an exponential decay curve fit to surveillance data to estimate reactivation risks, then adjusted the reactivation risks for all-cause mortality risks. Calculations were done using a back-calculation package in R software after accounting for the long lag between LTBI and active disease, and general all-cause mortality as a competing risk. We produced uncertainty limits (UL) using lower and upper bounds for reactivation risks and the LTBI prevalence.
Results: The mortality-adjusted reactivation risk in the first year following infection was 1.42% (UL 1.40 to 1.43), and the lifetime cumulative risk for 85 years was 7.12% (UL 4.70 to 9.54). The back-calculation estimates suggest that 2.36% (UL 1.61 to 4.09) of U.S. population in 2016 were living with LTBI (corresponds to 7.65 million (UL 5.22 to 13.25)). Estimated LTBI prevalence in 2016 was 4.07% (UL 2.71 to 7.23) in California, 5.29% (UL 3.80 to 8.18) in Alameda County, 5.51% (UL 3.50 to 10.23) in Los Angeles County, 4.13% (UL 2.72 to 7.38) in Orange County, 4.79% (UL 3.22 to 8.28) in San Diego County, and 5.60% (UL 3.97 to 8.81) in Santa Clara County.
Conclusions: Our LTBI prevalence estimates are similar with previous estimates from the 2011-2012 National Health and Nutrition Examination Survey (NHANES) for the U.S. (2.1%) when TST & IGRA combined positivity was used to define the LTBI infection, and in range with NHANES estimates extrapolated to state and county demographics for California (5.99%), and the five counties (5.18%-8.20%). Our model can be used at national, state, and county levels to estimate LTBI.

TUPEC332

Epidemiological benefits of integrating services for the secondary prevention of cervical cancer into HIV care in Kenya: A mathematical modelling study

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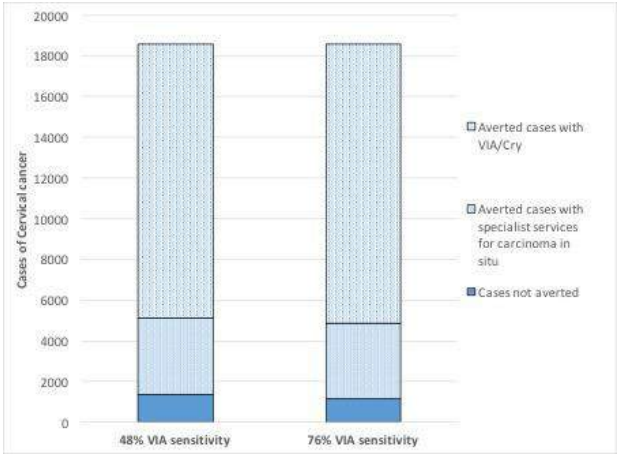
Background: Practice guidelines in Kenya recommend secondary prevention of cervical cancer (CC) through a 'screen-and-treat' approach for pre-cancerous lesions of the cervix. The Ministry of Health recognises HIV care as one of the most effective platforms for integrating such services. However, CC screening coverage remains low, at an estimated 3.2% country-wide. We aim to quantify the impact of fully implementing guideline recommendations on CC incidence amongst HIV-positive women in care (HIV-WiC).
Methods: We developed an individual-based multi-disease model of the HIV and HPV epidemics in Kenya. The model was parameterised with and fitted to national and regional surveillance and epidemiological data (Figure 1A). We compared projections of the *status quo* levels of HPV screening to a scenario of 100% coverage of HIV-WiC with visual inspection which acetic acid (VIA) and, if indicated, treatment of pre-cancerous lesions (cervical intraepithelial neoplasia 1 to 3) with cryotherapy (Cry). We assumed VIA sensitivity to range from 48% to 76% and Cry success rates of 87.5% based on literature. Screening intervals were 6-monthly, for the first year, followed by annual, as per national guidelines.
Results: Our model predicts a baseline of 18,600 CC cases (18,078-19,123) between 2018 and 2035 amongst HIV-WiC, with an incidence of 215.35 (208.96-221.76) per 100,000 person-years (py). Integrating screen-and-treat services with VIA/Cry in this population could avert 72% to 74% of cases (13,480-13,700) and reduce CC incidence to 56 to 58 per 100,000py (48-69), depending on VIA sensitivity (Figure 1). Widespread availability of specialised services for the treatment of carcinoma *in situ* could further avert up to 20% of pre-invasive cancer cases, potentially driving CC incidence down to 38 per 100,000py.
Conclusions: In the absence of effective secondary prevention programs, HIV-WiC are at an increased risk of CC than HIV-negative populations. Our modelled projections are in agreement with this. Despite variability in VIA performance, scaling-up VIA/Cry in HIV-WiC in Kenya could forestall a large proportion of HPV-related morbidity.



[Figure 1 - Modelled cervical cancer incidence rate in HIV-WiC from 2018 to 2035, with varying levels of VIA sensitivity from pre-cancerous lesions (ce]

TUPEC333

Characterizing the need for integrated chronic disease healthcare for people living with HIV

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Background: Non-communicable diseases (NCDs) are a significant and growing source of morbidity and mortality among HIV positive people in sub-Saharan Africa. In Kenya, pilot integrated care programs providing services for both HIV and chronic NCDs such as hypertension and diabetes are emerging in some counties, but there is little information about the growth of overlapping conditions at the clinical and population level to provide a basis to assess healthcare needs. The research described within this abstract generates foundational knowledge of potential demand for integrated care in two ways; by assessing development of hypertension among a longitudinal clinical cohort of people living with HIV, and modeling the dual burden of NCD and HIV at the population level.