

Incidence of TB and HIV in prospectively followed household contacts of TB index patients in South Africa

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The World Health Organization (WHO) estimates that South Africa has an annual tuberculosis (TB) incidence rate of 1.0 per 100 population (95% CI 0.8–1.2) – an epidemic that is in part fuelled by the generalised human immunodeficiency virus (HIV) epidemic, which continues to be propagated by an estimated HIV incidence of 1.3 per 100 susceptible individuals per annum in 15–49 year olds (95% CI 0.6–2.5). Household contacts of active TB cases are at increased risk of TB infection and several studies have measured TB prevalence in this key population. This study not only measured TB prevalence, but also measured TB and HIV incidence in the household contacts of 729 TB index cases in the Matlosana sub-district in North West Province (1,2).

All consenting household contacts provided a sputum sample if possible, received pre- and post-test counselling for HIV and received a rapid HIV test at the first study visit in 2009. Participants were referred to receive isoniazid preventative therapy (IPT), antiretroviral therapy (ART) or TB treatment where appropriate. At the follow up visit one year later, the same household contacts were: 1) included in the study if they consented again; 2) included in the TB incidence analysis if they had a TB diagnosis or were on current TB treatment at first visit; and 3) included in the HIV incidence analysis if they tested HIV negative at first visit. Incident TB was defined either as a new diagnosis of TB, neither present at the first household visit, nor diagnosed within 60 days following that first study visit. We also included as incident cases contacts whose relatives reported that they died of TB in the time between visits. Those with prevalent TB at the first visit were considered to have an incident episode only if they were diagnosed with TB at least 8 months after the prior TB diagnosis.

Of the 2,337 (82%) household contacts tested at first study visit who consented at the follow up visit, 9.2% (95% CI 8.0–10.5%) had active TB and 17.9% (95% CI 16.0–20.0%) tested positive for HIV at baseline. TB prevalence among HIV-infected participants was 10.6% (95% CI 7.2–15.0%) and HIV prevalence among TB patients was 24.3% (95% CI 16.8–33.2%).

At the follow up visit, 26 incident TB cases were found for 1,960 person years which equates to a TB incidence of 1.3 per 100 person years (/100py) (95% CI 0.9–1.9/100py); for individuals who were

HIV-infected and HIV-seronegative at baseline this was 5.4/100py (95% CI 2.9–9.0/100py) and 0.7/100py (95% CI 0.3–1.4/100py), respectively.

18 of the 815 household contacts who tested negative at baseline seroconverted, reflecting an overall HIV incidence rate of 2.2/100py (95% CI 1.3–8.4/100py).

Although subsequent cases of TB may have been reduced by the single intensified case finding strategy, the point estimate of annual TB incidence rate in contacts of index TB cases we report is still higher than the notification based estimate of incidence for the entire district of 1.2 per 100 person years. Despite receiving HIV testing and counselling within the last year, the point estimate of HIV incidence in retested participants was also high when compared to the modelled HIV incidence estimate for North West Province in 2010 which was 0.79% for the general population.

This study had three important limitations: 1) Although the study revisited a large number of household contacts, the sample size was too small to identify statistically significant risk factors for either incident TB or HIV; 2) Two different case finding strategies were used at the two study visits. At the first visit all participants provided a sputum sample or were referred to a facility to obtain a TB diagnosis, but at the second visit only symptomatic participants provided a sputum sample; 3) Refusal rates for HIV testing were high at both study visits – 39% at the first visit and 32% at the second visit.

If this study were to be repeated today, lower HIV and TB incidence rates may be recorded due to improvements in TB diagnostics and greater numbers of HIV positive people receiving ART and IPT. However, we posit that the efficacy of contact tracing for TB control purposes might be improved by a second intensified case finding visit and by providing preventive treatment against TB for both HIV-infected and HIV-seronegative household contacts of TB cases.

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References

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