Reply to Wilson et al

To the Editor—Wilson et al make an excellent point that we as a field are lacking direct estimates of the reduction in human immunodeficiency virus (HIV) transmission associated with anal intercourse among men who have sex with men (MSM) who are virologically suppressed [1]. The recent exciting finding of a 96% overall reduction in HIV transmission in discordant heterosexual couples randomized to early HIV treatment in HPTN 052 provides strong evidence for the dramatic effectiveness of antiretroviral therapy (ART) in reducing HIV infectiousness [2].

Given the strength of the effect of ART on reducing HIV transmission, it is questionable whether a large-scale randomized trial in MSM would be acceptable for ethical reasons. While this is being debated, we can look to cities such as San Francisco, California, and Vancouver, British Columbia, where HIV incidence, ART coverage, and community viral load are closely monitored [3–5]. In our home city of San Francisco, we are seeing decreases in newly diagnosed and reported HIV infections that correlate well with the expansion of ART coverage and increases in the proportion of HIV-infected MSM who are virologically suppressed (a 39% increase between 2004 and 2008), all in the context of stable or increasing rates of HIV transmission risk behaviors and reported sexually transmitted infections among those uninfected with HIV. Of course, correlation is not causation, and the multiple factors that influence HIV transmission dynamics and could explain the modeled and observed differences between Sydney and San Francisco may not be fully appreciated in our studies.

As identified in our sensitivity analysis, the magnitude of the reduction in new HIV infections is most strongly influenced by the estimate of the effectiveness of ART-induced virologic suppression in reducing infectiousness. Indeed, major decreases in the estimated effectiveness of ART in reducing HIV transmission resulted in a modeled halving of the potential beneficial effect of expanded ART and testing and attenuation of the projected gains over time (see Figure 1). There is optimism in the HIV prevention field that among MSM virologic suppression will dramatically reduce HIV infectivity, even in the setting of the higher transmission potential associated with anal sex. Essentially, absent or extremely low virus copy numbers below the limit of detection are unlikely to result in new infections.

Figure 1. Sensitivity to antiretroviral therapy (ART) effectiveness estimates for the modeled percent reduction in new HIV infections with the test and treat all strategy.
infections as long as the amounts are below the putative threshold for transmission, even if that threshold is lower for anal sex than vaginal sex. Although the viral load numerical threshold is uncertain, we have seen evidence of such limits since the earliest findings associating viral load with transmission probability [6–7]. We are very encouraged that the Sydney group is conducting a prospective cohort study among HIV-serodiscordant MSM couples to estimate the effect of ART on transmission risk associated with anal intercourse, and we look forward to the findings, their ability to inform modeling endeavors, and their eventual comparison with observed trends.

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