Published in final edited form as:

AIDS. 2010 March 27; 24(6): 936–938. doi:10.1097/QAD.0b013e328337afa9.

Available evidence does not support serosorting as an HIV risk reduction strategy: author's reply

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Heymer and Wilson offer four critiques of our study [1], concluding that serosorting may be more harmful than helpful in many settings. We address each critique below.

First, they were concerned that our model does not consider how strategic positioning and negotiated safety ‘change with or without disclosure of HIV status’. We did not explicitly model HIV status disclosure. However, we randomly assigned nondisclosers serostatuses based on local prevalence and partitioned strategic positioning and negotiated safety behaviors accordingly. Thus, our model considered both behaviors, parameterized using our 2003 RDD study data of men who have sex with men (MSM) [2] and with weighted averages across nondisclosing and disclosing serodiscordant couples, hence avoiding bias.

Second, they express concern that, given 16% HIV prevalence, our ‘model would require partner acquisition rates among HIV-positive men to be much greater than among HIV-negative men’. We did not assume a priori that HIV-positive men have higher partner acquisition rates; rather, men with higher partner acquisition rates were more likely to become HIV-positive.

Third, our colleagues ‘question the relevance of using equilibrium prevalence to gain insight into the effect of a recent phenomenon on an epidemic where there is increasing incidence’. We interpret this as favoring a focus on the immediate effects of serosorting to an individual, as in Heymer and Wilson’s recent study [3]. We find value in understanding both short-term individual and long-term population effects, and explored both in our study. For the latter, equilibrium prevalence is a commonly used metric with cross-study comparability; its use does not imply that researchers expect behavior to remain constant indefinitely. Both calculations supported our conclusion that in Seattle MSM, serosorting is more protective than not serosorting, all else equal. Additionally, overall HIV incidence among Seattle MSM appears to be stable [4].

Perhaps most importantly, Heymer and Wilson question our decision to parameterize our model assuming that MSM test one to two times per year, an estimate they believe exceeds common rates. We derived our testing estimates directly from the Seattle RDD study [2], where men reporting one anal sex partner and more than one anal sex partner in the previous year reported testing a median of 12 and 6 months prior to interview, respectively. Mean intertest interval was 18 and 10 months. Among MSM tested in five US STD clinics, the median intertest interval was 243 days [5]. Few US data are available on the proportion of HIV cases that are undiagnosed, and the representativeness of what data we have is mostly unknown. However, the 2008 National HIV Behavioral Surveillance System (NHBS) survey

conducted in King County, Washington, found that 13% of MSM testing HIV-positive were unaware of their infection (H. Theide, personal communication). Data from the same survey in San Francisco, California, found that 14.5% of HIV-positive MSM were undiagnosed (W. McFarland, personal communication). A 2001 population-based survey of California MSM found nearly 10% of HIV-infected MSM were undiagnosed [6]. These numbers are at odds with national data from the 2005 NHBS survey and a CDC estimate that 24.5% of HIV-positive US MSM are undiagnosed [7,8].

We believe there is evidence to support our estimate for Seattle. However, the USA is a large, heterogeneous nation and there are almost certainly regions where testing is less frequent and a greater proportion of infected MSM are undiagnosed. To assess that issue further, we explored the effect of serosorting under a wider array of testing frequencies (Fig. 1). In our model, serosorting has no impact on equilibrium HIV prevalence or the risk of HIV acquisition when high-risk and low-risk MSM test every 1.5 and 3 years, respectively. Serosorting has a small deleterious effect at lower testing frequencies.

We agree with Heymer and Wilson that the benefit of serosorting is highly context-specific and depends on testing frequency, accurate disclosure and behavior. Our findings suggest that, in Seattle, serosorting, as practiced, probably somewhat protects MSM both at the individual and population levels, a finding supported by empirical observation [9,10]. However, that may not be true throughout the USA and should not be construed to suggest that we are promoting serosorting. We believe that our modeling study and Heymer and Wilson's [3] have some similar conclusions. Serosorting would be protective if the proportion of HIV-infected MSM that are undiagnosed is less than 20% (as shown in Fig. 1 [3]), and serosorting can potentially increase risk when the population does not test frequently. These concordant findings should reinforce the importance of increasing the proportion and frequency of MSM testing for HIV.

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Fig. 1. Equilibrium HIV prevalence (a) and transmission probabilities during unprotected receptive anal intercourse with a randomly chosen apparent negative (b) by testing frequency