Chapter 6
Prevalence in MSM Is Enhanced by Role Versatility

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ABSTRACT

In the community of men who have sex with men (MSM) the prevalence of the HIV-1 infection is still high. Promiscuity and condom fatigue are making unprotected anal intercourse (UAI) more common and sexually transmitted infections (STIs) presumably harder to track. Yet, MSM communities are peculiar in the sense that men can adopt fixed (insertive or receptive) or versatile (both practices) roles. Some old theoretical work predicted that the transmission of HIV-1 would be enhanced in MSM populations engaged more in role versatility than in role segregation, in which fixed roles are predominantly adopted. These predictions were based on the assumption that the probability of acquisition from unprotected insertive anal (UIA) sex was neglectable, which is an inappropriate assumption. This chapter shows that the increase of the HIV-1 prevalence among MSM due to role versatility holds under a stronger assumption of bidirectional virus transmission.

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BACKGROUND

The prevalence of the HIV-1 infection has decayed in the last decades in western heterosexual populations (Beyrer *et al.,* 2012). However, in the community of men who have sex with men (MSM) the prevalence is still high, despite intensive campaigns and treatment programs that keep infected men as undetectable (Beyrer *et al.,* 2012). Promiscuity and condom fatigue (Adam *et al.,* 2005), which are not unique to the MSM community, are making unprotected anal intercourse (UAI) more common and sexually transmitted infections (STIs) presumably harder to track. Yet, MSM communities are peculiar in the sense that men can adopt fixed (insertive or receptive) or versatile (both practices) roles. Some old theoretical work (Trichopoulos *et al.* 1998; Van Druten *et al.* 1992; Wiley & Herschkorn 1989) predicted that the transmission of HIV-1 would be enhanced in MSM populations engaged more in role versatility than in role segregation, in which fixed roles are predominantly adopted. These predictions were based on the assumption that the probability of acquisition from unprotected insertive anal (UIA) sex was neglectable. However, as later shown (Goodreau *et al.* 2005; Vittinghoff *et al.* 1999), this assumption is inappropriate and HIV-1 can still be acquired, although at a lower rate, via UIA sex. Here I show that the increase of the HIV-1 prevalence among MSM due to role versatility holds under a stronger assumption of bidirectional virus transmission.

I aim developing a stochastic model to demonstrate that in MSM populations that practice UAI, the prevalence of the HIV-1 infection decays when there is a transition from role versatility to role segregation without assuming that the long-term probability of acquisition from UIA sex with receptive infected partners is negligible. In other words, I will demonstrate, in a more realistic scenario that allows for bidirectional virus transmission, that the high prevalence of the HIV-1 infection in MSM populations can still theoretically be attributed to role versatility.

METHODS: A STOCHASTIC MODEL WITH DIFFERENT ROLE CLASSES

The following is assumed:

- The MSM population practices UAI.
- There is random mixing among individuals and sexual-role classes.