

HIV Epidemics in Africa, India, and San Francisco

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At first it seems impossible to model complex social/medical environments in which HIV/AIDS spreads in India and sub-Saharan Africa. Nonetheless we have found ways of modelling aspects of the spread of HIV that reveal considerable information of use to health officials. Our approach yields equations describing the rate of increase of the epidemic. These findings are based in part on our estimates of how infectious HIV is.

How infectious a person is when infected with HIV depends upon what stage of the disease the person is in. We use three stages, which we call primary, asymptomatic and symptomatic. It is important to have a systematic method for computing all three infectivities so that the measurements are comparable. Using robust modeling we provide high-resolution estimates of semen infectivity by HIV disease stage. We find that the infectivity of the symptomatic stage is far higher, hence more potent, than the values that prior studies have used when modeling HIV transmission dynamics. The stage infectivity rates for semen are 0.024, 0.002, 0.299 for primary, asymptomatic and symptomatic (late-stage) respectively. Implications of our infectivity estimates and modeling for understanding heterosexual epidemics such as the Sub-Saharan African one are explored. Our infectiousness results are soon to appear in *J. AIDS*.

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