

Modeling Complex Contact Networks, or Things I Don't Understand

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Abstract. The talk covers the author's work for more than a decade on modeling the heterosexual transmission of the HIV/AIDS epidemic in Thailand which was primarily driven by the female sex workers (FSW) and their male clients. The evolution of the model, to account for the complex social network of Thai commercial sex and its change in time, was described with refinements of earlier simple models with core group and pair formation (Busenberg, Cooke, and Hsieh 1995; Hsieh and Cooke 2000), resulting in a more complicated model incorporating intervention and behavior changes of the male clients in response to the explosive epidemic in the 1990's and the subsequent change in the structure of commercial sex under a supply and demand assumption, in order to conserve the number of total contacts between the FSWs and their clients (Hsieh and Chen 2004; Hsieh and Wang 2006). Analysis was carried out for some special cases of the full model. Moreover, data was utilized to estimate the basic reproduction number and to simulate future trends of the epidemic. The results indicate these changes was able to lower the number of infections but the system still approaches a stable endemic equilibrium, albeit at a lower level. Recent statistics appears to confirm this trend that was predicted by the model.