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Cost-effectiveness Evaluation of Vaccination Programs Against Sexually Transmitted Diseases for Different Sexes

For sexually transmitted diseases the determination of an optimal vaccination program is not straightforward due to sexual heterogeneity since (1) the transmission probabilities between two different sexes are normally unequal (weighted to a greater probability from males to females than vice versa), (2) demographic parameters between the two sexes are unequal, (3) the prevalence of disease in one sex may have a greater impact on the morbidity and mortality of the next generation (transmission to the neonate).

In this talk, we will present two models of sexually transmitted infections (with and without age structure) to evaluate the cost-efficacy of vaccination programs for different sexes in the context of sexually transmitted disease control, with special application to potential genital herpes vaccination programs. For both models, we find that the stability of the system and ultimate eradication of the disease depend explicitly on the corresponding reproduction number. We also find that vaccinating females is more cost-effective, providing a greater reduction in disease prevalence in the population and the number of infected females of childbearing age. This result is counter-intuitive since vaccinating super-transmitters (males) over sub-transmitters (females) usually has the greatest impact on disease prevalence. Sensitivity analysis is implemented to investigate how the parameters affect the control reproduction numbers and infectious population sizes.