STDSIM is a dynamic stochastic simulation model for decision support in attempts to control sexually transmitted diseases (STDs). It describes the mechanisms responsible for the transmission of five STDs, including HIV/AIDS, at the level of individuals. A large variety of outcome measures (for example, STD prevalence, incidence, and mortality) can be calculated for different groups of the population (for example, adolescents, prostitutes, pregnant women, and migrants) to evaluate the effects of alternative STD control interventions. We designed the model to support decision making for different settings in developing countries, with Nairobi (Kenya) as its first application area. The model adequately describes STD prevalences and the time-trend of HIV prevalence measured in Nairobi. As an illustration of the possibilities of the model, we show model predictions of the effects of improved STD care and increased condom use on the prevalence and incidence of HIV.