

The thesis purpose is to discuss urn models where the probability of success at any trial depends upon the number of previous successes. Such a scheme allows us to estimate the number of HIV cases among intravenous drug users. The coefficients in known probability generating function will be derived for the number of new infectives generated in both homogenous and inhomogenous population. The expectations and variances of the number of new infectives are also derived for both cases. These derived values will be verified for some fixed number of infectives and susceptibles by simulations. In the end of this thesis the studied model will be applied on a practical example where the effect of vaccination will be studied.