1073-92-27 **Nicoleta Tarfulea*** (ntarfule@purduecal.edu), Department of Mathematics, Purdue University Calumet, 2200 169th Street, Hammond, IN 46323. *A mathematical Model for HIV Treatment with Time-varying Antiretroviral Therapy.*

We present a mathematical model to investigate theoretically and numerically the effect of immune effectors, such as the cytotoxic lymphocyte (CTL), in modeling HIV pathogenesis during primary infection. Additionally, by introducing drug therapy, we assess the effect of treatments consisting of a combination of several antiretroviral drugs. A periodic model of bang-bang type and a pharmacokinetic model are employed to estimate the drug efficiencies. Nevertheless, even in the presence of drug therapy, ongoing viral replication can lead to the emergence of drug-resistant virus variances. Thus, by including two viral strains, wild-type and drug-resistant, we show that the inclusion of the CTL compartment produces a higher rebound for an individual's healthy helper T-cell compartment than does drug therapy alone. We investigate numerically how time-varying drug efficacy due to drug dosing regimen and/or suboptimal adherence affects the antiviral response and the emergence of drug resistance. Moreover, we characterize successful drugs or drug combination scenarios for both strains of virus. (Received July 06, 2011)