Abstract

This study considered the problem of selecting the best single model for modeling state-specific failure rates in HIV/AIDS progression for patients on antiretroviral therapy with age and gender as risk factors using exponential, twoparameter, and three-parameter Weibull distributions. CD4 count changes in any two consecutive visits, the mean waiting time (μ), and transitional rates (λ) for remaining in the same state or transiting to a better or a worse state were analyzed. Various model selection criteria, namely, Akaike Information Criteria (AIC), Bayesian Information Criteria (BIC), and Log-Likelihood (LL), were used in each specific disease state. The Maximum Likelihood Estimation (MLE) method was applied to obtain the parameters of the distributions used. Plots of State-specific transition rates (λ) depicted constant, increasing, decreasing, and unimodal trends. Three-parameter Weibull distribution was the best for male patients and patients aged (40-69) years transiting in the states 1-2, 3-4, and 4-5, and 1-2, 3-4, and 5-6, respectively, and for male, female patients, and patients aged (40-69), remaining in the same state. Two-parameter Weibull distribution was the best for female patients and patients aged (20-39) years transiting in the states 1-2, 2-3, 4-5, and 1-2, 2-3, 3-4, respectively. Exponential distribution proved inferior to the other two distributions used.