1068-35-150 **Ronald E. Mickens*** (rohrs@math.gatech.edu), Clark Atlanta University, Physics Department, Atlanta, GA 30314, and **Kale Oyedeji** (koyedeji@morehouse.edu), Morehouse College, Atlanta, GA 30314. *The Methodology of the Construction of SIR Models for the Spread of Disease.*

The standard SIR model, for the spread of a disease, gives a mathematical representation of the conversion of members of the susceptible population to the infective population, and then the subsequent transition of infectives to the removed class. In general, it is assumed that the transition or interaction terms are expressible as integer valued polynomials of the relevant variables. However, there does not exist any *a priori* rules which require that this is the proper mathematical structure for such terms. In this work, we introduce the principal of "dynamic consistency" (DC) and demonstrate how its application can produce SIR models that are in better agreement with the known epidemiological data. Consistent with the principal of DC, we construct a new SIR model that has the feature that its exact, explicit solution can be found. Finally, we examine the generic properties of a SIR model having population growth and contrast its solutions with models not having this characteristic. (Received January 17, 2011)