Hospitals and health centers provide a variety of healthcare services and normally generate hazardous waste as well as general waste. General waste has a similar nature to that of municipal solid waste and therefore could be disposed of in municipal landfills. However, hazardous waste poses risks to public health, unless it is properly managed. The hospital waste management system encompasses many factors, i.e., number of beds, number of employees, level of service, population, birth rate, fertility rate, and not in my back yard (NIMBY) syndrome. Therefore, this management system requires a comprehensive analysis to determine the role of each factor and its influence on the whole system. In this research, a hospital waste management simulation model is presented based on the system dynamics technique to determine the interaction among these factors in the system using a software package, ithink. This model is used to estimate waste segregation as this is important in the hospital waste management system to minimize risk to public health. Real data has been obtained from a case study of the city of Nablus, Palestine to validate the model. The model exhibits wastes generated from three types of hospitals (private, charitable, and government) by considering the number of both inpatients and outpatients depending on the population of the city under study. The model also offers the facility to compare the total waste generated among these different types of hospitals and anticipate and predict the future generated waste both infectious and non-infectious and the treatment cost incurred.