

Mathematical Modeling of Vital Organ Failure and Treatment Outcomes with Lindley Distribution

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Abstract

In this paper, we consider that diabetic person gets kidney and heart ailment. We described four different models. In model 1 Kidney gets affected at random times with a mixture of exponential distribution (λ) and Erlang Phase-2 distribution (θ). In model 2 Kidney gets affected at random times with a Lindley mixture of exponential distribution (θ) and Erlang Phase-2 distribution (θ). In these models, the heart gets affected at a random time which has Erlang phase-2 distribution. The time to prophylactic treatment has general distribution in models 1, 2. The time to prophylactic treatment has exponential distribution in models 3, 4 and illustrates the numerical example. We present the expected time to send the hospital for treatment, the expected time to treatment in the hospital, and its variances are also derived.

Keyword: Lindley distribution, Exponential distribution, Erlang Phase-2 distribution, Laplace transform.