

## **Cure Fraction, Modelling and Estimating in a Population-Based Cancer Survival Analysis**

**<sup>1</sup>Mohd Rizam Abu Bakar, <sup>2</sup>Khalid A. Salah, <sup>1</sup>Noor Akma Ibrahim  
and <sup>1</sup>Kassim Haron**

*<sup>1</sup>Department of Mathematics, Universiti Putra Malaysia and  
Institute for Mathematical Research, Universiti Putra Malaysia*

*<sup>2</sup>Department of Mathematics, Al-Quds University, Jerusalem, Palestine  
E-mail: mrizam@math.upm.edu.my*

### **ABSTRACT**

In population-based cancer studies, cure is said to occur when the mortality (hazard) rate in the diseased group of individuals returns to the same level as that expected in the general population. The optimal method for monitoring the progress of patient care across the full spectrum of provider settings is through the population-based study of cancer patient survival, which is only possible using data collected by population-based cancer registries. The probability of cure, statistical cure, is defined for a cohort of cancer patients as the percent of patients whose annual death rate equals the death rate of general cancer-free population. Recently models have been introduced, so called cure fraction models, that estimates the cure fraction as well as the survival time distribution for those uncured. The colorectal cancer survival data from the Surveillance, Epidemiology and End Results (SEER) program, USA, is used. The aim is to evaluate the cure fraction models and compare these methods to other methods used to monitor time trends in cancer patient survival, and to highlight some problems using these models.

**Keywords:** Relative survival, Survival mixture cure rate model, Cure fraction, SEER Stat, CANSURV.