

**A  $k$ -sample median test based on the length of confidence interval for median survival time with right-censored data**

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**Abstract**

In clinical trials, researchers usually need to compare the treatment effects of several therapies in terms of median survival times, this can be done by employing a  $k$ -sample median test. The asymptotic distribution of the test statistic for comparing several median survival times proposed by Brookmeyer and Crowley (1982b) was derived when the shapes of  $k$  populations are the same. To overcome this limitation, Rahbar et al. (2012) suggested a nonparametric test statistic which employed the bootstrap method to estimate the asymptotic variance of sample median. To provide an explicit formula for estimating the asymptotic variance, Tsai et al. (2014) proposed a length-based variance estimator based on the length of confidence interval for median survival time. This paper further estimated the length of confidence interval for median by inverting the acceptance region of the test statistic proposed by Brookmeyer and Crowley (1982a). Because the type I error rates of the test statistic proposed by Rahbar et al. (2012) are slightly higher than the nominal level, their test is extended by replacing the bootstrapped variance estimator with the length-based estimators. Simulation studies are conducted to evaluate the bias of the proposed estimator as well as the type I error rates of the extended tests.

**Key words:** right-censored data,  $k$ -sample median test, median survival time, confidence interval