Survival Analysis of Breast Cancer Modelled by Parametric Methods

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MSC. APPLIED STATISTICS

Objectives

- We want to determine the factors or covariates associated with survival of someone diagnosed with breast cancer
- Comparison of survival rates for different groups and what it means

Survival Analysis

- Survival time is the analysis of data in the form of times from a well-defined time of origin until an event of interest occurs (end-point).
- Time of origin is the date that an individual was diagnosed with breast cancer according to my research
- The end-point or the event of interest is death.
- All the observations who are still alive or die from a different cause other than breast cancer are censored.

Importance of Survival Analysis

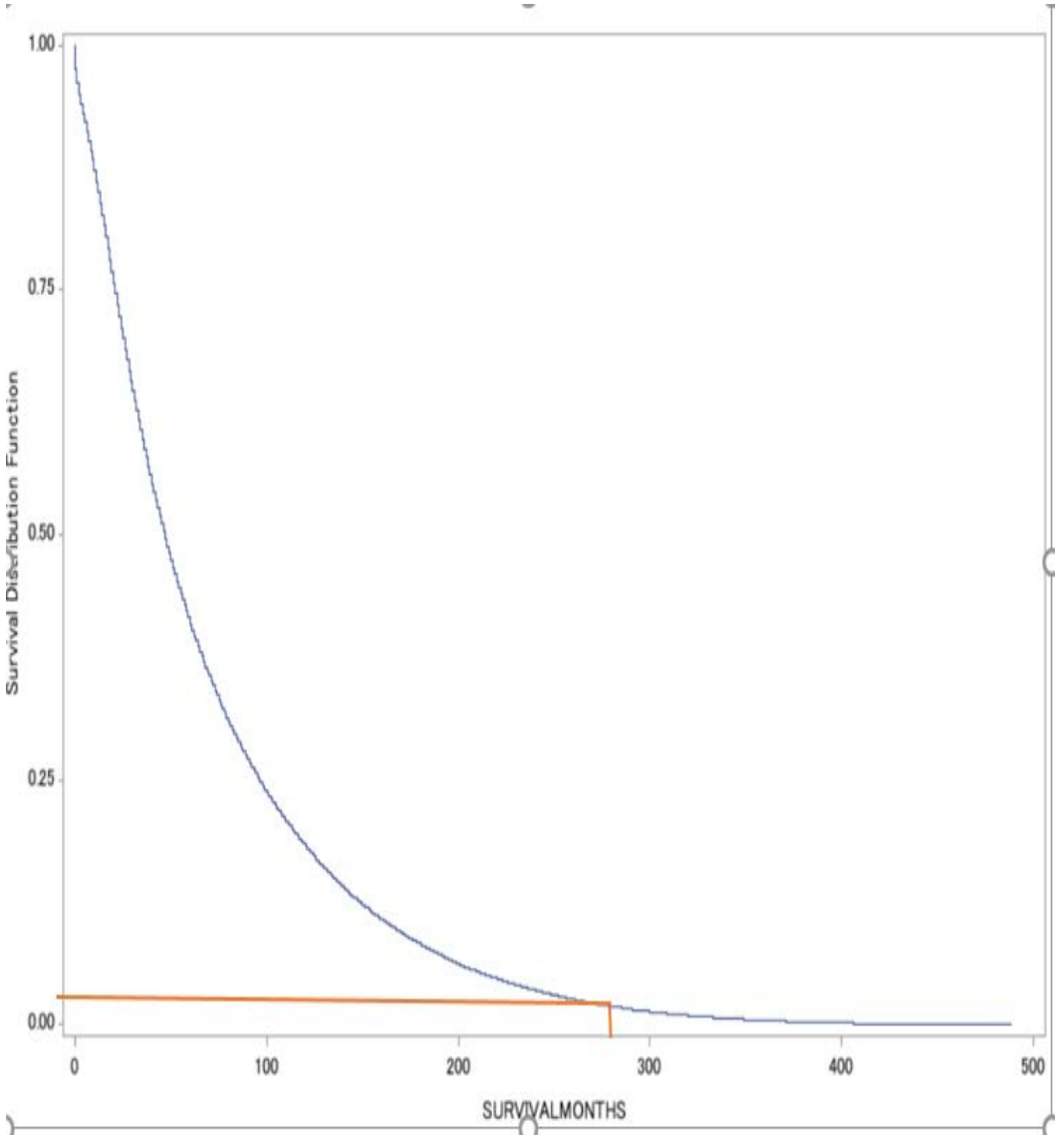
- Estimate time to event for a group of individuals
- Compare time to event for two or more groups
- Assess the relationships of covariates to time of event

Breast cancer Statistics

- Breast cancer is the second leading cause of death after skin cancer and affects both men and women
- According to CDC, in 2013, 230,815 women and 2109 men in the USA were diagnosed with breast cancer and 40,860 women and 464 men died from breast cancer.
- In 2017, there are 3.1 million survivors of breast cancer in the united states including those who are still under treatment and those done with treatment.

Analysis of Survival curves

- at zero months of survival, the survival probability is equal to unity.
- We can see from diagram that the probability levels off to zero at about 280 months
- the probability of survival at 280 months is less than *10%*.



Different Age groups

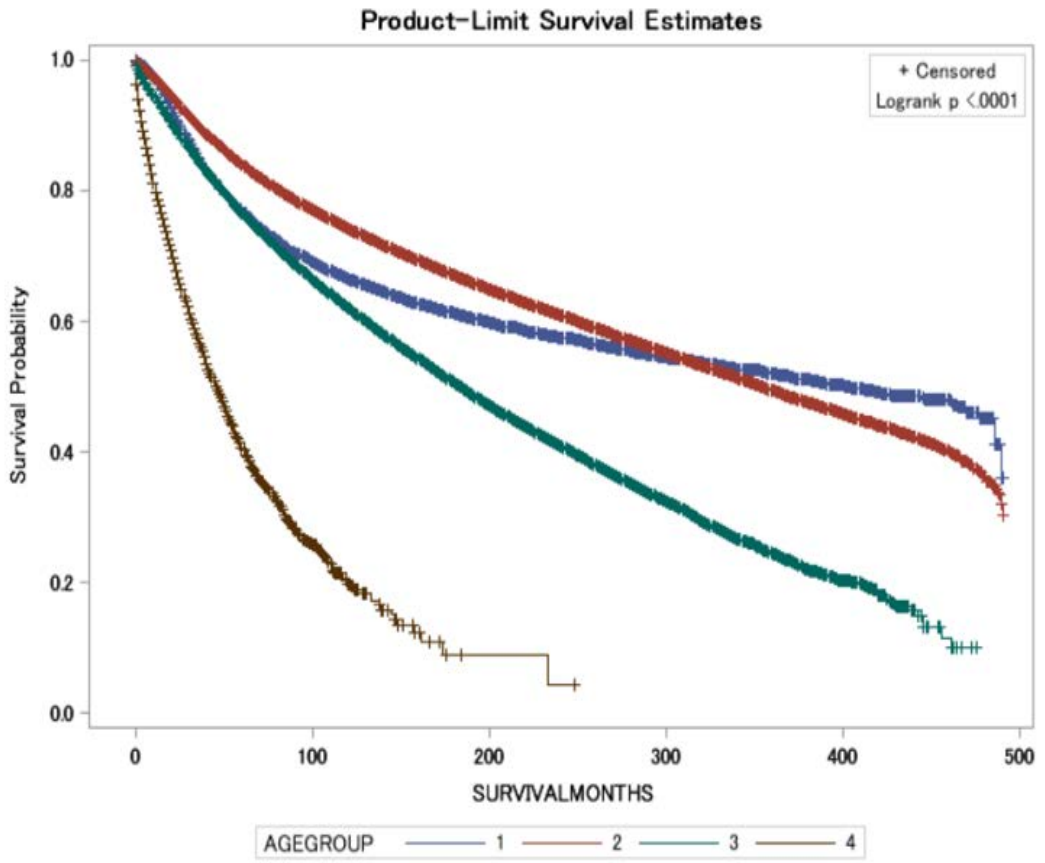
From the logrank p-value we can determine that there is a significant difference of survival among the four different groups

1=0-32

2=32-62

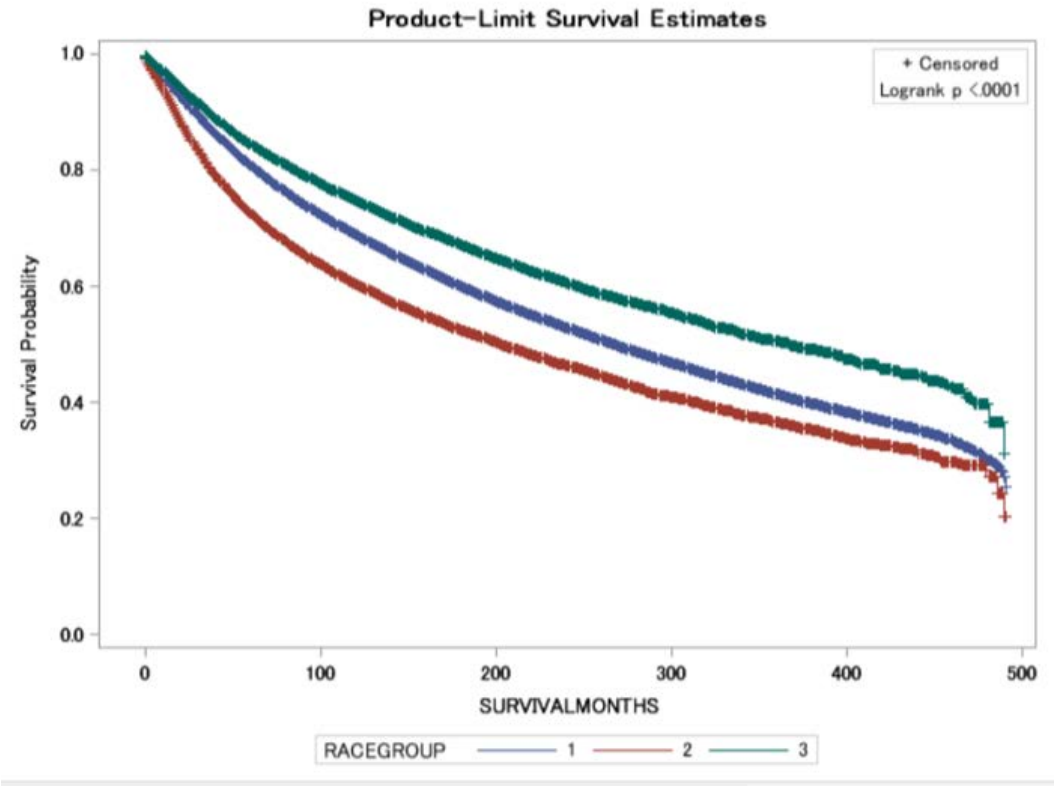
3=63-92

4=>92



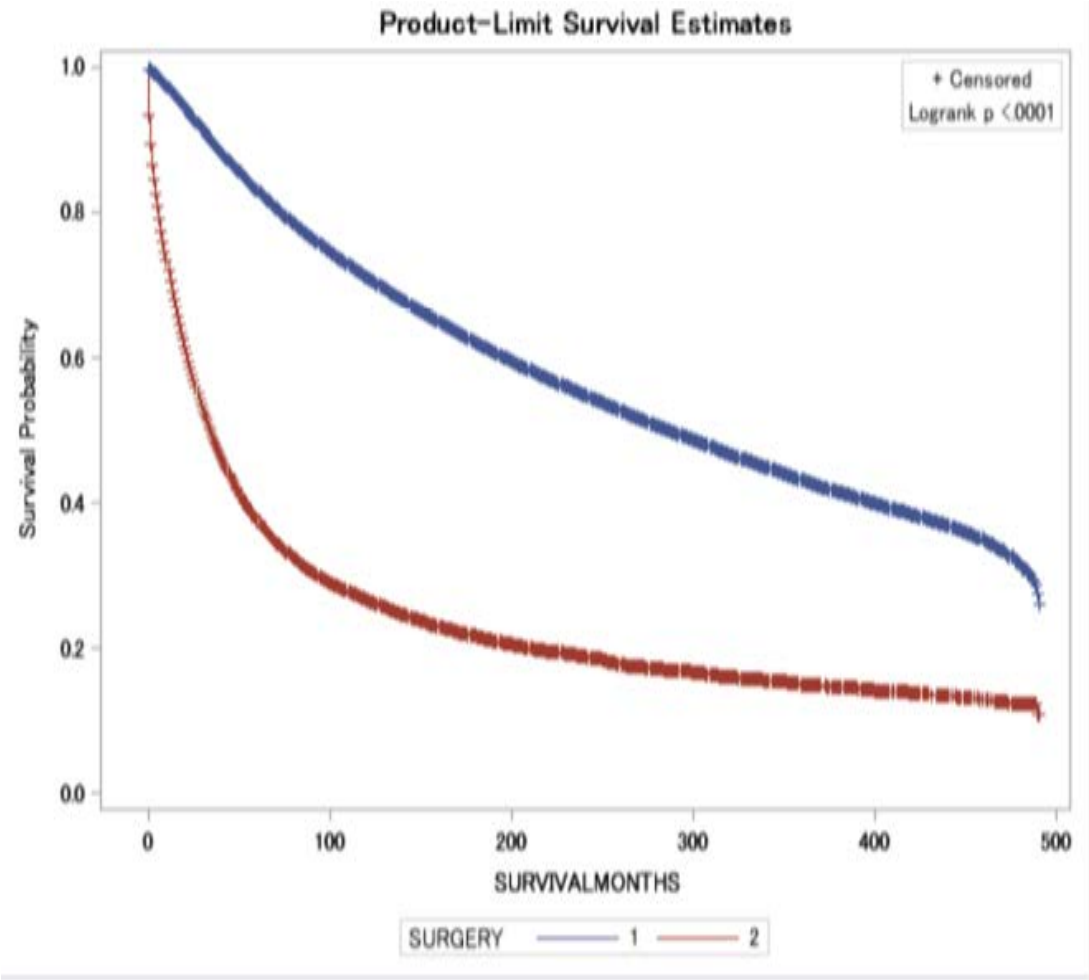
Comparison By Ethnicity

- The race is divided into 1.white ,2. black and the 3.other
- The chance of survival is higher for other races compared to that of black and white races.



Comparison by treatment

- 1- the number of patients who had surgery had a higher probability pf survival compared to those who did not have any surgery performed.



Extended Applications

- Business planning in determining which customer has a higher survival rate of making payments.
- Evaluating the lifetime of a machine component in engineering
- Used by insurance companies to determine the time till lapsing of a policy.

Conclusions

From the analysis of survival curves we can see how there is a steep difference for individuals who underwent surgery as a form of treatment compared to those who did not have any surgery performed. We could therefore recommend surgery as a treatment form to boost survival for breast cancer patients.