

Cox PH Model example question

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A study is made into the effect of a new treatment on survival times of patients with a tropical disease.

The model fitted is $h_i(t) = h_0(t) \exp(\beta^T \cdot z)$ where

$h_i(t)$ is the hazard at time t since treatment

$h_0(t)$ is the baseline hazard

z is a vector of covariates where z_1 is the period from diagnosis to treatment in years; z_2 is 0 if the existing treatment is applied and 1 if the new treatment is applied; and z_3 is 1 if the patient is male, 0 if female.

β is a vector of parameters where $\beta_1 = 0.5$; $\beta_2 = 0.01$; $\beta_3 = -0.05$

- (i) State the group of lives to which the baseline hazard applies
- (ii) For a male who was given the new treatment 6 months after diagnosis,
 - a. Write down the hazard function in terms of $h_0(t)$
 - b. Express the survival function in terms of $h_0(t)$
- (iii) For a female given the new treatment at time of diagnosis the probability of survival for 5 years is 0.75. Calculate the probability that the male in (ii) above will survive 5 years.