

Survival Analysis STAT 2261 / BIOST 2054

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Your Name: _____

For this problem we are considering a randomized trial of high dose versus low dose of Heparin in treating COVID patients who require hospitalization. The data have been simulated as the study has not released the data to the public yet. We will consider the following variables:

time time in days since randomization to a composite outcome of
a major thrombotic event or death whichever occurred first
event censoring variable, 0 = censoring, 1 = a major thrombotic event or death
Ddimer 0=low, 1=medium, 2=high D-dimer level
age standardized patient's age
trt 0=low, 1=high dose of Heparin
severity 0 = no need for the ICU level care; 1= need of the ICU level care

1. Examine thrombotic-event-free survival curves for those who received high dose of Heparin and for those who were randomized to the low dose group and perform a two-sample test to compare the efficacy of using a high dose versus a low dose in preventing major thrombotic events or death.
2. Fit a Cox proportional hazard model with treatment, two dummy variables for D-dimer with the low level as the reference, severity and age as predictors. After adjusting for other risk factors, does the high dose of Heparin seem to help prevent major thrombotic events or death?
3. There is some concern that those who need the ICU level care may benefit differently from Heparin than those who do not need the ICU level care. Test whether this is true by adding a severity and treatment interaction to your model.

4. Can the variable Ddimer be included in the Cox model as a continuous variable? Justify your answer.
5. Based on your final model discuss how each risk factor in your model is associated with the composite outcome.