

# Problem Set 4

## Applied Stats II

Due: April 12, 2024

### Instructions

- Please show your work! You may lose points by simply writing in the answer. If the problem requires you to execute commands in R, please include the code you used to get your answers. Please also include the .R file that contains your code. If you are not sure if work needs to be shown for a particular problem, please ask.
- Your homework should be submitted electronically on GitHub in .pdf form.
- This problem set is due before 23:59 on Friday April 12, 2024. No late assignments will be accepted.

### Question 1

We're interested in modeling the historical causes of child mortality. We have data from 26855 children born in Skellefteå, Sweden from 1850 to 1884. Using the "child" dataset in the `eha` library, fit a Cox Proportional Hazard model using mother's age and infant's gender as covariates. Present and interpret the output.

```
1 # load data on child mortality by mother's background and child gender
2 data("child")
3
4 #fit model
5 infant_cox_harzard <- coxph(Surv(enter, exit, event) ~ m.age + sex, data =
  child)
6 summary(infant_cox_harzard)
7 stargazer(infant_cox_harzard, type = "text")
```

```
1  Dependent variable:
2
3      enter
4
```

5	m. age	0.008***	
	(0.002)		
	sexfemale	−0.082***	
	(0.027)		
6	Observations	26,574	
7	R2	0.001	
8	Max. Possible R2	0.986	
9	Log Likelihood	−56,503.480	
10	Wald Test	22.520***	(df = 2)
11	LR Test	22.518***	(df = 2)
12	Score (Logrank) Test	22.530***	(df = 2)
13	Note:	*p<0.1; **p<0.05; ***p<0.01	
14			

From the result we can see that keeping gender constant, one unit increase in the mother's age is associated with 0.008 increase in the log hazard rate for the infant, and for mothers with same age, the logged hazard ratio for girls is about 0.082 less than boys. So an older mother or having a boy will increase the hazard risk for infant mortality, in other words, boys with older mother are less likely to survive.