**Spring 2022 BIOS 591P**

**HW 8 Week of April 12**

**Complete and submit on Canvas by 3pm on April 21, 2022.**

On the 10th of April, 1912, the RMS Titanic set out on its maiden voyage across the Atlantic Ocean carrying 2,223 passengers. On the 14th of April, it hit an iceberg and sank.

The data set, saved in the SAS dataset ‘Titanic Spring 2022.csv’, contains data on the following variables for some (though not all) of the passengers on the Titanic:

Variable Description

PassengerID Unique ID number for each passenger

Survived Survival status (1=survived, 0=died)

Age Age of passenger, in years

Sex Sex (1=male, 0=female)

TicketClass Ticket class (1=first class, 2=second class, 3=third class)

Use SAS or R (recommended: try both!) to examine the association between survival status and the other three variables using a single model. Complete the report on the next page and upload to Canvas.

**Factors Associated with Survival in the Titanic Disaster**

**Introduction:** On the 10th of April, 1912, the RMS Titanic set out on its maiden voyage across the Atlantic Ocean, carrying 2,223 passengers. On the 14th of April, it hit an iceberg and sank. In this analysis, we examine factors associated with the probability of survival in the Titanic disaster, including age, sex and ticket class using data available on 1309 of the passengers.

**Statistical Methods:** Descriptive statistics were examined for each variable. Age was incorporated into the analysis as a binary variable (<15 years old vs. older). <Insert test name here> tests were performed for preliminary inspection of potential associations between survival status and the other factors. A <insert method name here> analysis (model shown below) was performed.

Logit [Pr(Y=1)] = β0 + β1X1 + β2X2 + β3X3 + β4X4, where

Y = survival status (1=survived, 0 = died)

X1 = sex (1=male, 0=female)

X2 = age (=1 if >= 15 years old, 0 if < 15 years old)

X3 = 1 if First Class ticket, 0 else; X4 = 1 if Second Class ticket, 0 else.

**Results:** Characteristics of the 1309 passengers are summarized in Table 1. xxx passengers (xxx%) survived. xxx (xxx%) were male, and xxx (xxx%) were children under the age of 15. xxx (xxx%) were first class passengers, and xxx (xxx%) were in second class.

Table 1. Titanic Passenger Characteristics (n=1309) Table 2. Adjusted Odds Ratios for Survival

|  |  |
| --- | --- |
| Variable | n (%) or Mean (SD) |
| Survived |  |
| Male |  |
| Age (>= 15 years) |  |
| Ticket Class First |  |
| Second |  |

|  |  |
| --- | --- |
| Predictor | **95% CI for Adjusted Odds Ratios** |
| Sex (male vs. female) |  |
| Age (>= 15 yrs vs. <15 yrs) |  |
| Ticket Class: first vs. third |  |
| first vs. second |  |
| second vs. third |  |

The multivariable <insert name here> model was significant (<insert test name here> test p-value < xxx). The following were significantly associated with survival at the 5% significance level: <insert names of predictors here> (Table 2). With 95% confidence: (i)) the female odds of surviving were between xxx and xxx times the male odds of surviving, adjusted for age and ticket class; (ii) Children younger than 15 had odds of surviving that were between xxx and xxx times the odds of older passengers, adjusted for sex and ticket class; and (iii) first class passengers’ odds of surviving were between xxx and xxx times those of passengers in third class, and between xxx and xxx times those of passengers in second class, adjusted for <insert something here>. Second class passengers’ odds of surviving were between xxx and xxx times the odds of passengers in third class adjusted for <insert something here>.

The model fit was <insert relevant statistics here, along with a description of the nature of the fit>.

**Conclusions:** <Students fill in conclusions>