**1.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | Variable | N (msng) | Mean (SD) | Mdn (Range) |
| No relapse within 24mo  | lowest PSA value attained post therapy (ng/ml) | 28 (0) | 4.2 (17.3) | 0.2 (0.1, 92) |
|   | PSA value prior to therapy (ng/ml) | 23 (5) | 617.2 (1252.1) | 100 (4.8, 4377) |
|   | performance status (0= worst, 100= best) | 28 (0) | 84 (9.6) | 80 (50, 100) |
|   | bone scan score (1= least disease, 3= most) | 28 (0) | 2.4 (0.8) | 2.5 (1, 3) |
|   | tumor grade  | 24 (4) | 2.1 (0.9) | 2 (1, 3) |
|   | age (yr) | 28 (0) | 66.8 (5.9) | 65.5 (58, 81) |
| Relapse within 24mo  | lowest PSA value attained post therapy (ng/ml) | 22 (0) | 32 (52.5) | 10.5 (0.5, 183) |
|   | PSA value prior to therapy (ng/ml) | 20 (2) | 732.4 (1357.4) | 174 (25, 4797) |
|   | performance status (0= worst, 100= best) | 20 (2) | 76.5 (11.9) | 80 (50, 100) |
|   | bone scan score (1= least disease, 3= most) | 20 (2) | 2.8 (0.5) | 3 (2, 3) |
|   | tumor grade  | 17 (5) | 2.3 (0.8) | 2 (1, 3) |
|   | age (yr) | 22 (0) | 68.4 (5.7) | 68 (61, 86) |

**2a.**
Used the command
xi: logit relap24 nadir ps i.bss, robust

Comparing 2 groups of patients with 10 ng/ml difference in the lowest PSA value attained post therapy and controlling for bone scan score and performance status, the odd of relapse within 24 months in the higher PSA group is 1.39 time that of the lower PSA group. However, the observed trend is not beyond what might be expected to occur by chance in the absence of a true difference of 24-month relapse risk (p = 0.445, 95% CI: 0.60, 3.23).

**2b.**Used the command
xi: logit relap24 ln\_nadir ps i.bss, robust

Comparing 2 groups of patients with 2 fold difference in the lowest PSA value attained post therapy and controlling for bone scan score and performance status, the odd of relapse within 24 months in the higher PSA group is 1.79 time that of the lower PSA group. The trend is statistically significant (p=.008), with a 95% CI suggesting that such an observation would not be unusual if the true odd ratio is from 1.16 to 2.77.

**2c.**Used the command
xi: logit relap24 snadir1 snadir2 snadir3 snadir4 ps i.bss, robust
test snadir1 snadir2 snadir3 snadir4

After adjusting for bone scan score and performance status, the lowest PSA value attained post therapy is significantly associated with the risk of 24-month relapse (p=0.0190)

**2d.**
eβ0 (4.19e-06) in 2a can be interpreted as the odds of 24-month relapse in patients with nadir PSA=0, performance status=0 and bss=1. Patients with such profile rarely relapse within 24-month.

eβ0 (8.835e-06) in 2b can be interpreted as the odds of 24-month relapse in patients with nadir PSA=1, performance status=0 and bss=1.

eβ0 (5.499e-06) in 2c can be interpreted as the odds of 24-month relapse in patients with nadir PSA=0, performance status=0 and bss=1.

**3a.**Use the command
xi: reg nadir relap24 ps i.bss, robust

After adjusting bone scan score and performance status, the mean lowest PSA value attained post therapy in patients who relapsed within 24 months is 23.4 ng/ml higher than that of patients who did not relapse within 24 months. The trend is statistically significant (p=.050), with a 95% CI suggesting that such an observation would not be unusual if the true difference of mean PSA is between 0.02 to 46.70ng/ml.

**3b.**Use the command
xi: reg ln\_nadir relap24 ps i.bss, robust

After adjusting bone scan score and performance status, the geometric mean lowest PSA value attained post therapy in patients who relapsed within 24 months is 13.7 times that of patients who did not relapse within 24 months. The association is statistically significant (p<0.0005), with a 95% CI suggesting that such an observation would not be unusual if true fold change of geometric mean is from 4.1 to 45.6.

**4a.**
The first 3 analysis (problem 2) modeled 24-m relapse status as outcome, which is more intuitive. 2b and 3b used log transformed nadir PSA, which reflected the multiplicative instead of additive nature of PSA. 2c is a more flexible model of nadir PSA, which did not assume linear or log linear effect of PSA. *a priori* I would have chosen 2b because 1) PSA is most likely right skewed and maybe log normal, 2) the effect of PSA is likely multiplicative instead of additive, 3) we can have point estimate and confidence interval for the average effect of nadir PSA on the risk of 24-m relapse.

**4b.**
We did not use all the information collected for this study to access the relationship between nadir PSA and time in remission. Many patients were followed more than 24 months though some were censored. A model using the full information would have been better suited to address the association.