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Applied Regression II, Homework 4

(a) Three Statistical Analysis Topics:

1. Kaplan-Meier Survival Curves: "At 10 years, the rate of survival among patients with any grade of prostate cancer was 79.3% in the finasteride group and 79.5% in the placebo group. When men were classified according to cancer grade, the 10-year survival rates were 83.0% in the finasteride group and 80.9% in the placebo group among those with low-grade prostate cancer and 73.0% and 73.6%, respectively, among those with high-grade prostate cancer."

2. Cox Proportional Hazards Model: "A Cox model was used to estimate hazard ratios for death associated with the two treatments, after adjustment for risk factors. The covariates that were included in the model for overall survival were the age at study entry as a continuous variable, race (black vs. nonblack), and a time-dependent variable for the diagnosis of prostate cancer."

3. Hazard Ratios: "Hazard ratios are for the finasteride group as compared with the placebo group, unless otherwise indicated. A hazard ratio of less than 1 indicates a reduced risk of death.", "The unadjusted hazard ratio for death in the finasteride group was 1.02 (95% CI, 0.97 to 1.08; P = 0.46); after adjustment for age, race, and a diagnosis of prostate cancer, the hazard ratio was 1.03 (95% CI, 0.98 to 1.09; P = 0.26).", etc.

(b) Comments on their Descriptions:

1. Kaplan-Meier Survival Curves: The description is partially sufficient. While it provides point estimates for survival rates at 10 years, it could be improved by:

- Including 95% confidence intervals for all survival rate estimates
- Mentioning the number at risk at different time points (maybe using a table)
- Describing how censoring were handled

2. Cox Proportional Hazards Model: The description needs improvement. While it lists the covariates, it lacks:

- Details on how the time-dependent covariate was implemented
- Information about model diagnostics or goodness-of-fit (for example, log-rank test)
- Does not mention the proportional-hazards assumption test result

3. Hazard Ratios: The description is quite sufficient as it provides both unadjusted and adjusted hazard ratios with 95% CIs and p-values. However, it could be enhanced by:

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- Clarifying the interpretation (e.g., "a hazard ratio of 1.02 indicates a 2% increased risk of death") in the text
- Providing hazard ratios for other covariates in the model to show their relative importance in the main text part