BIOST/EPI 537 -- WINTER 2020

CHECK LIST OF IMPORTANT SKILLS AND CONCEPTS FOR THE MIDTERM

(This will hopefully help guide your review of the material. However, it is not necessarily an exhaustive list.)

1. You should be able to describe what are the defining features of survival data and what renders their analysis challenging.
2. You should be able to describe and recognize different forms of data incompleteness, including the different types of censoring and truncation.
3. You should understand how a naive analysis of data subject to censoring or truncation may fail.
4. You should be able to understand the concept of a risk set and be able to calculate the risk set at different times for a given data example.
5. You should be familiar with the definition and interpretation of the density function, the survival function, the hazard function, the cumulative hazard function, the mean residual time and the median residual time, and with the fact that each of these can be computed from any of the others.
6. You should explicitly know how the density, hazard, survival and cumulative hazard are related to each other.
7. You should be familiar with the likelihood approach to fitting a parametric model for survival data subject to right-censoring.
8. You should understand the trade-off (in terms of bias and variance) involved in choosing smaller or larger parametric models.
9. You should be able to formally assess whether a smaller model is an appropriate simplification of a larger model, particularly in the context of the exponential, Weibull, gamma and generalized gamma models.
10. You should be able to describe what the Kaplan-Meier and Nelson-Aalen estimators are, what their characteristics are, and how they are computed.
11. You should be able to state the independent censoring assumption and understand what it implies about the individuals found in the risk set at any given time.
12. You should be able to discuss when and why transformations may be useful to construct confidence intervals (including for survival probabilities and values of the cumulative hazard function).
13. You should be able to interpret graphical output (e.g., Kaplan-Meier and Nelson-Aalen curves) of a survival analysis.
14. You should be able to interpret tabular output of a survival analysis.
15. You should understand the trade-off (in terms of bias and variance) involved in selecting the amount of smoothing used to produce an estimated hazard function from the estimated cumulative hazard function.
16. You should be able to discuss why the mean is problematic in the context of survival analysis and describe remedies that have been proposed along with their limitations.
17. You should be able to compute an estimate and 95% confidence interval for the median survival time using tabular output of a survival analysis.
18. You should be able to define the median residual lifetime and to calculate an estimate of the median residual lifetime at a given time t using tabular output of a survival analysis.
19. You should be able to test whether two groups differ with respect to their survival probability at a given time or their median survival time.
20. You should be able to describe what the null and alternative hypotheses in the logrank test are.
21. You should be familiar with how the logrank test statistic is calculated and what it should be compared to in order to determine a p-value.
22. You should understand when the logrank test has good power and when it does not.
23. You should know why a weighted logrank test might be used and what its test statistic should be compared to in order to determine a p-value.
24. You should know why a stratified logrank test might be used and what its test statistic should be compared to in order to determine a p-value.