BIOST/EPI 537
Winter Quarter 2009
Dr. Heagerty

BIOST/EPI 537
SURVIVAL DATA ANALYSIS IN EPIDEMIOLOGY

Course Outline

TOPIC (estimated number of lectures), ∗=optional	READING
1. **Introduction to longitudinal studies, survival distributions and event-time data.** (1)	H&L: Ch. 1 B&D: Ch. 1
2. **One, Two, and K-sample Nonparametric methods for censored survival data.** (2)	
Product-limit estimator	H&L: 2.2, 2.3
Nelson cumulative hazard estimator	H&L: 2.5; B&D 5.3
Kernal hazard estimator	B&D: 5.3(a)
Two and K-sample log-rank test	H&L: 2.4; Collett: 2.5, 2.6
Trend test; Stratified test	H&L: 2.4; Collett: 2.7, 2.8
3. **Introduction to the Cox regression model** (3)	
Forms of the model	H&L: 3.1, 3.2; B&D: 5.1(c)
Interpretation of coefficients	H&L: 4.1-4.4; Collett: 3.7
Relationship to K-sample methods	Collett: 3.9
Survival curve and hazard function estimation	H&L: 4.5, 4.6; B&D: 5.3(b) Collett: 3.8
Stratification	H&L: 7.2; B&D: 5.1
4. **Advanced topics in Cox regression and its application to cohort studies** (6)	
Left truncation due to staggered entry	H&L: 7.4; B&D: 5.6(a)
Time-dependent covariates	H&L: 7.3; B&D: 5.1(b) B&D: 5.5(g), Ch. 6
Time-dependent strata	B&D: 5.1
Different time scales	B&D: 5.1, 5.6(a),(b)
Comparison with population rates (external)	B&D: 5.1(d), 5.5(a),(c),(d)
Goodness-of-fit and regression diagnostics	B&D: 4.3, 5.2(c), 5.6(c) Collett: Ch. 5
Competing Risks	
Post-stratification	

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Course Outline
(continued)

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5.	**Sampling strategies / designs** (2)	
	Sampling from the risk set	H&L: 9.4; B&D: 5.4
		B&D: 5.4, 5.5(e)
	Case-cohort design	
6.	**Additive hazards regression model** (1*)	
	Form of the model	H&L: 9.5
	Interpretation of regression coefficients	B&D: 5.1(c), 5.2(d)
	Inference/testing of hypotheses	
7.	**Parametric hazard models / accelerated failure model** (1)	
8.	**Analysis of grouped survival data**(4)	
	Introduction to Poisson regression	B&D: 4.2
	Poisson regression	B&D: 4.3-4.5, 4.8, 5.2(a)
	Calculation of person years	B&D: 3.1, 3.2
	Comparison with population rates (external standard) and the SMR	B&D: 4.6, 5.5(b)
9.	**Regression models for prediction** (2)	
	Defining error of prediction	H&L: 5.4, 6.5
	Bias versus variance	
	AIC and BIC as criteria	
	Accuracy ideas for survival data	
	Validation	
10.	**Regression models for multiple outcomes / recurrent events** (1*)	
	Recurrent events	H&L: 9.2