

Stat 479
Fall 2010
Quiz 8
November 2, 2010

1. You are given the following information on 23 lives in a one year mortality study.

Life	Time of Entry	Time of Termination	Cause of Termination
1	0	.5	Lapse
2	0	.2	Death
3	0	.6	Death
4	0	.6	Lapse
5	0	.8	Death
6	0	.7	Lapse
7-20	0	1	End of Study
21	.2	.6	Death
22	.5	.9	Lapse
23	.7	1	End of Study

Calculate $\hat{S}_{23}(0.9)$ using the Nelson-Åalen estimate.

j	t_{time}	S_j	r_j
1	.2	1	$20 - 0 = 20$
2	.6	2	$22 - 2 = 20$
3	.8	1	$23 - 6 = 17$

Nelson Aalen

$$\hat{H}_{23}(0.9) = \sum \frac{S_j}{r_j} = \frac{1}{20} + \frac{2}{20} + \frac{1}{17} = 0.2088235$$

$$\hat{S}_{23}(0.9) = e^{-\hat{H}_{23}(0.9)} = e^{-0.2088235}$$

$$= 0.811538$$

2. You are given following information about claims from automobile accidents occurring on Purdue Campus:

Amount of Claim	Number of Claims
0-1000	700
1000-2500	150
2500-5000	90
5000-10,000	40
Over 10,000	20

Using the ogive, calculate $F_{1000}(x)$ for $2500 \leq x \leq 5000$.

$$F_{1000}(2500) = \frac{850}{1000} = 0.85$$

$$F_{1000}(5000) = \frac{940}{1000} = 0.94$$

The ogive states that we linearly interpolate.

$$F_{1000}(x) = \frac{5000-x}{2500} (.85) + \frac{x-2500}{2500} (.94)$$

$$= \frac{1}{2500} (1900 + .09x)$$

$$= 0.76 + .000036x$$

for $2500 < x < 5000$