Applied Survival Analysis – December 2010
Solutions to Lab 1: Empirical Survival Estimate

(a)

Values of t	*# Failed*	$\hat{S}(t^+)$
1	1	11/12=0.917
2	3	8/12=0.667
3	1	7/12=0.583
5	1	6/12=0.500
6	1	5/12=0.417
7	1	4/12=0.333
8	1	3/12=0.250
16	1	2/12=0.167
17	1	1/12=0.083
34	1	0/12=0

(b) **Median:** survival time (t) such that $\hat{S}(t) \le 0.5 \Rightarrow \hat{S}(5) = 0.5$, so the estimated median survival time is **5**

Lower quartile (25%) : the smallest time (LQ) such that ,
$\hat{S}(LQ) \le 0.75 \Rightarrow \hat{S}(2) = 0.667$, so the estimated 25%-ile survival time is **2**

Upper quartile (75%) : the smallest time (UQ) such that ,
$\hat{S}(UQ) \le 0.25 \Rightarrow \hat{S}(8) = 0.25$, so the estimated 75%-ile survival time is **8**
A quick way to get the above information is by simply typing in STATA:

```
stsum

        failure _d:  fail
  analysis time _t:  nhltime

        |              incidence       no. of    |------ Survival time -----|
        | time at risk     rate        subjects        25%       50%       75%
--------+-------------------------------------------------------------------
  total |          103   .1165049            12          2         5         8
```

(c) There are two ways of saving the graph in STATA , either by going to the *File Menu* and selecting *Save Graph* (the easy way) or by adding the option **`saving(filename)`** in the graph command.

e.g **`sts graph, saving(kmnhl)`**

This will save the graph in the file *kmnhl.gph* (*gph* is the default extension for STATA graphs). To re-open it you either go to the directory where you saved the graph and double-click on it or you type the following command:

```
graph use kmnhl
```

(d) We assume that the probability of an event (relapse or death) is a binomial proportion. Thus the probability of relapse or death at time $t=6^+$ is $p=x/n$ ($p=7/12=0.583$)

or

$(1-\hat{S}(6^+)) = 1-0.417 = 0.583$ and according to standard error of the binomial distribution we get :

$$se = \sqrt{\frac{p(1-p)}{n}} = \sqrt{\frac{0.583(0.417)}{12}} = 0.1423$$

(e)