# Lab 6
Psychology 319 (GCM)

*Instructions.* Work through the lab, saving the output as you go. If you work in Microsoft Word, you can easily copy any graph to Word via the clipboard. Numerical output may also be copied easily by highlighting, moving it to the clipboard, then copying into Word. However, you should format R output in TrueType Courier New font so that it is *monospaced.* Output from this lab is to be handed in by Friday, March 26. Your output file should be named `LAST_FIRST_LAB6.DOC`, where `LAST` is your last name, and `FIRST` is your first name. Any additional files should have the same naming scheme, except the file extension should be correct. You may add any description text you wish after `LAB6` in the file name.

*Preamble.* In today's lab, we construct a life table and plot the estimated hazard function and survivor function using the simple descriptive techniques described in Chapter 10 of Singer and Willett.

## 1   Introduction

King, et al (1979), as discussed in Chapter 3 of the textbook *Statistical Methods for Survival Data Analysis* by Lee and Wang, investigated the impact of diet on development of tumors in rats exposed to a chemical agent, 7,12-Dimethylbenz($\alpha$)antheacene. One of their groups was fed a low-fat diet, the other two saturated fat, and unsaturated fat diets, respectively. The rats were of the same age and species and were in similar physical condition. An identical amount of tumor cells were injected into a foot pad of each rat.

The rats were observed for 200 days. Many developed a tumor early in the study period. Some were tumor-free at the end of the 200 days. A few of the rats died before the completion of the 200 day study period.

Survival in this case was defined as the length of time a rat remained tumor free. The data for the 30 rats in the unsaturated-fat group are in the file *unsat.txt.* Download and load the file into R.

```
> data <- read.table("unsat.txt",header=T,sep=",")
> data
   time censor
1   112      0
2    68      0
3    84      0
4   109      0
5   153      0
6   143      0
7    60      0
8    70      0
9    98      0
10  164      0
11   63      0
12   63      0
13   77      0
14   91      0
15   91      0
16   66      0
17   70      0
18   77      0
19   63      0
20   66      0
21   66      0
22   94      0
23  101      0
24  105      0
25  108      0
26  112      0
27  115      0
28  126      0
29  161      0
30  178      0
```

In Chapter 10 of Singer and Willett, and the associated lecture notes, there are demonstrations of how to construct the items listed below. There is code in the lecture notes that I want you to read, understand, and adapt (slightly) to successfully generate the following:

1. A life table.

2. An estimated survival function, including the cross-hairs showing where the median survival time is.

3. An estimated hazard function.

Describe what you observe in the estimated hazard function plot.