PCB-3043 – Fall 2016 Assignment 2 HEADSTONE PROJECT

This is a more complicated version of a lifetable, using birth and death data from an associated excel file. If you understand this more complicated example, similar questions on the exam will be seem easy. This assignment is probably the longest one that you will have all semester – give yourself time to complete it. This is due Tuesday Sept. 27 by 5:00 pm. We accept only hard-copies.

It is often difficult to get the information necessary to construct an accurate life table for a species. Fortunately, some species leave a history of their growth and development; for example, trees have tree rings and fish have bones in their ears that leave similar growth rings. But in general, it takes a great deal of work, marking and following individuals, to create either a cohort or static life table for a species. Fortunately, humans keep records. We keep somewhat accurate records of births and deaths, although few records are kept about immigration or emigration. In part because of our tendency to record everything, more is known about the demography of humans than about any other species.

In Assignment #2, you are going to construct a life table for humans in Tallahassee in the 19th century. While we encourage you to respectfully visit local graveyards to understand the source of this data, we are using information provided by St. Johns Church for the City Graveyard. (If you do visit the graveyards off Call Street, note the wonderful gravestone of Prince Murat, a relative of Napoleon). I have provided you with the name, sex, year of birth, and year of death for 150 people, collected from the City of Tallahassee graveyard just east of campus. These people must have been born between 1790 and 1850. I encourage you to use excel to complete the assignment, but you can use other programs or do it by hand. You can ask your fellow students for help on how to analyze this data, but <u>you must do the analyses yourself</u>. I will briefly go over the results in lecture after the assignment is turned in and you can check your answers.

With these data, do the following:

- 1. (16 pts.) Divide the data into the following age classes: 0-9, 10-19, 20-29, etc. in 10 year groups. For example, if someone was born in 1855 and died in 1865, we will assume that they lived for 10+ years and belong in the 10-19 age class.
 - a. Use this data to construct a table with age classes and a separate lx for each sex and each age class.
 - b. Construct a graph showing separate survivorship curves for each gender on the same graph. Label the axes clearly and correctly.
 - c. Are these type I, II, or III survivorship curves? How can you tell?
 - d. Note and explain 3 major differences between the male and female survivorship curves.
- 2. We cannot get age specific birth rates from cemetery data. I have used other records* to estimate m_x and obtain the following:

age	m _x	X
0-9	0.0	0
10-19	0.086	10
20-29	0.561	20
30-39	0.528	30
40-49	0.142	40
50 +	0.0	

For simplicity, we are going to just use the survivorship for women and assume it reflects the entire population.

- a. (6 pts) Use the female's l_x with the m_x above to determine R_0 , G, and r for this population ($r = ln(R_0)/G$). Show your work.
- b. (3 pts) Is the population increasing or decreasing? Explain the basis for your answer. What assumptions are you making to say if it will increase or decrease?

*Birth rates were obtained from Hacker, J. D., 2003. Demography 40:605-620.