Pubhlth 740
Assignment 2

3-Week Project Assignment- Overview
You'll work in groups over the next 3 weeks. Each group will be assigned 3 problems (among problems 2.1-2.9, and one problem from each chapter (from among problems 2.10-2.19). Only one solution is needed per group for each problem. When the assignments are turned in , each group member will have to rate each member (including themselves) confidentially on their contribution to the group (1=less, 2=equal, 3=more).

There are examples of reports from previous years projects on the web-site. Each group should prepare their own group solution, but may use the previous years solutions for examples and ideas.

2.1. The Seasons study collected data on a volunteer set of subjects from the Fallon Clinic to study seasonal patterns in cholesterol. Each subject was followed for one year, with up to 5 measures made of cholesterol (every three months). In this study, data were collected over a 1 year time period, with subjects (ID) measured on different quarters (QUARTER). Using the data from the Season's Web site (qtr.sd2), write a descriptive report (3 pages or less) for LDL cholesterol. In your report, consider two factors that may be related to cholesterol: chronological time (indicated by the variable Quarter), and month of the year (that can be constructed from the blood-draw date (indicated by the variable bdate). (Note that you need to use the engine v608 in the Libname statement to read the data).

2.2. The Seasons study collected data on a volunteer set of subjects from the Fallon Clinic to study seasonal patterns in cholesterol. Changes in cholesterol may be related to changes in diet. To guard against this possibility, 24 hour recall dietary interviews were conducted with participants in a defined period prior to a cholesterol measure each quarter. A total of three diet recalls were to be made, with one on the weekend (Saturday and Sunday), and two on weekdays. The actual date of diet collection is recorded in the variable CALLDATE. Using the data from the Season's Web site (t4hr.sd2), investigate develop a descriptive report on protocol adherence relative to the measures that should have been made of the percent of Kcal from fat (FATPCNT). Summarize how complete diet collection was relative to the anticipated 5 quarters of data, and within a quarter, how complete it was with respect to collection on weekdays or weekends. Your report should be 3 pages or less.

2.3. The Seasons study collected data on a volunteer set of subjects from the Fallon Clinic to study seasonal patterns in cholesterol. Changes in cholesterol may be related to changes in diet. To guard against this possibility, 24 hour recall dietary interviews were conducted with participants in a defined period prior to a cholesterol measure each quarter. A total of three diet recalls were to be made, with one on the weekend (Saturday and Sunday), and two on weekdays. The actual date of diet collection is recorded in the variable CALLDATE. Using the data from the Season's Web site (t4hr.sd2), define a
model for the percent of Kcal from fat (FATPCNT), and develop an appropriate summary of this variable (focusing on the distribution of % Kcal from fat between subjects. Your report should be 3 pages or less.

2.4. In the Seasons study, there was interest in whether there was a difference in percent kcal intake from fat between subjects of different gender (CA2) and different marital status (DA3) (base.sd2). Using the Seasons data, write a simple report that summarizes the results, answering this question. Use data from the Season's Web site (base.sd2 and t4hr.sd2) to answer these questions. Your report should be 3 pages or less.

2.5. Is there evidence based on the Seasons study that there are differences in LDL cholesterol between subjects by age (CC1A) (using age groupings of 18-39, 40-54, and 55+) and gender (CA2). Use data from the Season's Web site (base.sd2 and t4hr.sd2) to answer these questions.

2.6. (Exercise 18-1 from KKMN, see Resources for data) A private research corporation conducted an experiment to investigate the toxic effects of three chemicals (I, II, and III) used in the tire-manufacturing industry. Three 1-inch squares were marked on the back of each of 8 rats, a different chemical was applied to each square, and the degree of irritation was reported (on a scale of 1 to 10). Write a brief report that summarizes the results of this study.

2.7. (see 2.3)The Seasons study collected data on a volunteer set of subjects from the Fallon Clinic to study seasonal patterns in cholesterol. Changes in cholesterol may be related to changes in diet. To guard against this possibility, 24 hour recall dietary interviews were conducted with participants in a defined period prior to a cholesterol measure each quarter. A total of three diet recalls were to be made, with one on the weekend, and two on weekdays. The actual date of diet collection is recorded in the variable CALLDATE. Using the data from the Season's Web site (t4hr.sd2), develop a report that will answer the question as to whether or not there is a difference in the percent kcal from fat between weekdays and weekend days.

2.8. A study was conducted to evaluate the impact of lead ingestion from food on fertility in mice. Different diets were prepared. Female Swiss mice typically display signs of puberty at about 33-37 days of age. In the present investigation (96 female mice tested in eight Pb exposure levels, n=12 per exposure level ), the time to puberty onset was markedly influenced by exposure to dietary lead. Note that the 96 mice were offspring of 24 mothers. (See I. Iavicoli a , G. Carelli b , E.J. Stanek III c , N. Castellino d , & E.J. Calabrese, "Effects of Low Doses of Dietary Lead on Puberty Onset in Female Mice").

One day after mating (evaluated by vaginal plug - 1st day of gestation) 24 female Swiss mice (from the Experimental Animal Production Plant of the Catholic University of Sacred Heart, Roma, Italy) were randomly divided in eight groups of three mice. Each group was given the solid purified phytoestrogen -free rodent diet DP 1000 (Altromin Rieper A. S.p.A., Vandoies, Italy ) at 8 different Pb levels: 0.02, 0.06, 0.11, 0.2, 2, 4, 20, 40 ppm. We describe the 40 ppm Pb diet group and 20 ppm Pb diet group as “high and relatively high exposure”; the 4 ppm Pb diet group and a 2 ppm Pb diet group, as “low
exposures”; the 0.2 ppm Pb diet group (considered the normal background “control” group); and the 0.11 ppm Pb diet group, and the 0.06 ppm Pb diet group, rated as “very low exposure”. Finally we describe the 0.02 ppm Pb diet group, as a “Pb-free” environment. Diets and drinking water were administered ad libitum. All diets, > 0.02 ppm Pb diet, were obtained by addition of Pb acetate trihydrate to this diet. After the birth, four female mice were randomly selected from each litter and housed in Macrolon ® cages manufactured by Tecniplast S.p.A. (Buguggiate, Italy). During lactation the mothers received the same feed given during pregnancy and the same diets were given to the litter after weaning.

Data from this study are contained in Resources (see Mice Fertility and Lead). Write a report 3 pages or less that describes the relationship between mice blood lead levels and lead concentration in feed.

2.9. Mice in the study described in 2.8 are weighed over time. Consider two growth models for the mice, one that has linear growth, and a second that has quadratic growth. Write a report (4 pages or less) that describes the growth rates by dose, and compares the growth rates. Describe the models that you use in summarizing these data.

Problems 2-10 through 2.19 refers to an Example in SAS for Mixed Models (2nd edition). For each problem:

- a. Write a description of the problem identifying the population structure, sampling and allocation of treatments or other factors. Also, identify the main question(s) of interest. Be prepared to present this orally to the class.
- b. Translate the description into a stochastic model, and define terms in the model.
- c. Analyze the data, and write a report (3 pages or less) that summarize the results.

From Chapter 2. Randomized Block Designs

2.10. Example: Bond data

2.11. Example: Partially balanced Incomplete Design data (PBIB)

From Chapter 3. Random Effects Models

2.12. Example: Mississippi River data

2.13. Example: Semiconductor data

2.14. Example: Genetics data

From Chapter 4. Multi-factor treatment designs with multiple error terms.

2.15. Example: Semi-conductor split-plot experiment
2.16. Example: Variety-pesticide evaluation

2.17. Example: Mouse condition-diet experiment

From Chapter 5. Analysis of repeated Measures Data

2.18. Example: Respiratory ability

2.19. Example: Heart rate data