**IHP 525 Module Six Problem Set**

1. Hemoglobin levels in 11-year-old boys vary according to a normal distribution with σ=1.2 g/dL.
2. How large a sample is needed to estimate µ with 95% confidence so the margin of error is no greater than 0.5 g/dL?
3. A researcher fails to find a significant difference in mean blood pressure in 36 matched pairs. The test was carried out with a power of 85%. Assuming that this study was well designed and carried out properly, do you believe that there really is no significant difference in blood pressure? Explain your answer.
4. Would you use a one-sample, paired-sample, or independent-sample *t-test* in the following situations?
5. A lab technician obtains a specimen of known concentration from a reference lab. He/she tests the specimen 10 times using an assay kit and compares the calculated mean to that of the known standard.
6. A different technician compares the concentration of 10 specimens using 2 different assay kits. Ten measurements (1 on each specimen) are taken with each kit. Results are then compared.
7. In a study of maternal cigarette smoking and bone density in newborns, 77 infants of mothers who smoked had a mean bone mineral content of 0.098 g/cm3 (*s*1 = 0.026 g/cm3). The 161 infants whose mothers did not smoke had a mean bone mineral content of 0.095 g/cm3 (*s*2 = 0.025 g/cm3).
8. Calculate the 95% confidence interval for µ1 - µ2.
9. Based on the confidence interval you just calculated, is there a statistically significant difference in bone mineral content between newborns with mothers who did smoke and newborns with mothers who did not smoke?
10. A randomized, double-blind, placebo-controlled study evaluated the effect of the herbal remedy *Echinacea purpurea* in treating upper respiratory tract infections in 2- to 11-year olds. Each time a child had an upper respiratory tract infection, treatment with either echinacea or a placebo was given for the duration of the illness. One of the outcomes studied was “severity of symptoms.” A severity scale based on four symptoms was monitored and recorded by the parents of subjects for each instance of upper respiratory infection. The peak severity of symptoms in the 337 cases treated with echinacea had a mean score of 6.0 (standard deviation 2.3). The peak severity of symptoms in the placebo group (np = 370) had a mean score of 6.1 (standard deviation 2.4). Test the mean difference for significance using an independent t-test. Discuss your findings.