BS 728
Homework 4
Irene Hsueh

Question 1A

(see R Code)

Question 1B

Using the model assuming independence between sources, the total number of births with spina bifida is estimated to be 55 people.

Question 1C

Using the model assuming interaction between sources 1 and 2 and sources 2 and 3, the total number of births with spina bifida is estimated to be 71 people.

Question 1D

Assuming that the model accounting for interaction between sources is the best model (which one can see from the output that it is not), the results would imply that the sources are not independent of each other.

The interaction term between source 1 and 2 is positive, which indicates positive source dependence. Infants with spina bifida who show up in source 1 are more likely to show up in source 2, resulting in underestimation.

The interaction term between source 2 and 3 is negative, which indicates negative source dependence. Sources 2 and 3 must have a high degree of mutual exclusive groups of infants with spina bifida, resulting in overestimation.

Also, the estimate using interaction terms is larger than the estimate assuming independence, which indicates positive source dependence and an underestimation of the true population size.

Question 2

Capture recapture is a sampling approach to estimate an unknown population size by using two or more samples from that population. Alternative methods to estimating prevalence include LQAS, surveys, and multiplier methods.