STAT511 HW#10 KEY
30 points total, **2** points per problem part unless otherwise noted.

#1 Birds Odds Ratio

A. OR = 2.26.
   The YesBird group has the higher odds of lung cancer.
B. 95% CI = (1.605, 3.174)
   Since the CI does NOT include one, we can conclude that there is a relationship between bird ownership and lung cancer.
C. Chi-squared p-value < 0.001.
   Reject H0; conclude there is a relationship between bird ownership and lung cancer.

#2 BCG

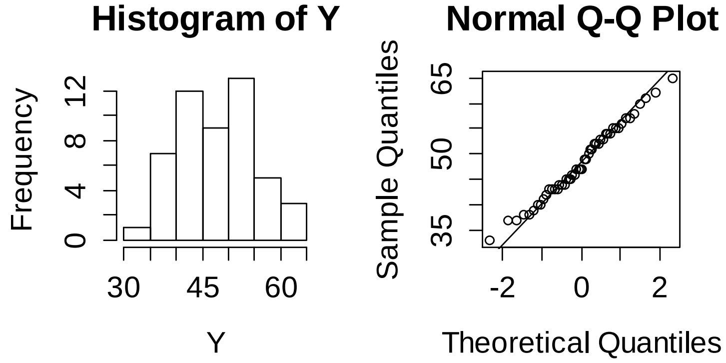
A. (**3 pts**)
   Study1: OR= 0.195
   Study2: OR = 1.012
   Study3: OR = 0.624
B. BD p-value = 0.000145
   Reject H0, conclude that the odds ratios are not the same for all studies.
C. (**3 pts**)
   CMH OR = 0.957
   CMH p-value = 0.466
   Fail to Reject H0, we cannot conclude that the "average" odds ratio is different from 1.

#3 Plants Poisson

A. 2.104
B. (**4 pts**)
   X^2=6.32, df=3,
   p-value = 0.0969
   Fail to Reject H0; no evidence against the Poisson distribution.

#4 Poisson Data

A. (**4 pts**) Summary Statistics
   mean=48.38
   sd=7.34



B. 95% CI: (46.293, 50.467)
C. (**4 pts**)
95% CI: (46.452, 50.308)
NOTE: 2pts for (2322.601, 2515.399)

```
#R Code
#1 Birds Odds Ratio
Birds <- matrix(c(98,101,141,328), byrow=TRUE, nrow=2)
colnames(Birds) <- c("Cancer","Control")
rownames(Birds)<-c("YesBird","NoBird")
library(epitools)
oddsratio(Birds,method="wald")

#2 BCG
TB<-array(c( 8,10,2537,619,
              505,499,87886,87892,
              29,45,7470,7232),
          dim=c(2,2,3),
          dimnames=list( Trt=c("Trt","Ctrl"),
                         Response=c("TBpos","TBneg"),
                         Study=c("1","2","3")))

#A/C CMH Test to find Odds Ratios by Study
library(lawstat)
cmh.test(TB)
#B BD Test
library(metafor)
cmh<-rma.mh(ai=TB[1,1,],bi= TB[1,2,], ci=TB[2,1,],
di=TB[2,2,])
#Breslow Day Test
cmh$BD
cmh$BDp

#3 Plants Poisson
#A
Y0<-seq(0,6,1)
Obs0<-c(9,9,10,14,2,2,2)
Muhat<-sum(Obs0*Y0)/sum(Obs0)
Muhat
#B
Y<-seq(0,4,1)
Obs<-c(9,9,10,14,6)
#Calculate the corresponding Poisson Probabilities
Prob<-dpois(Y,Muhat)
Prob
length(Prob)
sum(Prob)
#“Fix” the final entry so that the probabilities sum to 1
```

```
Prob[5]<-1-ppois(3,Muhat)
Prob
sum(Prob)
#Calculate Expected values and Contributions to Chisquare TS
Exp<-Prob*sum(Obs)
X2<-(Obs-Exp)^2/Exp
cbind(Y,Obs,Prob,Exp,X2)
#Run GOF Test
ChiSqTS=sum(X2)
ChiSqTS
pval=1-pchisq(ChiSqTS,5-2)
pval
```

#4 Poisson Data

```
PoissonData<-
read.csv("C:/hess/STAT511_FA11/HW_2015/HW10/PoissonData.csv")
#A
attach(PoissonData)
mean(Y)
sd(Y)
par(mfrow=c(1,2))
hist(Y)
qqnorm(Y);qqline(Y)
#B
t.test(Y)
#C
sum(Y)
LB <- 2419 - 1.96*sqrt(2419)
UB <- 2419 + 1.96*sqrt(2419)
LB/50
UB/50
```