MATH-650 Assignment 11

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Chapter 18: 9

```
obesity.data <- read.csv('case1801.csv')
obese <- obesity.data[obesity.data$Obesity=='Obese',]
notobese <- obesity.data[obesity.data$Obesity=='NotObese',]

obesity.data
```

```
##    Obesity Deaths NonDeaths
## 1    Obese     22      1179
## 2 NotObese     22      1409
```

```
n1 = obese$Deaths+obese$NonDeaths
n2 = notobese$Deaths+notobese$NonDeaths
pc = (obese$Deaths+notobese$Deaths)/(n1+n2)
```

Part (a)

Part (i)

```
p1 = obese$Deaths/n1
p2 = notobese$Deaths/n2
```

Sample proportion of CVD deaths for obese group: $\pi_1 = 0.0183181$

Sample proportion of CVD deaths for nonbese group: $\pi_2 = 0.0153739$

Part (ii)

```
seci <- sqrt(p1*(1-p1)/n1+p2*(1-p2)/n2)
setest <- sqrt(pc*(1-pc)/n1+pc*(1-pc)/n2)
```

Standard error for difference : 0.0050548

Part (iii)

```
difference <- p1-p2
Z <- difference/setest
halfwidth <- 1.96*setest
hci <- difference + halfwidth
lci <- difference - halfwidth
```

95% confidence interval: $[-0.0068898, 0.0127782]$

Part (b)

```
pval <- 1-pnorm(Z)
```

One sided p-value: 0.2786674

Part (c)

```
w1 <- obese$Deaths/obese$NonDeaths
w2 <- notobese$Deaths/notobese$NonDeaths
oddsratio <- w1/w2
logodds <- log(oddsratio)
selogci <- sqrt(1/obese$Deaths + 1/obese$NonDeaths + 1/notobese$Deaths + 1/notobese$NonDeaths)
selogtest <- sqrt(1/(n1*pc*(1-pc)) + 1/(n2*pc*(1-pc)) )
logwidth <- 1.96*selogci
loglci <- logodds-logwidth
loghci <- logodds+logwidth
```

Part (i)

Sample Odds: $\omega_1 = 0.0186599$; $\omega_2 = 0.0156139$

Part (ii)

Odds ratio: 1.1950806

Part (iii)

Standard error of the log odds ratio: 0.3040839

Part (iv)

95% confidence interval for log odds ratio: $[-0.4177907, 0.774218]$

Part (d)

While testing for equality, we opbtained a p-value of 0.2786674. Also the 95% CI for log odds ratio is $[-0.4177907, 0.774218]$ which does not include the estimated odds ratio of 1.1950806 and thus there is no evidence that odds ratio of deaths among obese grooup over nonobese groups is different from 1.

Chapter 18: 11

Part (a)

```
smoker.data <- read.csv('smokers.csv')
smokers <- smoker.data[smoker.data$Smoker=='Smokers',]
nonsmokers <- smoker.data[smoker.data$Smoker=='Nonsmokers',]
```

```
cancer.smokers <- smokers$Cancer/(smokers$Cancer+smokers$NoCancer)
```

Proportion of lung cancer patients among smokers: 4.9975012×10^{-4}

Part (b)

```
cancer.nonsmokers <- nonsmokers$Cancer/(nonsmokers$Cancer+nonsmokers$NoCancer)
```

Proportion of lung cancer patients among nonsmokers: 4.9975012×10^{-4}

Part (c)

```
difference.smokers <- cancer.smokers - cancer.nonsmokers
difference.smokers
```

```
## [1] 0.0002498126
```