Practical 3: Logistic Regression Models

Comparison of Several Groups

Fit a one-factor (Age) model for these data:

TABLE 3.4: Contraceptive Use by Age

Age i	Using y_i	Not Using $n_i - y_i$	Total n_i
<25	72	325	397
25–29	105	299	404
30–39	237	375	612
40–49	93	101	194
Total	507	1100	1607

```
Age = c(1, 2, 3, 4)
Using = c(72, 105, 237, 93)
n = c(397, 404, 612, 194)

y<-cbind(Using, n - Using)

glm1<- glm(y ~ factor(Age), family = binomial
(link = logit))

summary(glm1)
```

1. Formally specify this logistic regression model.

2. Write out the logistic regression model for each age group using the parameter estimates calculated by R.

3. Calculate the odds of using contraception for each age group.

4. Use these calculated odds to calculate the odds-ratio for Age Group 3 relative to Age Group 1. Interpret this.

5. Calculate this odds-ratio from the R output. Is this statistically significant? Explain what this means.

Refer to Page 2.12 of the notes: Fit a one-variate (Age) model.

```
AgeC<-c(20, 27.5, 35,45)
glm2<- glm(y ~ AgeC, family = binomial (link
= logit))

summary(glm2)
```

6. Formally specify this logistic regression model.

7. Interpret the coefficient associated with Age. Is this statistically significant?

8. Calculate a 95% confidence interval for this odds ratio. Interpret this.

9. Use this 95% confidence interval to test whether the odds ratio equals 1. What does this null hypothesis imply?