CITY UNIVERSITY OF HONG KONG
STUDENTS' UNION
http://www.cityusu.net/

Name : CHAN King Yeung
SID : 1155119394

STAT 3004

Assignment 4

Question 1

a)

	GFR	GFR'
Group D	52	300
Group H	66	753

$\hat{OR} = \frac{52(753)}{66(300)}$
≈ 1.9776

b) 95% CI for OR
$= e^{\ln(1.9776) \pm 1.96\sqrt{\frac{1}{52}+\frac{1}{300}+\frac{1}{66}+\frac{1}{753}}}$
$\approx (1.3426, 2.913)$

Question 2

a) H_0: raloxifee is independent of the incidence of new feature
H_1: raloxifee is dependent of the incidence of new feature

$X_0^2 = \frac{(|34-51|-0.5)^2}{51} + \frac{(|1466-1449|-0.5)^2}{1449} + \frac{(|68-51|-0.5)^2}{51} + \frac{(|1432-1449|-0.5)^2}{1449}$
≈ 11.0522

p-value ≈ 0.0009
Since p-value < 0.05, we reject H_0 at $\alpha = 0.05$

b) $\hat{RR} = \frac{34/1500}{68/1500}$
$= 0.5$

95% CI for RR
$= e^{\ln(0.5) \pm 1.96\sqrt{\frac{1466}{34(1500)}+\frac{1432}{68(1500)}}}$
$\approx (0.3333, 0.75)$

c) H_0: raloxifee is independent of the incidence of new feature
H_1: raloxifee is dependent of the incidence of new feature

$X_0^2 = \frac{(|137-183.3333|-0.5)^2}{183.3333} + \frac{(|2063-2016.6666|-0.5)^2}{2016.6666} + \frac{(|238-191.6666|-0.5)^2}{191.6666} + \frac{(|2062-2108.3333|-0.5)^2}{2108.3333}$
≈ 24.4565

p-value $\approx 7.601 \times 10^{-7}$
Since p-value < 0.05, we reject H_0 at $\alpha = 0.05$

d) standardised $\hat{RR} = \frac{137/4500}{238/4500}$
≈ 0.5756

e) Since standardised $\hat{RR} \neq$ adjusted $\hat{RR}$, pre-existing fracture is a confounder in given data

Question 3

a) Right censored data

b) $\hat{\lambda}_{\text{PMH user}} = \frac{2}{133}$
≈ 0.015

$\hat{\lambda}_{\text{non-PMH user}} = \frac{9}{716}$
≈ 0.0126

c) Two-sample inference for incidence rate

d) $H_0: \lambda_{PMH} = \lambda_{non\text{-}PMH}$ vs $H_1: \lambda_{PMH} \neq \lambda_{non\text{-}PMH}$

$V_1 = \frac{(2+9)(133)(716)}{(133+716)^2}$
≈ 1.4533

Since $V_1 < 5$, exact test being used.

p-value $= \min\{1, 2\sum_{i=2}^{11}\binom{11}{i}(0.1567)^i(0.8433)^{11-i}\}$
$= 1$

Since p-value > 0.05, we do not reject H_0 at $\alpha = 0.05$.