$\theta = \mu$

$a(\phi) = \sigma^2$

$b(\theta) = \frac{1}{2}\mu^2$

$b'(\theta) = \mu$

$b''(\theta) = 1$

$Var(Y) = b''(\theta) \cdot a(\phi) = 1 \times \sigma^2 = \sigma^2$

$E(Y) = b'(\theta) = \mu$

$\theta = \log\left(\frac{\pi}{1-\pi}\right)$ $\quad b(\theta) = -\log(1-\pi)$ $\quad a(\phi) = 1$

$\exp(\theta) = \frac{\pi}{1-\pi}$ $\quad = -\log\left(\frac{1}{1+\exp(\theta)}\right)$

$\exp(\theta) - \pi\exp(\theta) = \pi$ $\quad = \log(1+\exp(\theta))$

$\pi(1+\exp(\theta)) = \exp(\theta)$

$\pi = \frac{\exp(\theta)}{1+\exp(\theta)}$ $\quad b'(\theta) = \frac{\exp(\theta)}{1+\exp(\theta)} = \pi$

$b''(\theta) = \frac{\exp(\theta)(1+\exp(\theta)) - \exp(\theta)\exp(\theta)}{(1+\exp(\theta))^2}$

$= \frac{\exp(\theta)}{(1+\exp(\theta))^2} = \frac{\exp(\theta)}{1+\exp(\theta)} \times \frac{1}{1+\exp(\theta)}$

$= \pi \times (1-\pi)$

$\theta = \log \lambda \quad b(\theta) = \lambda = e^{\theta} \quad a(\phi) = 1$

$\lambda = e^{\theta}$

$E(Y) = b'(\theta)$?

$b'(\theta) = e^{\theta} = \lambda$

$V(Y) = b''(\theta)\, a(\phi)$?

$b'(\theta) = e^{\theta} = \lambda$

$b''(\theta)\, a(\phi) = \lambda \times 1 = \lambda$

$$\log(\mu_i) = \log(n_i) + \beta_0 + \beta_1 \times \text{medium}_i + \beta_2 \times \text{small}_i + \beta_3 \times \text{elder}_i$$

理賠件数

$$\log(\mu_i) - \log(n_i) = \beta_0 + \beta_1 \times \text{medium}_i + \beta_2 \times \text{small}_i + \beta_3 \times \text{elder}_i$$

$$\log\left(\frac{\mu_i}{n_i}\right)$$

理賠率

offset : $\log(n_i)$

抵銷項

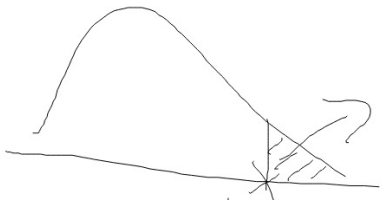
(2) H_0: 本model与saturated model無異

H_1: 〃 有〃

$$\text{deviance} = 2[\text{logLik}(\hat{\beta}_{\text{saturated}}) - \text{logLik}(\hat{\beta})]$$

差 ↓ 天花板模式 (6) ↑ 現在的model (4)

$= 2.8207 \sim \chi^2_{(2)}$



qchisq(0.95, 2) =

Do not reject H_0

The model fits well.

在車型相當的情況下，

年長人要求理賠率是年輕人的3.94倍

exp(1.3199) = 3.74

在年紀相當的情況下，

中車要求理賠率是大車2.92倍

小　　〃　　exp(1.7643)

= 5.84倍

Hwk 題幹：

標準化死亡率(以每十萬人年為單位)

是否與性別或年齡層有關？

(以性別作為)

(以年齡層作為)