

Sex differences in the reporting of serious adverse drug reactions: A Pharmacovigilance Study of Statin Therapy in the UK Yellow Card Scheme

David K Ryan, Dipender Gill

June 2021

Formulae

The following values were extracted from the UK Yellow Card Scheme:

- The value A indicates the number of individual cases with the suspect medicinal product P involving an adverse event R.
- The value B indicates the number of individual cases related to the suspect medicinal product P, involving any other adverse events but R.
- The value C indicates the number of individual cases involving event R in relation to any other medicinal products but P.
- The value D indicates the number of individual cases involving any other adverse events but R and any other medicinal products but P.

The proportional reporting ratio (PRR) for each adverse event R:

$$PRR_R = \frac{\frac{a}{a+b}}{\frac{c}{c+d}}$$

The standard deviation S for the PRR is calculated using the formula:

$$S_{PRR} = \sqrt{\frac{b}{a(a+b)} + \frac{d}{c(c+d)}}$$

The corresponding 95% confidence interval is derived using:

$$95\% \text{ CI} = e^{\ln PRR \pm 1.96 S_{PRR}}$$

The sex-reporting ratio is calculated using the following formula:

$$SRR = \frac{PRR_{Female}}{PRR_{Male}}$$

The standard deviation for the SRR is calculated by propagating the error associated with the division:

$$S_{SRR} = SRR \sqrt{\left(\frac{S_{Male}}{PRR_{Male}}\right)^2 + \left(\frac{S_{Female}}{PRR_{Female}}\right)^2}$$

The corresponding 95% confidence interval is derived using:

$$95\% \text{ CI} = e^{\ln SRR \pm 1.96 S_{SRR}}$$

To calculate the p-value for the confidence interval:

- The estimate and 95% confidence limits were converted to the log scale.
- The standard error SE was calculated using the formula:

$$SE = \frac{Upper \ limit - lower \ limit}{3.92}$$

- Z is calculated using the formula:

$$Z = \frac{estimate}{SE}$$

- The p-value is derived using:

$$\exp(0.717Z - 0.416Z^2)$$