

S4 – Full regression equation for MOAT

The predicted risk for an individual patient can be calculated using the standard logistic regression equation:

$$\text{Log-odds of the outcome event} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p$$

where β_0 is the constant. The quantity on the right-hand side of the equal sign is the linear predictor of the log-odds of the outcome given the particular value of the p exposure variables x_1 to x_p (where x takes the numerical value of continuous variables, and is coded zero or one for categorical variables). The β 's are the regression coefficients associated with the p exposure variables.

The logistic regression model is a non-linear transformation of the linear regression and it ensures that predicted probabilities lie between 0 and 1. The predicted probability can be calculated by exponentiating the log-odds (to give the odds of the outcome event), followed by use of the formula:

$$\text{Predicted probability} = \frac{\text{odds}}{(1 + \text{odds})}$$

$$\text{Alternatively, predicted probability} = \frac{1}{(1 + \exp(-(\log \text{odds})))}$$

The predicted probability of experiencing at least one moderate or severe preventable medication related problem can therefore be calculated using the following formula:

Probability = $1 / (1 + \exp(-(-1.674 + 0.125 \times \text{number of comorbidities} - 0.0308 \times \text{estimated glomerular filtration rate}^*/10 + 0.0234 \times \text{white cell count}^* + 0.0347 \times \text{number of medicines} + 0.272 \times \text{previous allergy} + 0.354 \times \text{nervous system and mental disorders} - 0.234 \times \text{respiratory system} - 0.533 \times \text{gastrointestinal system} + 0.331 \times \text{aminoglycosides and glycopeptides} + 0.311 \times \text{other antimicrobials} + 0.385 \times \text{epilepsy medicines})))$

* Truncated value should be used if actual result above the following truncation point:

- estimated glomerular filtration rate = 161 ml/min/1.73m²;
- white cell count = 20.7 10⁹/L.

Please note, categorical variables such as 'previous allergy' should be coded as 'one' if present and 'zero' if absent (see Table 2).