# 17 November

Tuesday, November 17, 2020 11:13 AM

Binary variables → Dependent var <u>must</u> be binary

Birthweights of babies

low weight = 1 Not low weight = 0

mother's age

Sociodemographic status 1 = low 2 = med 3 = high

alcohol during pregnancy 1 = yes 0 = no

hypertension 1 = yes 0 = no

$P = \beta_0 + \beta_1(age) + \beta_2(socio) + \beta_3(alcohol) + \beta_4(hyper)$

↳ P can be greater than 1 so this is wrong

Probability must be between 0 and 1

$P = 1/[1 + e^{-(\beta_0 + \beta_1 X + \beta_2 X_2 + \dots)}]$ → this constraints so $0 \leq P \leq 1$

$\text{logit}(P) = \ln(P_i/1-P_i) = \beta_0 + \beta_1 X + \beta_2 X_2 + \dots$

$P_i = P_{outcome}$ $1 - P_i = P$ not outcome

$\beta_1$ = A unit change in $X_1$ changes log odds by $\beta_1$

$\text{odds} = P/1-P$

$\text{Odds ratio} = \text{Odds}_A/\text{Odds}_B$

$P_{\text{low weight}} = -.75 + .2(age) + .3(alcohol)$

$\text{logit}(P) = -.75 + .2(20) + .3(1) = -.75 + 4 + .3 = 3.55$

or $\text{logit}(P) = -.75 + .2(20) + .3(0) = -.75 + 4 + 0 = 3.25$

alc vs no alc = $e^{3.55}/e^{3.25} = 1.3498$

Babies are more likely to be born underweight if moms consumed alc compared to moms who didn't