Model forms and estimation for linear, log and logit risk GLM models.

Model Type	**Linear**	**Log Risk**	**Logit risk**
Model Form	Risk = $\beta_0 + \beta_1 X_1 \ldots + \beta_k X_k$	ln(Risk) = $\beta_0 + \beta_1 X_1 \ldots + \beta_k X_k$	logit(Risk)= $\beta_0 + \beta_1 X_1 \ldots + \beta_k X_k$
Outcome distribution	binomial	binomial	binomial
Link function	identity	ln()	logit()
Simple model	Risk(outcome | X_1) = $\beta_0 + \beta_1 X_1$	ln[Risk(outcome | X_1)] = $\beta_0 + \beta_1 X_1$	logit[Risk(outcome | X_1)] = $\beta_0 + \beta_1 X_1$
Risk(outcome | $X_1 =_0$)	$R_0 = \beta_0 + 0*\beta_1 = \beta_0$	$\ln(R_0) = \beta_0 + 0*\beta_1 = \beta_0$ so $R_0 = \exp[\beta_0]$	$\ln(Odds_0) = \beta_0 + 0*\beta_1 = \beta_0$ so $Odds_0 = \exp[\beta_0]$
Risk(outcome | $X_1 =_1$)	$R_1 = \beta_0 + 1*\beta_1 = \beta_0 + \beta_1$	$\ln(R_1) = \beta_0 + 1*\beta_1 = \beta_0 + \beta_1$ so $R_1 = \exp[\beta_0 + \beta_1]$	$\ln(Odds_1) = \beta_0 + 1*\beta_1 = \beta_0 + \beta_1$ so $Odds_1 = \exp[\beta_0 + \beta_1]$
Risk comparison	**Risk Difference**	**Risk Ratio**	**Odds Ratio**
	$RD = R_1 - R_0$ $= [\beta_0 + {}_1*\beta_1] - [\beta_0 + {}_0*\beta_1]$ $= [\beta_0 + \beta_1] - [\beta_0]$ $= \beta_1$	$\ln(RR) = \ln(R_1 / R_0) = \ln(R_1) - \ln(R_0)$ $= [\beta_0 + 1*\beta_1] - [\beta_0 + 0*\beta_1]$ $= [\beta_0 + \beta_1] - [\beta_0]$ $= \beta_1$	$\ln(OR) = \ln(O_1 / O_0) = \ln(O_1) - \ln(O_0)$ $= [\beta_0 + 1*\beta_1] - [\beta_0 + 0*\beta_1]$ $= [\beta_0 + \beta_1] - [\beta_0]$ $= \beta_1$
	95% CI = β_1 +/- (${}_1$.96*SE(β_1))	so RR = exp(β_1) and 95% CI = exp(β_1 +/- (1.96*SE(β_1)))	so OR = exp(β_1) and 95% CI = exp(β_1 +/- (1.96*SE(β_1)))
R Commands	glm(death ~ bord5, family = “binomial”(link = “identity”), data = dat)	glm(death ~ bord5, family = “binomial”(link = “log”), data = dat)	glm(death ~ bord5, family = “binomial”(link = “logit”), data = dat)