1 Kidney stone removal procedures 1

The 1986 BMJ article *Comparison of treatment of renal calculi by open surgery, percutaneous nephrolithotomy, and extracorporeal shockwave lithotripsy* by Charig et. al, was a study designed to compare different methods of treating kidney stones in order to establish which was the most cost effective and successful. The procedure, either open surgery, or percutaneous nephrolithotomy (PN, a keyhole surgery procedure), was defined to be successful if stones were eliminated or reduced to less than 2 mm after three months. The study collected cases of kidney stones treated at a particular UK hospital during 1972-1985. The counts of successes for the two surgical procedures were:

	Unsuccessful	Successful	Total
Open surgery	77	273	350
PN	61	289	350
Total	138	562	700

```
##
## Call:
## glm(formula = cbind(cases, controls) ~ open, family = binomial(link = "logit"),
##     data = df)
##
## Deviance Residuals:
## [1]  0  0
##
## Coefficients:
##             Estimate Std. Error z value Pr(>|z|)
## (Intercept)  -1.5556     0.1409 -11.040   <2e-16 ***
## open          0.2899     0.1911   1.517    0.129
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 2.3148e+00  on 1  degrees of freedom
## Residual deviance: 9.9920e-15  on 0  degrees of freedom
## AIC: 15.696
##
## Number of Fisher Scoring iterations: 3
```

2 Kidney stone removal procedures 2

Below are the same outcomes tabulated by the size of the kidney stone (smaller than 2cm/at least 2cm in diameter):

$<$ 2cm	Unsuccessful	Successful	Total
Open surgery	6	81	87
PN	36	234	270
Total	42	315	357

$\geq$ 2cm	Unsuccessful	Successful	Total
Open surgery	71	192	263
PN	25	55	80
Total	96	247	343

```
##
## Call:
## glm(formula = cbind(cases, controls) ~ open + size, family = binomial(link = "logit"),
##     data = df)
##
## Deviance Residuals:
##       1        2        3        4
## -0.7636   0.3588   0.2756  -0.4695
##
## Coefficients:
##             Estimate Std. Error z value Pr(>|z|)
## (Intercept)  -1.9366     0.1704 -11.361  < 2e-16 ***
## open         -0.3572     0.2291  -1.559    0.119
## size          1.2606     0.2390   5.274 1.33e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 33.1239  on 3  degrees of freedom
## Residual deviance:  1.0082  on 1  degrees of freedom
## AIC: 26.355
##
## Number of Fisher Scoring iterations: 3
```

3 Diabetes cohort data 1

	Dead	Censored	Total
Type II	218	326	544
Type I	105	253	323
Total	323	579	902

```
##
## Call:
## glm(formula = cbind(cases, controls) ~ type, family = binomial(link = "logit"),
##     data = df)
##
## Deviance Residuals:
## [1]  0  0
##
## Coefficients:
##             Estimate Std. Error z value Pr(>|z|)
## (Intercept)  -0.8794     0.1161  -7.576 3.58e-14 ***
## type          0.4770     0.1454   3.282  0.00103 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 1.0978e+01  on 1  degrees of freedom
## Residual deviance: 1.4033e-13  on 0  degrees of freedom
## AIC: 16.858
##
## Number of Fisher Scoring iterations: 2
```

4 Diabetes cohort data 2

Below are the same outcomes tabulated by age:

≤ 40	Dead	Censored	Total
Type II	0	15	15
Type I	1	129	130
Total	1	144	145

> 40	Dead	Censored	Total
Type II	218	311	529
Type I	104	124	228
Total	322	435	757

```
##
## Call:
## glm(formula = cbind(dead, censored) ~ type + age, family = binomial(link = "logit"),
##     data = df)
##
## Deviance Residuals:
##        1         2         3         4
## -0.41982   0.09091   0.00776  -0.01168
##
## Coefficients:
##             Estimate Std. Error z value Pr(>|z|)
## (Intercept)  -4.9525     1.0036  -4.935 8.02e-07 ***
## type         -0.1816     0.1595  -1.139    0.255
## age           4.7781     1.0108   4.727 2.28e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 133.81237  on 3  degrees of freedom
## Residual deviance:   0.18471  on 1  degrees of freedom
## AIC: 20.745
##
## Number of Fisher Scoring iterations: 5
```