

Meta-Analysis of Rare Events

A One-day Course

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Practical 2

Data sets:

- 1) **rosiglitazone12**: contains 56 trials on side effects (MI deaths and CV deaths) of the treatment with Rosiglitazone; duration is provided as studies differ in follow-up time
variables: treatment/control; MI= myocardial deaths, CV = cardiovascular deaths, n = number of participants, duration = follow-up time; person-time = n x duration

- 2) **catheterdays12**: contains 9 trials on the effect of anti-infective-treated central venous catheters on catheter-related bloodstream infection(CRBSI)
variables: treatment/control (control is standard catheter); xc = number of CRBSI events in control group, xt = number of CRBSI events in treatment group; cadayst = person-days of catheter use in treatment group, ; cadaysc = person-days of catheter use in control group

- 3) **ceasarean12**: A systematic review of the effectiveness of prophylactic antibiotic treatment on infectious complications in women undergoing caesarean delivery has recently been published as a Cochrane Review (Smaill F, Hofmeyr GJ. Antibiotic prophylaxis for cesarean section. *Cochrane Review* 2001; 3) . The review identified 61 studies, which compared the incidence of wound infection in women undergoing caesarean delivery who were administered prophylactic antibiotics and a placebo group using meta-analysis. The relevant data are given as ceasarean12.dta.

Tasks: Use the above three data sets to explore risk ratio analysis with the Poisson random effects regression model!

Is there effect heterogeneity?

SOLUTIONS

1) rosiglitazone12

```
Poisson regression                               Number of obs   =          112
                                                LR chi2(1)      =           3.83
                                                Prob > chi2     =          0.0505
Log likelihood = -174.20538                    Pseudo R2       =          0.0109
```

mi	IRR	Std. Err.	z	P> z	[95% Conf. Interval]	
treatment	1.256121	.146715	1.95	0.051	.9991049	1.579253
_cons	.0000716	6.14e-06	-111.30	0.000	.0000605	.0000847
ln(Person~e)	1	(exposure)				

```
. estat ic, n(56)
```

Model	Obs	ll(null)	ll(model)	df	AIC	BIC
.	56	-176.1183	-174.2054	2	352.4108	356.4615

Note: N=56 used in calculating BIC

Model	Obs	ll (null)	ll (model)	df	AIC	BIC
.	56	-176.1183	-174.2054	2	352.4108	356.4615

Model: study baseline random effect random effect

Model	Obs	ll (null)	ll (model)	df	AIC	BIC
.	56	.	-137.9558	3	281.9115	287.9876

Model: study baseline random effect random effect and random effect for treatment

Model	Obs	ll (null)	ll (model)	df	AIC	BIC
.	56	.	-137.9558	4	283.9115	292.0129

2) catheterdays:

```

Poisson regression                               Number of obs   =          18
                                                  LR chi2(1)      =           6.80
                                                  Prob > chi2     =          0.0091
Log likelihood = -71.238742                    Pseudo R2      =          0.0456

```

x	IRR	Std. Err.	z	P> z	[95% Conf. Interval]
treat	.6231576	.1146006	-2.57	0.010	.4345695 .8935862
_cons	.0030076	.0003427	-50.95	0.000	.0024055 .0037603
ln(cadays)	1	(exposure)			

```
. estat ic, n(9)
```

Model	Obs	ll (null)	ll (model)	df	AIC	BIC
.	9	-74.63869	-71.23874	2	146.4775	146.8719

Note: N=9 used in calculating BIC


```

Mixed-effects Poisson regression
Group variable: study_long

Number of obs      =      18
Number of groups   =       9

Obs per group: min =       2
                  avg =      2.0
                  max =       2

Integration points =    7
Log likelihood = -47.992003

Wald chi2(1)      =      4.34
Prob > chi2       =     0.0372

```

x	IRR	Std. Err.	z	P> z	[95% Conf. Interval]	
treat	.6082734	.1451442	-2.08	0.037	.3810553	.9709787
_cons	.0041113	.0009519	-23.73	0.000	.0026115	.0064725
ln(cadays)	1	(exposure)				

Random-effects Parameters	Estimate	Std. Err.	[95% Conf. Interval]	
study_long: Independent				
sd(treat)	.3640423	.2610955	.0892606	1.484718
sd(_cons)	.5724223	.1690782	.3208443	1.021265

LR test vs. Poisson regression: chi2(2) = 46.49 Prob > chi2 = 0.0000

Note: LR test is conservative and provided only for reference.

. estat ic, n(9)

Model	Obs	ll(null)	ll(model)	df	AIC	BIC
.	9	.	-47.992	4	103.984	104.7729

Note: N=9 used in calculating BIC

ceasarean12:

```

Poisson regression
Log likelihood = -359.23419

Number of obs      =      122
LR chi2(1)         =     116.99
Prob > chi2        =     0.0000
Pseudo R2         =     0.1400

```

x	IRR	Std. Err.	z	P> z	[95% Conf. Interval]	
treat	.3832489	.0353013	-10.41	0.000	.3199457	.4590771
_cons	.0938394	.0049389	-44.96	0.000	.0846418	.1040363
ln(n)	1	(exposure)				

. estat ic, n(61)

Model	Obs	ll(null)	ll(model)	df	AIC	BIC
.	61	-417.7316	-359.2342	2	722.4684	726.6901

Note: N=61 used in calculating BIC

