

## Estimation for Relative Risks

Example 1: A randomized clinical trial (RCT) was conducted to evaluate the use of infra-red stimulation (IRS) in reducing pain caused by osteoarthritis. **26** patients were randomized, **13** to be treated by IRS and **13** to receive mock transcutaneous electrical stimulation (i.e. a placebo). One patient in the IRS group dropped out. In the IRS group, **9** of the **12** patients reported an improvement in pain, compared with **4** out of **13** in the control group.

### Risk estimates

```
. cii 12 3
```

| Variable | Obs | Mean | Std. Err. | -- Binomial Exact --<br>[95% Conf. Interval] |          |
|----------|-----|------|-----------|--|----------|
|          | 12  | .25  | .125      | .0548606                                     | .5718585 |

```
. cii 12 3, wald
```

| Variable | Obs | Mean | Std. Err. | -- Binomial Wald ---<br>[95% Conf. Interval] |          |
|----------|-----|------|-----------|--|----------|
|          | 12  | .25  | .125      | .0050045                                     | .4949955 |

### Estimates of relative risk

```
. csi 3 9 9 4
```

|                 | Exposed        | Unexposed | Total                |           |
|-----------------|----------------|-----------|----------------------|-----------|
| Cases           | 3              | 9         | 12                   |           |
| Noncases        | 9              | 4         | 13                   |           |
| Total           | 12             | 13        | 25                   |           |
| Risk            | .25            | .6923077  | .48                  |           |
|                 | Point estimate |           | [95% Conf. Interval] |           |
| Risk difference | -.4423077      |           | -.7929769            | -.0916385 |
| Risk ratio      | .3611111       |           | .1270198             | 1.026621  |
| Prev. frac. ex. | .6388889       |           | -.0266215            | .8729802  |
| Prev. frac. pop | .3066667       |           |                      |           |

+-----+  
chi2(1) = 4.89 Pr>chi2 = 0.0270

Example 3: In a landmark study published in 1950 by Richard Doll and Austin Bradford Hill in the U.K. 60 female lung cancer patients were compared with 60 similarly aged healthy patients. 41 of the cancer patients were established smokers compared to 28 in the control group.

```
. cci 41 19 28 32
```

|                 | Exposed        | Unexposed | Total                | Proportion Exposed |
|-----------------|----------------|-----------|----------------------|--------------------|
| Cases           | 41             | 19        | 60                   | 0.6833             |
| Controls        | 28             | 32        | 60                   | 0.4667             |
| Total           | 69             | 51        | 120                  | 0.5750             |
|                 | Point estimate |           | [95% Conf. Interval] |                    |
| Odds ratio      | 2.466165       |           | 1.100926             | 5.562471 (exact)   |
| Attr. frac. ex. | .5945122       |           | .0916737             | .8202238 (exact)   |
| Attr. frac. pop | .40625         |           |                      |                    |
| +-----          |                |           |                      |                    |
|                 | chi2(1) =      |           | 5.76                 | Pr>chi2 = 0.0164   |

```
. cci 41 19 28 32, woolf
```

|                 | Exposed        | Unexposed | Total                | Proportion Exposed |
|-----------------|----------------|-----------|----------------------|--------------------|
| Cases           | 41             | 19        | 60                   | 0.6833             |
| Controls        | 28             | 32        | 60                   | 0.4667             |
| Total           | 69             | 51        | 120                  | 0.5750             |
|                 | Point estimate |           | [95% Conf. Interval] |                    |
| Odds ratio      | 2.466165       |           | 1.172275             | 5.188178 (Woolf)   |
| Attr. frac. ex. | .5945122       |           | .1469578             | .8072541 (Woolf)   |
| Attr. frac. pop | .40625         |           |                      |                    |
| +-----          |                |           |                      |                    |
|                 | chi2(1) =      |           | 5.76                 | Pr>chi2 = 0.0164   |