

# Case-control methods

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Smoker	Lung cancer		Total
	Cases	Controls	
Yes	688	650	1338
No	21	59	80
	709	709	1418

- Case status obtained from records

# Proof

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$C$  - case,  $S$  - smoker

Exchange  $C$  and  $S$  and the result is obtained

# Notes

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- Sample  $OR$  is  $\frac{n_{11}n_{22}}{n_{12}n_{21}}$
- Sample  $OR$  is unchanged if a row or column is multiplied by a constant
- Invariant to transposing
- Is related to  $RR$

- $OR$  approximate  $RR$  if  $P(C | \bar{S})$  and  $P(C | S)$  are small

# Rare disease assumption

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Exposure	Disease		Total
	Yes	No	
Yes	9	1	10
No	1	999	1000
	10	1000	1010

- Cross sectional data

# Notes

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- $OR = 1$  implies no association
- $OR > 1$  positive association
- $OR < 1$  negative association
- For retrospective CC studies,  $OR$  can be interpreted prospectively
- For diseases that are rare among the cases and controls, the  $OR$  approximates the  $RR$
- Delta method SE for  $OR$  is

$$\sqrt{\frac{1}{n_{11}} + \frac{1}{n_{12}} + \frac{1}{n_{21}} + \frac{1}{n_{22}}}$$

# Example

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