Risks and Odds.



Risks and odds.

When talking about the chance of something
happening, e.g. death, hip fracture, we can talk about:
risk and relative risk
or
odds and odds ratio.

## Risks and odds.

Risks.
A proportion.
Numerator / Denominator.

Odds.
A ratio
Numerator / (Denominator - Numerator).

Two by two table.

|  | Outcome event |  | Total |
| :--- | :---: | :---: | :---: |
|  | Yes | No |  |
| Experimental <br> group | a | b | $\mathrm{a}+\mathrm{b}$ |
| Control group | c | d | $\mathrm{c}+\mathrm{d}$ |
| Total | $\mathrm{a}+\mathrm{c}$ | $\mathrm{b}+\mathrm{d}$ | $\mathrm{a}+\mathrm{b}+\mathrm{c}+\mathrm{d}$ |

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Risk.

Risk is: a proportion.
Risk of event in expt. group $=\frac{a}{a+b}=$ EER.
Risk of event in control group $=\frac{c}{c+d}=C E R$.
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Relative risk.

Relative risk (RR) is: a ratio of proportions.
RR = EER CER.

A measure of the chance of the event occurring
in the experimental group relative to it occurring
in the control group.

## Relative risk - 2.

$R \mathrm{R}<1$ if group represented in the
numerator is at lower "risk" of the event.
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Want this if the event is a bad outcome
e.g. death.
$R R>1$ if group represented in numerator $\qquad$ is at greater "risk" of the event.

Want this if the event is a good outcome $\qquad$
e.g. smoking cessation. $\qquad$

Relative risk reduction.

The difference in the risk of the event between the control and experimental groups, relative to the control group.
$R R R=(C E R-E E R) / C E R$.

Use this term if the event is bad e.g. death. $\qquad$


## Absolute risk reduction.

The absolute difference between the risk of the event in the control and experimental groups.

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A R R=C E R-E E R .
$$

ARR can be used to calculate the number needed to treat (NNT).

Use this term if the event is bad e.g. death.

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## Absolute benefit increase.

The absolute difference between the risk of the
event in the control and experimental groups.
$A B I=C E R-E E R$.

ABI can be used to calculate the number needed to treat (NNT).
Use this term if the event is good e.g. smoking cessation.
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Number needed to treat.

The number of patients who needed to be
treated to prevent the occurrence of one adverse
event (e.g. complication, death) or promote the occurrence of one beneficial event (e.g.
cessation of smoking).
NNT = 1/ARR.
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Odds ratio.

Odds ratio (OR) is: a ratio of ratios.
$O R=a d$
bc.

