# **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.

A ratio. Numerator / (Denominator - Numerator)

	Outcome event		Total
	Yes	No	
Experimental group	а	b	a+b
Control group	С	d	c + d
Total	a + c	b + d	a + b +c + d



# Risk.

Risk is: a **proportion**. Risk of event in expt. group =  $\frac{a}{a+b}$  = EER. Risk of event in control group =  $\frac{c}{c+d}$  = CER.

#### Relative risk.

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

RR = <u>EER</u> 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.

RR <1 if group represented in the numerator is at lower "risk" of the event.

Want this if the event is a bad outcome e.g. death.

RR >1 if group represented in numerator is at greater "risk" of the event.

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

#### **Relative risk reduction.**

The difference in the risk of the event between the control and experimental groups, relative to the control group.

RRR = (CER - EER)/CER.

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

#### **Relative risk reduction - 2.**

An alternative way of calculating the relative risk reduction is to use the relative risk:

RRR = (1 - RR).

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

### Absolute risk reduction.

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

ARR = CER - EER.

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

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

#### **Relative benefit increase.**

The difference in the risk of the event between the control and experimental groups, relative to the control group.

RBI = (CER - EER)/CER.

Use this term if the event is good e.g. smoking cessation.

### **Relative benefit increase - 2.**

An alternative way of calculating the relative benefit increase is to use the relative risk:

RBI = (1 - RR).

Use this term if the event is good e.g. smoking cessation.

### Absolute benefit increase.

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

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

Use this term if the event is good e.g. smoking cessation.

### 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

# Odds.

Odds is: a ratio. Odds of event in expt. group =  $\frac{a}{b}$ . Odds of event in control group =  $\frac{c}{d}$ .

# Odds ratio.

Odds ratio (OR) is: a ratio of ratios. OR =  $\frac{ad}{bc}$ .