

STATISTICAL CONCEPTS: RISK RATIOS & CONFIDENCE INTERVALS



Risk Ratio (RR) = risk of the outcome in the treatment group / risk of the outcome in the control group. This tells us **how many times more likely** it is that an event will occur in the treatment group relative to the control group.

- An **RR** of **1** means that there is no difference between the two groups thus, the treatment had **no effect**.
- An $RR < 1$ means that the treatment decreases the risk of the outcome.
- An $RR > 1$ means that the treatment increased the risk of the outcome.

Example, the $RR = 0.10/0.15 = 0.67$ Since the $RR < 1$, the treatment decreases the risk of aspiration pneumonia

Absolute Risk Reduction (ARR) = risk of the outcome in the control group - risk of the outcome in the treatment group.

- This tells us the absolute difference in the rates of events between the two groups. It also indicates the baseline risk and treatment effect.
- An **ARR** of **0** means that there is no difference between the two groups thus, the treatment had **no effect**.

Example, the $ARR = 0.15 - 0.10 = 0.05$ or 5% The absolute benefit of treatment is a 5% reduction in the aspiration rate

Risk Ratio Reduction (RRR) = absolute risk reduction / risk of the outcome in the control group. This is also calculated by subtracting the RR from 1 (eg. $RRR = 1 - RR$)

- This is the complement of the RR, and is probably the most commonly reported measure of treatment effects. It tells us the reduction in the rate of the outcome in the treatment group relative to that in the control group.

Example, the $RRR = 0.05/0.15 = 0.33$ or 33% or $RRR = 1 - 0.67 = 0.33$ or 33%

The treatment reduced the risk of death by 33% relative to the risk in the control group.

Number Needed to Treat (NNT)

- inverse of the ARR and is calculated as $1 / ARR$.
- This is the number of patients we need to treat with the experimental therapy to prevent 1 bad outcome. It is a good way of deciding if the effect is clinically significant

Example, the $NNT = 1/0.05 = 20$ We need to treat 20 people for 2 years to prevent 1 Case of aspiration pneumonia

CONFIDENCE INTERVALS: How precise was the estimate of the treatment effect?

- The true risk of the outcome in the population is not known, so we estimate it from the sample of patients in the trial. This estimate is called the *point estimate*.
- To gauge how close/precise this estimate is to the true value we look at its 95% confidence interval (95% CI).
- If the 95% CI is narrow then we know our point estimate is fairly precise.
- The 95% CI also provides information about the statistical significance of the result: if the value corresponding to *no effect* falls outside the 95% CI then the result is statistically significant at the 0.05 level;
 - For Risk Ratio (RR) if confidence includes 1= not significant
 - For Absolute Risk Reduction (ARR) if confidence interval includes 0= not significant