

Relative Risk Reduction, Absolute Risk Reduction and NNT

A new anti-inflammatory drug A reduces the risk of serious GI bleed (event rate) by 50 % compared with a traditional NSAID. This is calculated from:

$$\frac{\text{GI bleed rate with drug A}}{\text{GI bleed rate with traditional NSAID}}$$

In the trial referred to, the rate was 1% with drug A and 2% with the traditional NSAID.

Relative Risk (RR) = $1/100$ divided by $2/100 = 0.5$ or 50%. This appears very significant; however the corresponding Absolute Risk Reduction (ARR) is the risk difference which takes in to account the background risk rate and is $0.02 - 0.01 = 0.01$ or 1%.

The NNT is $1/0.01$ (or $100/1$) or 100. Intuitively we can also see that we need to treat 100 patients with drug A to prevent one adverse event (GI Bleed).

The RR can be very misleading. In the above trial if the event rates were 1 in 10,000 and 2 in 10,000 respectively the RR would still be 50% but the ARR is 0.0001 and the NNT is 10,000.

The NNT therefore indicates how many patients we can expect to benefit from treatment. We also need to consider how many patients are likely to be harmed (e.g. from an ADR) from taking the drug or number needed to harm (NNH).