1.7 Understanding Drug Efficacy and numbers needed to treat (NNT)

To understand the probable clinical efficacy of a drug for the individual patient the numbers needed to treat (NNT) have been calculated to see the likely impact over a 12 month period. E.g., if the NNT to prevent one death in 5 years is 25 people, then the *annualised NNT* will be 125.

The *annualised NNT*s for common primary care drug interventions are summarised in the *Drug Efficacy (NNT)* table, which was first put together in 2012 has been updated for this guidance and can be found in Appendix C, along with the methodology for developing and maintaining NNTs.

> The **number needed to treat (NNT)** is a measure used in assessing the effectiveness of a particular intervention. The NNT is the *average* number of patients who require to be treated for one to benefit compared with a control in a clinical trial. It can be expressed as the reciprocal of the absolute risk reduction.

Although the *annualised NNT* provides a numerical comparison between therapeutic interventions this information should **not** be viewed in isolation as there is always a need to consider:

- **What is the outcome being avoided?** Death is more significant than a vertebral fracture, but different outcomes will be more or less significant to the individual patient
- **Over what period does the benefit accrue?** Two drugs may have the same NNT to avoid one death, but the drug that achieves that over 6 months is more effective than that which takes 10 years. NNTs can be put on the same timescale by multiplying or dividing the NNT appropriately, but there is then the untested assumption that benefit accrues consistently over time
- **What are the TRUE costs of the drug?** If a medicine saves the life of one patient in 25, but causes debilitating side effects for the rest, its costs may outweigh its benefits

> The ideal NNT is 1, where everyone improves with treatment: the higher the NNT, the less effective is the treatment in terms of the trial outcome and timescale.
>
> So if treatment with a medicine reduces the death rate over 5 years from 5% to 1% (very effective), the absolute risk reduction is 4% (5 minus 1), and the NNT is 100/4, (25).

NNTs are only estimates of average benefit, and it is rarely possible to know precisely what the likely benefit will be in a particular patient. Clinicians and patients should be aware of a degree of uncertainty since it is usually not possible to calculate valid confidence intervals around NNTs.

> The **number needed to harm (NNH)** is the *average* number of people taking a medication for one to suffer an adverse event. Specify the specific end point and note that risk of ADR is higher in frail elderly.
>
> The overall benefit to risk ratio (NNT/ NNH) should be weighed in the individual patient and may vary considerably in people with polypharmacy.

Applicability of Trial Data to Individual Adults

The *Drug Efficacy (NNT)* table provides trial population and duration information. The closer an individual is in terms of characteristics and duration of treatment to the trial the more likely they will achieve the expected benefits.

Adults approaching end of life have an increased risk of many events, so each individual event has a higher absolute risk. This means that interventions may have a much lower NNT for that adult. This should be balanced against the shorter time they have in life to obtain a benefit and the increased risk that any harm may also have a higher impact.