MAKING NUMBERS MEANINGFUL: WHAT IS “NUMBER NEEDED TO TREAT” AND HOW CAN IT BE USED TO INFORM HEALTHCARE DECISIONS?

KEY MESSAGES

- Number needed to treat (NNT) describes the potential effectiveness of a particular clinical intervention. Specifically, it captures the number of patients who would need to be treated for a specific length of time in order to help just one patient.

- NNT is only one of many factors that can inform healthcare planning. Others, such as baseline risks, side effects, duration of treatment, costs and cost-effectiveness, and patient preferences, should complement the use of NNT.

- Every measure, including NNT, has its limitations. If these limitations are not well-understood, misinterpretation may result.

Health professionals, managers and policymakers are aware of the importance of using research evidence to inform healthcare decisions. As well, in a bid to become increasingly information-savvy about their health and healthcare, patients and the greater public are seeking out evidence to inform personal health practices and care decisions. However, in order to achieve a healthcare system that’s truly evidence-informed, research evidence must consistently be brought to bear across all levels of decision-making. This is often easier said than done; there are many methods and approaches to applying research results, and each has its own advantages and limitations.

The “number needed to treat” (NNT) is one particularly useful tool for guiding a health organization’s resource allocation planning and allowing for a shared-informed decision-making process to occur with a patient. Interestingly, though NNT is often used, it is not consistently well-understood by the very people who could benefit most from its results.

What is NNT?

Dr. Andreas Laupacis and colleagues are credited for introducing the NNT over 20 years ago. The NNT provides an aggregate measure of clinical benefit for a specific intervention, such as a new drug or therapy. The measure is expressed as the number of patients who would need to be treated with the intervention, for a specific length of time, to see one person benefit. An NNT can be helpful for evaluating the
effectiveness of two or more interventions, such as comparing the effectiveness of a new drug with that of a control treatment like a placebo or a drug already in use.

To better understand NNT, let’s consider a hypothetical example:

Researchers tested a new drug that aims to decrease the chance of heart attacks in men over 50 years of age. The study included 2,000 subjects: 1,000 took the new drug for five years, and 1,000 were given a placebo. At the end of the trial, 2% of the men in the placebo group experienced a heart attack, compared to only 1% in the group taking the new drug. A common way of expressing the benefit of the new drug is the relative risk reduction (RRR), which is calculated by dividing 1% by 2%. This works out to 0.5, or 50%. The absolute risk reduction (ARR), calculated by subtracting 1% from 2%, gives a more modest (and less misleading) description of the benefit, amounting to just one man in 100 clinically benefiting from the drug. The NNT – the inverse of absolute risk – is 100, since 100 men had to receive the new drug for 5 years in order for one man to benefit (or one less heart attack to occur). Now consider a study with the same parameters at the outset, but 20% of men suffered a heart attack on placebo compared with 10% on the new drug. The relative risk reduction is still 50%, but the NNT is now 10. One of the advantages of the NNT is that it better reflects the absolute benefit of therapy (which is, after all, what patients are most concerned about) than does the relative risk reduction.

**The danger of misinterpretation**

The NNT holds much promise in guiding organizations in allocating healthcare resources and in counselling patients who face treatment decisions. Many studies have suggested that physicians, patients, and healthcare policy makers, when presented with NNT data, will tend to make more conservative decisions compared with the relative risk reduction. However, research findings also suggest that NNT is not always well-understood by the very people it is intended to inform. Confusion sometimes occurs when people use NNT from different studies to make comparisons between two or more therapies. For the comparison to be meaningful, the therapies must have been tested in similar population samples with the same condition, using the same comparator, time period, and outcomes. In addition, there always needs to be a time frame associated with the NNT (five years, 10 years, and so on). The NNT should also be interpreted very carefully with patients who experience the same event numerous times, such as repeated asthma attacks, as it can lead doctors to over-estimate the benefit of therapy and even over-prescribe.

Relying solely on NNT ignores a range of other helpful sources of information. Data on side-effects, costs, cost-effectiveness, and patient preferences are also important for making informed health and healthcare decisions. And using NNT alone also doesn’t give patients an idea of their baseline risks. To follow up on our
hypothetical example: a new heart attack drug may have varying effectiveness, depending on the combined risk factors for heart disease such as being 65 or older; being male; having a family history of heart disease, high blood pressure and/or high cholesterol; smoking; and physical inactivity. For our example, you might wonder why all men didn’t benefit from the new drug? There are two reasons: first, not all people who take the drug will benefit from it; and second, few people who don’t take the drug will ever develop heart attacks.

Conclusion

NNT can be useful in the process of making informed healthcare decisions. However, like many tools for presenting data, it requires a broad, analytical approach and should not be used in isolation. No one measure should trump good judgment, which involves careful weighing of a range of evidence and incorporating patient and organizational preferences.

References


Further Reading

Center for Evidence-Based Medicine, University of Toronto. No Date. “Glossary of EBM terms.”

