Evidence-based dermatology: Number needed to treat and its relation to other risk measures

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When discussing treatment options with patients, clinicians often use terms such as “frequently” or “rarely” when referring to potential benefits or possible harms. Quantitative measurements of treatment benefits and harms derived from randomized clinical trials or meta-analysis such as odds ratios or risk reduction are more precise terms, yet physicians and their patients find them difficult to understand and they are not, therefore, commonly used in clinical practice. To overcome the lack of intuitiveness for traditional measures of risk estimates derived from clinical trials, the number needed to treat (NNT) has been widely recommended as a measure of effectiveness, and number needed to harm as a way of describing risk of possible adverse events. NNT is simply the number of patients who, on average, would need to be treated with a proposed intervention to demonstrate one additional gain over the standard comparator intervention. NNT is an absolute measure and it is calculated as the inverse of the absolute risk reduction. In this article we describe the usefulness and limits of the NNT with particular reference to dermatology, and compare NNT with other relative measures such as the relative risk and relative risk reduction.

WHAT IS NUMBER NEEDED TO TREAT?

In clinical trials and meta-analysis with outcome measures such as mortality or improvement expressed in a dichotomous way, using “yes” or “no” answers, it is possible to calculate two sorts of summary measures of effectiveness or harm. These include those of: (1) relative type, such as relative risk (RR) and RR reduction; or (2) absolute type, such as absolute risk (AR) reduction (ARR) and the number needed to treat (NNT).1-4 The formulas to calculate these measures are summarized in Table 1.

The NNT corresponds to the average number of patients who need to be treated with a particular therapy to achieve one extra positive outcome when compared with standard therapy or placebo. NNT is simply the reciprocal of the ARR. The NNT range of values goes from 1 to infinity. The ideal NNT is 1 because it implies only one patient needs to be treated to receive additional benefit. The higher the NNT, the less effective the intervention. By consensus, NNT is only expressed in whole numbers because it does not make much sense to refer to fractions of patients. When its calculation results in a fraction, the value is usually approximated to the next highest whole number.5,6 It is also important to point out at this stage that for diseases affecting a large number of patients, even a small difference in NNT (in the first decimal place) between two treatments could be clinically important, especially from a public health perspective. Thus, it is important that the actual values of the NNT (before rounding) are also presented.

The NNT has the advantage of providing clinicians with a more tangible concept to aid clinical decision making in relation to the effectiveness of a treatment. A NNT is easy to remember and allows a simple way of comparing the benefits for different therapies. A similar concept to NNT is the number
needed to harm (NNH). Like NNT, the NNH represents the number of additional patients who, on average, need to be treated with an intervention of interest before one extra harmful event is encountered when compared with standard therapy.

One danger of using NNT is that it may draw attention from other important details of a randomized clinical trial (RCT) reporting and quality. Although NNTs are a useful guide for interpreting the magnitude of clinical benefit, they are not a substitute for the critical appraisal of the original study.

**HOW IS NNT CALCULATED?**

To illustrate how the various measures of effectiveness are derived, we will use the results from two double-blind RCTs carried out in 24 centers of the United States and Canada, which evaluated the efficacy of topical imiquimod 5% cream compared with vehicle (placebo) for the treatment of patients with actinic keratoses affecting the face and scalp.

Both trials were done concurrently and were evaluated as only one trial. In total, 436 patients older than 18 years with 4 to 8 actinic keratoses (clinically diagnosed) were included. The intervention consisted of imiquimod 5% topical cream, applied twice a week for 16 weeks, compared with placebo (vehicle without active ingredient) applied in the same way and for the same duration.

**Table I. Mean and calculation of principal risk measures**

<table>
<thead>
<tr>
<th>Event rate</th>
<th>Is the percentage of patients having an outcome in Pc or Pt</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARR</td>
<td>Is the difference in probability of an event between Pc and Pt (ARR = Pc − Pt)</td>
</tr>
<tr>
<td>BR</td>
<td>Is the percentage of patients in Pc in whom outcome is observed (BR = Pc)</td>
</tr>
<tr>
<td>NNT</td>
<td>Is the number of patients who a physician needs to treat to prevent one additional person from having the event (NNT = 1/ARR)</td>
</tr>
<tr>
<td>RR</td>
<td>Is the percentage of patients having an outcome in Pt divided by percentage of patients having an outcome in Pc (RR = Pt/Pc)</td>
</tr>
<tr>
<td>RRR</td>
<td>Is the proportional reduction in rates of outcomes between Pt and Pc (RRR = 1 − RR)</td>
</tr>
</tbody>
</table>

**ARR**, Absolute risk reduction; **BR**, basal risk; **NNT**, number needed to treat; **Pc**, control group; **Pt**, treatment group; **RR**, relative risk; **RRR**, RR reduction.

**Table II. Summary with results of the trial for outcome “complete clearance of actinic keratosis” with imiquimod versus placebo for 16 weeks**

<table>
<thead>
<tr>
<th>Complete clearance</th>
<th>Not complete clearance</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imiquimod</td>
<td>97 Patients</td>
<td>118 Patients</td>
</tr>
<tr>
<td>Placebo</td>
<td>7 Patients</td>
<td>214 Patients</td>
</tr>
</tbody>
</table>

The results of the study for the outcome “complete resolution of the lesions” are summarized in Table II.

As seen in Table II, in the group treated with imiquimod, 97 of 215 (45.1%) patients improved completely, whereas in the placebo group only 7 of 221 (3.2%) improved. First, it is necessary to calculate the ARR. Applying the formulas from Table I, the ARR (difference in the events rates in the control and experimental groups) is 42% (45%−3%), which implies that for every 100 patients treated for 16 weeks with imiquimod, 42 more patients improved completely, when compared with those receiving placebo. The event rate in the control group is also known as the basal risk (BR) of the population studied, because it reflects the background risk of events in those who are not receiving the intervention being investigated.

The NNT is now simply calculated as the reciprocal of the ARR. In the example in Table II, the NNT corresponds to 1/0.42, which is 2.4 rounded up to 3. A NNT of 3, in this case, implies that only 3 patients with actinic keratosis need to be treated with imiquimod to see one additional patient clear completely when compared with placebo. Generalizing this NNT of 3 to our own patients is only appropriate if the BR of the patients who we treat is similar to that of those included in the study.

It is important to make a distinction between NNT for treatment and NNT for prophylaxis. For prophylaxis, where fewer events occur in the treated group, the standard NNT calculation will give a negative number. There are two options in such a situation: either to use the negative NNT with the appropriate interpretation, or to switch the treatment and control groups to express the NNT in positive terms, again with the appropriate interpretation.

**CONFIDENCE INTERVALS FOR NNT**

The study’s calculated NNT of 3 corresponds to what is termed a “punctual estimator” (PE). If the RCT is repeated 100 times, similar results to the PE will be found, but not necessarily the same. The confidence interval (CI) of a PE corresponds to the range within which the PE will fall most of the time if a RCT is repeated many times in patients with the same BR.
To calculate the CI of an NNT it is necessary to calculate both upper and lower limits of the CI of the ARR; calculate the reciprocal of each of these, which then become the CI of the NNT. Various calculation tools are freely available on the Internet, which makes the calculation of NNT and other effective measures quick and easy (Table III).

The most commonly used CI is at 95%. That means if we repeat the RCT 100 times, the PE will be between the considered intervals around 95% of the time. In the example from Table II, with a NNT of 3, the 95% CI is calculated to range from 2 to 3. In this situation, the best-case scenario will be NNT of 2, and in the worst case it will be 3. In other words, if we repeat the study 100 times, we will have to treat 2 to 3 patients with imiquimod for 16 weeks to achieve one complete improvement over placebo 95% of the time.

The width of the CI depends directly on the sample size of the study. A NNT with a narrow CI is much more precise than when the CI is wider. When the CI of the ARR passes through the noneffect (0 value), it can mean two things: that there is no effect from the intervention or that the sample size was insufficient to demonstrate significant effects. When a 95% CI of a NNT is not statistically significant (ie, includes a minus value), it is difficult to interpret and is, therefore, usually omitted. For example, consider a hypothetic study where the ARR for the outcome of global improvement with treatment X (27 of 100 healthy individuals) and Y (35 of 100 healthy individuals) was 4.7% with a 95% CI of −5.6% to 15%. These results correspond to an NNT of 21 with a 95% CI of −18 to +7. In this example we find two difficulties.

First, the CI shows that the NNT can be negative. The fact that the NNT CI can be −18 means that if 18 patients received X treatment, one less will reach improvement than if they were treated with Y treatment. In this case the value −18 is the number of patients necessary to harm one, or NNH. The CI in this case should be described as NNH 18 to NNT 7.

Second, the CI does not include the PE of 21. The 95% CI NNH 18 to NNT 7 still does not include our PE of NNT = 21. This is explained because the 95% CI ARR of −5.6% to 15% includes all the values between −5.6 and +15, including 0, although, when the ARR is 0 the NNT is infinite, therefore, the NNT CI of −18 to 7 must necessarily include infinity. This peculiar situation implies that our 95% CI for a NNT of 21 includes values of NNH from 18 to infinite and of NNT from 7 to infinite.

### Table III. Internet tools for calculation of risk measures

- [http://www.cebm.utoronto.ca](http://www.cebm.utoronto.ca)
- [http://araw.med.eiu.edu/cgi-bin/nntcalc.pl](http://araw.med.eiu.edu/cgi-bin/nntcalc.pl)
- [http://www.spc.univ-lyon1.fr/mbcalc](http://www.spc.univ-lyon1.fr/mbcalc)
- [http://medcalc3000.com/BayesianAnalysis_1.htm](http://medcalc3000.com/BayesianAnalysis_1.htm)

### Table IV. Calculation of number needed to treat starting from relative risk or odds ratio when basal risk is known

<table>
<thead>
<tr>
<th>NNT = ( \frac{1}{BR \times (1 - RR)} )</th>
<th>NNT = ( \frac{1 - BR \times (1 - OR)}{(1 - BR) \times (1 - OR)} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR, Basal risk; NNT, number needed to treat; OR, odds ratio; RR, relative risk.</td>
<td></td>
</tr>
</tbody>
</table>

The formula for OR should only be used in prospective studies where BR is <15%.

#### CALCULATION OF THE NNT FROM RR OR ODDS RATIO

RR is the ratio of the event rates of an experimental group and the event rate of the control group (Table I). It is the risk that the experimental group maintains after receiving the intervention. The RR reduction is a measure derived from the RR and it is an estimation of the percentage reduction of an intervention groups’ BR in relation to the control groups’ risk as a result of a therapy. It is calculated by subtracting the RR from 1. A RR of 1 indicates that the event rate is similar in the experimental group and in the control group. For adverse outcomes, a RR of less than 1 shows that the intervention is protective because the experimental group RR is less than the control group RR. The opposite occurs for RR greater than 1.

If an RCT or a meta-analysis does not report the ARR or the NNT, and the control even rate is known, it is possible to calculate the NNT from the RR according to the formula presented in Table IV. In the study we had used as an example, the RR for the outcome “complete improvement of the lesions” was 14.2%, which, without knowing the ARR, but knowing the BR, gives an NNT of 3.

Although the odds ratio is a measure less used for summarizing clinical trial results, the NNT can be calculated knowing the value of the odds ratio and the basal event rates (BR). This calculation is valid only for prospective studies, and with BR is not very common (<15%).

#### HOW DOES NNT DIFFER FROM RR MEASURES?

Before discussing the use in the clinical practice of measures such as the NNT, it is necessary to answer a question: Are the absolute effect measures (NNT) better than the relative effect measures (RR)?
To explain the advantages and disadvantages of absolute versus relative measures of risk, beyond mathemetic formulas, consider the results of a hypothetic clinical trial shown in Fig 1 of a new oral drug for vitiligo treatment carried out in a group of patients with a good prognosis (facial distribution, recent onset, no family history, and no mucocutaneous involvement). According to the results in Fig 1, A, the studied drug has an ARR of 10% and a RR of 133%, compared with placebo, for improvement. B, The results of a second hypothetical study about the same oral drug for the treatment of vitiligo, but carried out in subjects with a bad disease prognosis. The RR of improvement is still 133%, but the improvement rate is less in the treatment group and in the control group. Therefore, the ARR is only 2.5%. From this figure, we can deduce that the relative risk from an intervention remains constant in different groups of patients, independent of their basal risk (risk of the subjects without intervention). The absolute risk of an intervention, on the contrary, is dependent on the patients’ basal risk.

**Fig 1.** A. Results from an hypothetical clinical trial about a new oral drug for vitiligo treatment carried out in a group of patients with a good prognosis. The studied drug has an ARR of 10% and a RR of 133%, compared with placebo, for improvement. B. The results of a second hypothetical study about the same oral drug for the treatment of vitiligo, but carried out in subjects with a bad disease prognosis. The RR of improvement is still 133%, but the ARR is only 2.5%. From this example we can arrive at the following conclusions.8-11

First, the RR of the patients undergoing an intervention remains constant in different clinical stages, independent from their BR (in patients not undergoing the intervention).

Second, the ARR of an intervention, on the contrary, is dependent on the patients’ basal risk. In other words, the AR is less when the number of events is less.

Third, the differences in the RR sound more impressive than measures of AR. The smaller the basal events rate, the greater the differences between absolute and relative measures. Despite these anomalies, physicians are more used to reading reports of clinical trials of treatments with results only expressed in terms of RR.

Fourth, these observations in relation to the differences in the perception of the AR and RR are
important for clinical practice. Trials that set out to prove the effectiveness of a medication in people with a high basal rate of response will yield impressive-sounding RR results. However, when applied to a more typical clinical population with lower basal event rates, the ARR will be substantially less, and the treatment may be disappointing.

Last, similar conclusions apply to the NNT, which, as we have shown, is a risk measure of the absolute type.

In generalizing from a published trial, it is important to identify the basal event rates that are most similar to your own patients: (1) if the study specifies the BR of different subgroups, the most similar subgroup can be used; (2) the patients’ BR can be estimated from the reported BR by other studies that describe prognosis in similar patients; and (3) use clinical judgment and personal experience.

In relation to the study example in Table II, an 87-year-old man could present for medical help with 15 actinic keratoses on the face, scalp, neck, and extremities that have been resistant to cryosurgery and topical 5-fluorouracil. We know that the NNT for imiquimod versus placebo for the outcome “complete resolution of the lesions” was 3 in the published study. However, the patients included in this trial had an average age of 66 years and between 4 and 8 keratotic lesions. The patient under discussion probably does not have the same BR as the patient included in the study and, according to our clinical experience, we can estimate that his real NNT will be half of the one obtained by the studied patients. This way, the estimated NNT will be 3/0.5, that is, a NNT of 6.

**WHAT DOES NNT MEAN IN CLINICAL PRACTICE?**

Once a physician knows the magnitude of the NNT or NNH for a given treatment along with its CI, the physician is then in a good position to estimate the likelihood of a particular patient improving or worsening with a specific treatment, as long as the patient has a similar BR to the patients included in the study.

As an exercise to help the reader understand the scope and the advantages of using the NNT, please consider answering the questions shown below in relation to studies comparing active treatments against placebo.

How many patients should one reasonably be expected to vaccinate with a new herpes vaccine to avoid one episode of illness in 1 year?

How many patients with moderate to severe psoriasis should be treated with etanercept to reach one patient’s improvement greater than 75% from basal Psoriasis Area and Severity Index after 12 weeks of treatment compared with placebo? And with efalizumab compared with placebo?

How many patients with moderate to severe psoriasis should be treated with infliximab to reach

### Table V. List of numbers needed to treat

<table>
<thead>
<tr>
<th>Illness</th>
<th>Intervention/comparison</th>
<th>Outcome</th>
<th>NNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herpes zoster</td>
<td>0.5 mL of attenuated virus varicella zoster vaccine vs placebo</td>
<td>Herpes zoster prevention during 1 y follow-up</td>
<td>175</td>
</tr>
<tr>
<td>Psoriasis vulgaris (moderate-severe)</td>
<td>Etanercept (25 mg) vs placebo twice/wk</td>
<td>PASI 75% improvement after 12 wk of treatment</td>
<td>4</td>
</tr>
<tr>
<td>Psoriasis vulgaris (moderate-severe)</td>
<td>Efalizumab (2 mg/kg) vs placebo once/wk</td>
<td>PASI 75% improvement after 12 wk of treatment</td>
<td>4</td>
</tr>
<tr>
<td>Psoriasis vulgaris (moderate-severe)</td>
<td>Infliximab (5 mg/kg) vs placebo in wk 0, 2, and 6 and then every 8 wk until 46 wk</td>
<td>PASI 75% improvement after 10 wk of treatment</td>
<td>1</td>
</tr>
<tr>
<td>Superficial basal cell carcinoma</td>
<td>Topic imiquimod 5% cream vs placebo 5-7/wk during 8 wk</td>
<td>Clinical and histologic improvement of the lesions after 12 wk of follow-up</td>
<td>1</td>
</tr>
<tr>
<td>Actinic keratosis</td>
<td>Topic imiquimod 5% cream vs placebo twice/wk during 16 wk</td>
<td>Complete improvement of the lesions after 16 wk of treatment</td>
<td>2</td>
</tr>
<tr>
<td>Severe atopical dermatitis</td>
<td>Topic tacrolimus 0.1% vs placebo twice/d</td>
<td>At least 90% of clinical improvement after 12 wk</td>
<td>3</td>
</tr>
<tr>
<td>Tinea versicolor</td>
<td>Ketoconazole 2% shampoo vs placebo once/d for 3 d</td>
<td>1 mo Follow-up improvement</td>
<td>2</td>
</tr>
<tr>
<td>Discordant couples for herpes simplex virus</td>
<td>Oral valacyclovir (500 mg) to the infected patient vs placebo during 8 mo</td>
<td>VHS-2 symptomatic infection of the seronegative couple after 8 mo of treatment</td>
<td>62</td>
</tr>
</tbody>
</table>

NNT, Number needed to treat; PASI, Psoriasis Area and Severity Index; VHS-2, herpes simplex virus 2 infection.
<table>
<thead>
<tr>
<th>Illness</th>
<th>Intervention/comparison</th>
<th>Outcome</th>
<th>NNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low to moderate inflammatory acne&lt;sup&gt;20&lt;/sup&gt;</td>
<td>Oral contraceptives (20 μg etinil estradiol and 100 μg levonorgestrel) vs placebo</td>
<td>Complete improvement after 6 treatment cycles (global clinical assessment)</td>
<td>10*</td>
</tr>
<tr>
<td>Low to moderate inflammatory acne&lt;sup&gt;21&lt;/sup&gt;</td>
<td>Oral contraceptive Belara (etinil estradiol and chlormadinone acetate) vs Microgynon (etinil estradiol and levonorgestrel)</td>
<td>50% reduction on papulopustules after 12 treatment cycles</td>
<td>8*</td>
</tr>
<tr>
<td>Papulopustular rosacea&lt;sup&gt;22&lt;/sup&gt;</td>
<td>15% azelaic acid gel vs 0.75% metronidazole gel, both twice/d</td>
<td>At least 1 of 4 points improvement in erythema evaluation</td>
<td>7</td>
</tr>
<tr>
<td>Inferior extremity uncomplicated cellulitis, but that requires intravenous treatment&lt;sup&gt;23&lt;/sup&gt;</td>
<td>Intravenous antibiotic treatment at home vs hospitalized</td>
<td>Patients’ satisfaction with the place where the therapy was administered 1 wk after application</td>
<td>4</td>
</tr>
<tr>
<td>Onychomycosis&lt;sup&gt;24&lt;/sup&gt;</td>
<td>Ciclopinox nail lacquer vs placebo</td>
<td>Clinical improvement after 48 wk of application</td>
<td>15</td>
</tr>
<tr>
<td>Psoriasis vulgaris&lt;sup&gt;25&lt;/sup&gt;</td>
<td>Topic combination of calcipotriene and betamethasone vs betamethasone as monotherapy, both twice/d</td>
<td>75% lesions’ improvement after 4 wk of treatment</td>
<td>5</td>
</tr>
<tr>
<td>Psoriasis vulgaris&lt;sup&gt;25&lt;/sup&gt;</td>
<td>Topic combination of calcipotriene and betamethasone vs calcipotriene as monotherapy, both twice/d</td>
<td>75% lesions’ improvement after 4 wk of treatment</td>
<td>2</td>
</tr>
<tr>
<td>Psoriasis vulgaris&lt;sup&gt;25&lt;/sup&gt;</td>
<td>Topic combination of calcipotriene and betamethasone vs placebo, both twice/d</td>
<td>75% lesions’ improvement after 4 wk of treatment</td>
<td>2</td>
</tr>
<tr>
<td>Adult atopic dermatitis, relapse prevention after treatment&lt;sup&gt;26&lt;/sup&gt;</td>
<td>Topic fluticasone vs placebo, twice a wk</td>
<td>Relapse after 16 wk of treatment</td>
<td>3</td>
</tr>
<tr>
<td>Chronic paronychia&lt;sup&gt;27&lt;/sup&gt;</td>
<td>Topic metilprednisolone vs itraconazole</td>
<td>Cure or improvement after 6 wk treatment</td>
<td>3</td>
</tr>
<tr>
<td>Bullous pemphigoid&lt;sup&gt;28&lt;/sup&gt;</td>
<td>Topic clobetasol 0.05% twice/d vs oral prednisone (0.5 mg/kg in moderate illness and 1 mg/kg in severe illness)</td>
<td>Illness control after 3 wk of treatment</td>
<td>13*</td>
</tr>
<tr>
<td>Bullous pemphigoid&lt;sup&gt;28&lt;/sup&gt;</td>
<td>Topic clobetasol 0.05% twice/d vs oral prednisone (0.5 mg/kg in moderate illness and 1 mg/kg in severe illness)</td>
<td>Survival after 3 wk of treatment</td>
<td>6*</td>
</tr>
<tr>
<td>Seborrheic dermatitis&lt;sup&gt;29&lt;/sup&gt;</td>
<td>Topic metronidazole 1% gel vs placebo twice/d</td>
<td>Complete or important improvement after 8 wk of treatment 2-y-old Atopic eczema</td>
<td>2</td>
</tr>
<tr>
<td>Women with high risk of having children with atopic dermatitis&lt;sup&gt;30&lt;/sup&gt;</td>
<td>Lactobacillus CG daily since wk 2-4 before delivery, and after delivery to wet nurses or to newborns up to age 6 mo vs placebo</td>
<td>2-y-old Atopic eczema</td>
<td>5</td>
</tr>
<tr>
<td>Melanoma with Breslow &gt; 2 mm&lt;sup&gt;31&lt;/sup&gt;</td>
<td>Surgical margin of 3 vs 1 cm</td>
<td>Local or regional recurrence after 60 mo of follow-up</td>
<td>18*</td>
</tr>
<tr>
<td>Melanoma with Breslow &gt; 2 mm&lt;sup&gt;31&lt;/sup&gt;</td>
<td>Surgical margin of 3 vs 1 cm</td>
<td>Recurrence or death after 60 mo of follow-up</td>
<td>18*</td>
</tr>
<tr>
<td>Facial or intertriginous psoriasis&lt;sup&gt;32&lt;/sup&gt;</td>
<td>Topic tacrolimus 0.1% vs placebo twice/d</td>
<td>At least 90% of clinical improvement after 8 wk of treatment</td>
<td>3</td>
</tr>
<tr>
<td>Warts&lt;sup&gt;33&lt;/sup&gt;</td>
<td>Duct tape during ≤2 mo vs cryotherapy of 6 treatments or less</td>
<td>Complete improvement of the lesions</td>
<td>5</td>
</tr>
<tr>
<td>Moderate to severe atopic dermatitis&lt;sup&gt;34&lt;/sup&gt;</td>
<td>Topic tacrolimus ointment 0.1% (in patients &gt;16 y), 0.03% (in patients age 2-16 y) vs pimecrolimus 1% cream twice/d</td>
<td>Complete improvement or almost complete improvement after 16 wk of treatment</td>
<td>7</td>
</tr>
</tbody>
</table>

*Lactobacillus CG, Lactobacillus rhamnosus (Lactobacillus GG, American Type Culture Collection 53103); NNT, number needed to treat.
*Confidence interval not significant.
one patient's improvement greater than 75% from basal Psoriasis Area and Severity Index after 10 weeks of treatment when compared with placebo?

How many patients with superficial basal cell carcinoma should be treated with topical imiquimod to achieve one patient's clinical and histologic remission after 12 weeks of follow-up?

How many patients with severe atopic dermatitis should be treated with topic tacrolimus 0.1% ointment to achieve one patient's improvement greater than 90% after 12 weeks compared with placebo?

How many patients with tinea versicolor should be treated with ketoconazole 2% shampoo to achieve one patient's improvement after 1 month of follow-up?

How many patients with type 2 herpes simplex should be treated with valacyclovir to prevent one seronegative couple infection after 8 months of treatment?

Compare the NNTs that you guessed from those derived from the published clinical trials (Table V). Are you surprised with the values of the published NNTs and those you calculated? Further examples of NNTs from the dermatologic literature are shown in Table VI.

WHAT IS AN ACCEPTABLE NNT?

Given that the reader now understands the concept of NNT or NNH and how it is calculated, it is now important to consider what value NNT or NNH you and your patients would be able to accept to justify the risks and benefits of a treatment. The answer will vary according to the clinical stage that will determine what is known as "threshold NNT"35 whereby the benefits of a therapy exceed the risks in a particular clinical situation, to justify starting therapy. Determining the threshold NNT includes principles and preferences of the patient, clinical experience of the physician, importance of the desired outcome, and costs and adverse effects of the intervention.

Thus, for an intervention with very low risk that might prevent an important outcome, such as aspirin for prevention of myocardial infarction, a very high NNT might be acceptable. For individual patients seen in clinic wishing to have treatment of an existing disease, low NNTs are desirable. Ideally NNTs should be derived for new treatments compared with current existing standard or best therapy rather than placebo, because it is not common for doctors to use placebo or vehicle creams in clinical practice.

Some recent research has thrown further light on the use of NNT in clinical practice. The value of NNT analysis has recently been demonstrated for evaluating the effectiveness of combination therapy to prevent obstructive pulmonary disease exacerbations,36 and other work has demonstrated how NNT was a good predictor of health benefit when compared with quality of life—adjusted years.37 An important study by Mayne et al38 has suggested that NNT should be limited to fairly acute conditions with short-term well-defined treatment courses, and that another concept of annualized NNT should be used for chronic conditions. Further research exploring the use and interpretation of NNTs in dermatology is to be encouraged.

REFERENCES


38. Mayne TJ, Whalen E, Vu A. Annualized was found better than absolute risk reduction in the calculation of number needed to treat in chronic conditions. J Clin Epidemiol 2006;59:217-23.