has shifted away from services run by local authorities towards purchasing services from the voluntary and private sectors.[15] Purchasers' requirements are increasingly shaping the direction of mental health services, and fundholding general practitioners are using contracts to detail what they expect from secondary care. Anxiety has, however, been expressed that fundholding will result in the inhibition of the coordination of services for patients with long-term severe mental illness.[16]

Nazareth and colleagues are rightly concerned by the burden of care placed on general practitioners by people with chronic mental illness, particularly in inner city practices.[9] General practitioners in inner city areas have spoken of new community services caring for patients who are less severely ill at the expense of those with severe chronic mental disorders.[17] Coid has also drawn attention to the failure of community care in inner London, where hospital psychiatric inpatient units are full and the proportion of emergency and compulsory admissions is four times the national average.[18] If people with long-term mental illness are to be properly cared for in the community, sufficient hospital inpatient psychiatric beds and suitably trained staff must be retained.

We should not lose sight of the humane vision of caring for mentally ill people away from institutions, at home and close to their neighbours, but the over-enthusiastic application of political policy and professional dogma can also seriously damage health. Many hospitals have closed but the careful evaluation of patient outcomes and use of community care services is lagging far behind.

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Editor, British Journal of General Practice

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Conveying the benefits and risks of treatment

A NECESSARY part of every general practitioner's continuing medical education is critical reading of the medical literature. Most medical reports, trials and guidelines now contain quantitative data. Understanding the methods of data presentation is essential if the results of studies are to be interpreted correctly and incorporated into normal clinical practice.

The most reliable way of assessing a medical intervention is by means of the randomized controlled trial.[1] Reports of randomized controlled trials and quantitative syntheses (meta-analyses) are becoming increasingly common.[2] The results of such trials and meta-analyses can be presented in several ways, the most common summary measurements of efficacy being a relative risk reduction, an absolute risk reduction and the number of patients who need to be treated in a specified time period to prevent a single adverse event occurring (NNT).[3,4]

Unfortunately, all too often when the results of randomized controlled trials are reported only one summary measurement of efficacy is used, most commonly the relative risk reduction. The problem with this approach is that the relative risk reduction gives the reader no idea of the baseline event rate, that is, the susceptibility of the population to the outcome of interest. Does this matter? There is evidence that it does. In several studies hospital doctors and general practitioners have been given the results of a randomized controlled trial expressed as either a relative or absolute risk reduction and have been questioned on their decision to treat on the basis of the results.[5-8] These studies have shown that giving relative risk reduction as the summary measurement of efficacy makes a decision to treat more likely than for other methods. Thus, when relative benefits are substantial the absolute value of treatment may not be considered. Quite often this problem is confounded in secondary reports and subsequent editorials which also emphasize relative differences at the expense of absolute benefits. As Feinstein states 'clinicians are much impressed by the bigger numbers of the relative changes than by the smaller magnitudes of the absolute changes for the same results'.[9]

For this reason the most versatile method of presenting the results of randomized controlled trials is in the form of the NNT.

This is because the population baseline risk is incorporated in its estimation.[10] The NNT is the reciprocal of the absolute risk difference, which is the difference between the proportion of patients with an adverse event in the placebo and treatment groups. If data on the side effects of treatment are available then an accurate benefit: risk ratio can be estimated. NNTs can be derived from randomized controlled trials, meta-analyses, vaccine trials and cohort studies providing that relationships are assumed to be causal and that the appropriate information is reported in published articles.[1]

The above points can be illustrated by comparing the results of the two United Kingdom randomized controlled trials in middle-aged (aged between 35 and 64 years) and elderly people (aged between 65 and 74 years) for the treatment of hypertension in terms of reduction of stroke at five years with adjustments for the length of trials and rounding up of numbers.[11,12] First, the baseline event rate or rate of strokes in the placebo group (X) can be estimated in middle-aged subjects (0.013 or 1.3%) and elderly subjects (0.06 or 6%). Secondly the baseline event rate in the treatment group (Y) can be estimated in middle-aged (0.007) and elderly people (0.046). Summary results can then be expressed in several ways: as an absolute risk reduction of stroke (X–Y), 0.006 in middle-aged subjects and 0.014 in elderly subjects; as a relative risk reduction of stroke [(X–Y)/X] x 100, 46% in middle-aged subjects and 23% in elderly subjects; and as the number of people who need to be treated for five years to prevent one stroke [1/(X–Y)], 170 middle-aged people compared with 60 elderly people (calculation adjusted for the length of the trials). Although the relative risk reduction is greater in middle-aged subjects than in elderly subjects, in real terms treatment of elderly subjects yields greater therapeutic benefit in terms of strokes prevented. This is because age is an important determinant in the risk of suffering a stroke,[13] as shown by the higher baseline event rate in elderly subjects (6%) compared with middle-aged subjects (1.3%).

The benefit of calculating NNTs is that treatment choice is more rational and explicit. The NNT conveys to both doctor and patient how much effort and cost is needed to prevent an event while side effects of therapy can be quantified as well. Also, different forms of interventions, such as drug therapies, surgical therapies and diagnostic tests can be compared in the common currency of NNTs.

However, the NNT does have limitations. First, the NNT is a single value that incorporates both the baseline risk and relative risk reduction estimate. Two different interventions can have the same NNT even though the baseline risk in the control groups may be quite different. The fact that a doctor treats seven patients to prevent an adverse event can mean that the baseline risk is 0.9 and the relative risk reduction is 15% or that the baseline risk is 0.3 and the relative risk reduction is 50%. Secondly, an NNT of seven means that six patients will not respond to therapy. Unfortunately it is not possible to predict which of these patients will benefit from treatment, who will gain no benefit and who will succumb to side effects of treatment; in order to prevent one adverse event all seven patients must be treated. Thirdly, NNTs by definition are expressed in terms of selected outcomes. There may be other important outcomes for patients not reported in the trial results. For example, in the Helsinki heart study,[14] where gemfibrozil was used to treat hypercholesterolaemia, the NNT to prevent a fatal or non-fatal myocardial infarction was 71, suggesting a reasonable intervention. Only when the total number of deaths in treatment and control groups is considered, showing a 6% relative increase in the gemfibrozil treatment group compared to controls, can the full value of treatment be appraised. Lastly, efficacy of treatment as measured in randomized controlled trials may be greater than that obtained in practice.[1] It is important to consider the setting of the trial and whether or not strategies to enhance compliance were used. The two large trials of treatment of hypertension in the UK[11,12] were 'pragmatic' trials which resembled everyday clinical practice. Thus the results of these trials can be generalized to ordinary practice and the NNTs derived from them can be used directly.

Presenting absolute risk differences in terms of NNTs does not solve all treatment dilemmas. This is because a value judgement is involved in all treatment decisions, whether implicitly or explicitly. To return to the question of hypertension, the two large UK trials demonstrate the potential benefit of treatment in terms of the prevention of stroke. They do not resolve the problem of which should be valued more highly, prevention of stroke in a middle-aged person or in an elderly person. Randomized controlled trials seek to resolve therapeutic uncertainty. The trade-off for internal validity is that complex multidimensional problems are necessarily simplified to accommodate the trial design.[15] However, complexity and uncertainty are a part of everyday clinical practice. Although the risks and benefits of treatment choices can be clarified by NNT calculations, the place of clinical judgement when considering treatment options for each individual patient remains.[16] Quantification of the likely risks and benefits of treatment for a particular patient is possible and should help the doctor and patient to make a joint decision.[17]

The conflict between benefits to the population and to the individual — the so-called prevention paradox[18] — is illustrated by presenting absolute risk differences in the form of the NNT. The chance of individual benefit may be quite small and balanced by a chance of unpleasant side effects in those with only a moderately raised absolute risk of disease. Randomized controlled trials, meta-analyses and guidelines tend to emphasize average population benefit and are often based on results from unrepresentative populations.[19] In a community setting with lower absolute risks, the potential benefits of treatment may be less, while potential side effects will remain the same. This is particularly true when hypertension and other cardiovascular risk factors are considered. It is general practitioners who deal with those patients in whom the absolute likelihood of cardiovascular disease is only moderately elevated and where the greatest public health gains in terms of disease prevention can occur. It is also in these patients that the individual benefit: risk ratio is most difficult to assess. Using guidelines based on absolute risk means that elderly patients become candidates for more aggressive treatment. Whether such options are desirable for each individual is a matter of clinical judgement and patient preference. The choice should be based on a clear understanding of the evidence and how it applies to that patient. Furthermore, treatment guidelines that are too prescriptive obscure individual variation in treatment benefit. For example, lowering blood pressure in a population below a certain threshold may be desirable in terms of overall population detection and control of hypertension, but it does not take account of individual treatment choice in terms of acceptable risks and benefits.

Conveying the risks and benefits of treatment requires extrapolation of the results of randomized controlled trials to individual patients. Calculation of the NNT incorporates the relative risk reduction and baseline risk into a clinically meaningful value. The way in which the results of randomized trials are presented has been shown to be of the utmost importance to the way in which doctors make decisions about treatment.[9,10] The type of information given to patients can also affect their treatment preferences.[20] Quantifying the results of randomized controlled trials by incorporation of an absolute benefit as well as a relative benefit does not mean that clinical judgement is forced: merely that the reason behind the choice of treatment is based on a more realistic index of benefit and risk. Doctors should try to present

therapeutic alternatives in the most objective manner possible; using absolute risk calculations in the form of NNTs facilitates this process.

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Acknowledgements

We thank Drs Godfrey Fowler and Martin Dawes, ICRF General Practice Research Group, University of Oxford for their advice and criticism.

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