Malnutrition: those at greatest risk

- Age over 75
- Bereaved
- Male
- Living alone
- Housebound
- Suffering from dementia

- Corns—pressure or friction causes these areas of hyperkeratosis; a chiropodist can provide advice on footwear
- Biomechanical problems—chiropodists can manufacture and fit corrective orthoses for mechanical problems of foot structure and function.

Chiropody services face a high level of demand. In some areas chiropodists' assistants perform the less technically demanding work. Some older people choose private chiropody, which is usually provided in their home and may be obtained more frequently than chiropody through the NHS.

Nutrition and dietetic services

A medical practitioner can refer an elderly patient at risk of malnutrition (see box) to a dietitian. The role of dietitians has evolved over the past 20 years, and they now provide nutritional education and treatment in the community. Patients may be seen in day centres, community hospitals, health centres, and at home.

Dietitians may offer simple, practical information about food to allow people to make informed choices about healthy eating or they may offer specific advice to the those with particular dietary requirements, such as patients with diabetes or those advised to follow a low fat diet. They may also provide help to patients receiving nasogastric or gastrostomy feeding.

Community pharmacists

As well as running commercial outlets, pharmacists offer advice to patients on the appropriateness of over the counter medications and can advise on risks of adverse drug reactions. Pharmacists may supply drugs dispensed in daily dose reminders,[6] and some will deliver drugs to patients' homes.

1 *Living in Britain: results from the 1994 general household survey.* London: OPCS, 1994. (Supplement A: people aged 65 and over.)
2 Wattis J. What an old age psychiatrist does. *BMJ* 1996;313:101-4.
3 Barodawala S. Community care: the independent sector. *BMJ* 1996;313:741-3.
4 Mulley GP, ed. *Everyday aids and appliances.* London: BMJ, 1989.
5 Mulley GP, ed. *More everyday aids and appliances.* London: BMJ, 1991.
6 Corlett A. Aids to compliance with medication. *BMJ* (in press).

Statistics Notes

Interaction 2: compare effect sizes not P values

John N S Matthews, Douglas G Altman

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As we have previously described,[1] the statistical term interaction relates to the non-independence of the effects of two variables on the outcome of interest. For example, in a controlled trial comparing a new treatment with a standard treatment we may want to examine whether the observed benefit was the same for different subgroups of patients. A common approach to answering this question is to analyse the data separately in each subgroup. Here we illustrate this approach and explain why it is incorrect.

One of several subgroup analyses in a trial of antenatal steroids for preventing neonatal respiratory distress syndrome[2] was performed to see whether the effect of treatment was different in mothers who did or did not develop pre-eclampsia. Among mothers with pre-eclampsia 21.2% (7/33) of babies whose mothers were given dexamethasone developed neonatal respiratory distress syndrome compared with 27.3% (9/33) of babies whose mothers received placebo, giving P = 0.57. Among mothers who did not have pre-eclampsia 7.9% (21/267) of babies in the steroid group and 14.1% (37/262) of babies in the placebo group developed neonatal respiratory distress syndrome, giving P = 0.021.

There is a temptation to claim that the difference in P values establishes a difference between subgroups because "there is a treatment effect in mothers without pre-eclampsia but not in those with pre-eclampsia." This argument is false: the key to realising this is to recall that a statement such as P = 0.57 does not mean there is no difference, merely that we have found no evidence that there is a difference. A P value is a composite which depends not only on the size of an effect but also on how precisely the effect has been estimated (its standard error). So differences in P values can arise because of differences in effect sizes or differences in standard errors or a combination of the two.

This is well illustrated by the present example. If we measure treatment effect by the difference in percentages developing neonatal respiratory distress syndrome in the placebo and steroid groups, then the treatment effect among mothers with pre-eclampsia, namely 27.3 – 21.2 = 6.1%, is very close to the effect among mothers without pre-eclampsia, which is 14.1 – 7.9 = 6.2%. The difference in P values has arisen because only a small proportion of mothers had pre-eclampsia (66 out of 595), so the former treatment effect is estimated much less precisely than the latter.

Another example can be found in a study of the effect of vitamin D supplementation for preventing neonatal hypocalcaemia: expectant mothers were given either supplements or placebo and the serum calcium concentration of the baby was measured at one week.[3] The benefit of supplementation was investigated separately for breast and bottle fed infants, and *t* tests to compare the treatment groups gave P = 0.40 in the breast fed group and P = 0.0006 in the bottle fed group.

As we have seen, it would be wrong to infer that vitamin D supplementation had a different effect on breast and bottle fed babies on the basis of these two P values: the correct way to proceed is to compare directly the sizes of the treatment effects. The effect of vitamin D supplementation can be measured by the difference in mean serum calcium concentrations between supplement and placebo groups and this gives effects of 0.04 mmol/l in the breast fed babies and 0.10 mmol/l in bottle fed babies. In order to interpret the difference in effect sizes, namely 0.06 mmol/l, we need to construct a confidence interval or perform a test of the null hypothesis that the true effect sizes are the same in each subgroup. A 95% confidence interval for the difference in effect sizes is – 0.05 to 0.17 mmol/l and a test of the null hypothesis gives P = 0.28. There is thus no evidence that the effect of vitamin D supplementation differs between breast and bottle fed infants. Comparing P values alone can be misleading.

Details of how to construct relevant confidence intervals and carry out associated tests are contained in a subsequent *Statistics Note*.

1 Altman DG, Matthews JNS. Interaction 1: heterogeneity of effects. *BMJ* 1996;313:486.
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3 Cockburn F, Belton NR, Purvis RJ, Giles MM, Brown JK, Turner TL, *et al.* Maternal vitamin D intake and mineral metabolism in mothers and their newborn infants. *BMJ* 1980;281:11-4.

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