Finally, our critics find fault with the outcome criteria, 'length of stay in the community' and 'length of stay in hospital after readmission'. The two care-related measures furnish fine indices of possible changes in the care provided by setting up complementary facilities. They operationalise just those goals for changes in the pattern of mental health care that have often been formulated by planners, for instance by the Royal Commission on Mental Health (Rollin, 1977): optimum replacement of in-patient treatment by extramural care. Further to care-related outcome criteria, we used disease-related outcome measures, assessed by PSE interview, which Drs Checinski & Goddard failed to notice.

The harshest criticism, the statement that it is not correct to assume that the frequency of out-patient contact directly influences the chance of readmission (this is in fact the most significant finding of our study) remains unfounded. We critically described our model (Fig. 1 of our paper) for testing the causal association under consideration of the relevant intervening variables. Drs Checinski & Goddard give no indication which of the variables not considered by us or which deficits of our model jeopardise the conclusions drawn.

Nevertheless, we are grateful to them for their stimulating comments on our paper – in particular for having pointed out that many aspects were not sufficiently treated, for example the description of programmes for mental health care, which indeed is true; articles in journals must regrettably be shorter than authors, and obviously also critics, wish.

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Reliability of GHQ factor structures

SIR: The paper by Huppert et al (Journal, August 1989, 155, 178–185) on the factor structure of the 30-item General Health Questionnaire (GHQ-30) is misleading on one specific point.

Factor analysis has been widely used not only in psychological and psychiatric research but also in other social sciences. When we perform factor analysis, we usually rotate the axes in order to simplify the concept of each factor/component, which is obtained from the allocation pattern of the variables with significant loadings on the factor. In an initial analysis, the eigenvalue of the first factor is always much greater than the others, and the results of initial unrotated factors are difficult to interpret. Thus, we carry out rotation of the axes in order to reallocate the item loadings.

The loadings following rotation are quite different from those of the initial analysis, the difference among the variances of rotated factors becoming smaller than that of the initial factors. As has been reported in recent factor analysis studies on the GHQ (Elton et al, 1988; Iwata et al, 1988), the result concerned with rotated factor structure involves the sum of squared loadings obtained after rotation as a variance of each rotated factor.

However, Dr Huppert et al appear to have miscalculated the variances. They present the proportion of each factor's variance accounting for the total variance as 28.9%, 7.6%, 6.2%, 4.1% and 3.8% from the factor A (greatest) to E (smallest), respectively (Table I of their paper). Thus, we can estimate the variances of these factors: the values are 8.67, 2.28, 1.86, 1.23 and 1.14 respectively.

In contrast to these values, based on the loadings demonstrated in the table, the sums of squared loadings (proportion of variance explained) are 5.40 (18.0%) for the factor A, 2.84 (9.5%) for B, 2.64 (8.8%) for C, 2.33 (7.8%) for D, and 1.75 (5.8%) for E, respectively. Taking into account the fact that the loadings given have been rounded off to two decimal places these become 5.30–5.50 (17.7–18.3%) for the factor A, 2.77–2.90 (9.2–9.7%) for B, 2.58–2.71 (8.6–9.0%) for C, 2.28–2.39 (7.6–8.0%) for D, and 1.71–1.80 (5.7–6.0%) for E, respectively.

These values are markedly different from those given by Dr Huppert et al, who appear to have regarded the eigenvalues derived from the initial unrotated factor solution as the variances of the rotated factors. The values for variances of factors displayed in Tables I and II, therefore, are in error. Also, although they state that, "Despite the large number of items with significant loadings on D'Arcy's first factor (13 items), it accounts for only 16% of the variance. This contrasts with the eight significant items in our anxiety factor, which accounts for 28.9% of the variance." (pp. 183–184), in truth, their value is not so different from that of D'Arcy (1982).

Although the errors mentioned above do not seem to affect strongly the main results or conclusions of the paper, in view of the spreading use of statistical

program packages it is worth noting the problems that may arise in their interpretation.

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IWATA, N., OKUYAMA, Y., KAWAKAMI, Y. *et al* (1988) Factor structure of the General Health Questionnaire in a sample of Japanese workers. *Industrial Health*, **26**, 69–74.

SIR: We regret that we may indeed have inadvertently misled our readers over one relatively minor matter. The figures quoted in our paper as "percentage variance accounted" are for unrotated vectors, and were presented simply to give a measure of the progressive removal of the total variability by the five principle axes. The values for the *rotated* vectors are indeed as given by Dr Iwata.

The main thrust of our paper was of course the consistency of the factor structure over randomly selected samples, and the figures for the percentage variance accounted for by the rotated first factors were 17.3, 15.8, 16.9, 21.9, 18.6, 21.2, 22.2, 18.3, 17.9 and 19.6 for the 10 random samples. providing yet further evidence of this consistency.

We are very grateful to Dr Iwata for raising this matter, and presenting us with the opportunity of clarifying the point.

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Behaviour disorders in mentally handicapped adults

SIR: We were interested to read the paper by Lund (*Journal*, September 1989, **155**, 377–383). We would question the assumption that measuring the frequencies of types of behaviour and determining a significant cut-off point provides information about an underlying 'behaviour disorder'. What the index

behaviours do seem to have in common is that they have come to the attention of the parents or carers, presumably because of their impact on the observers.

The author also states that there was an association between the 'behaviour disorder' and the setting in which the individual lived. It is important to elucidate the influence of such environmental factors on people with mental handicap, as they may have a powerful influence and might be more easily altered to produce an improvement.

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Violence in hospital

SIR: The report by Noble & Rodgers (*Journal*, September 1989, **155**, 384–390) concerning the Bethlem Royal and Maudsley Hospital violent incident register has important implications for management.

A gradual increase in violence by psychiatric in-patients, documented by this and other studies, is a worrying development (Tardiff & Sweillam, 1980; Mullen, 1988). Other authors have noted that violence registers tend to underestimate assaults on staff, particularly those of lesser severity (Haller & Deluty, 1988). The two- to threefold increase in violence found by Drs Noble & Rodgers is therefore even greater cause for concern.

The authors do not comment on the relevance of their findings for staff training or planning policy. Medical and nursing staff require training in early recognition and management of potentially violent patients and situations. One study showed nursing staff to be at greatest risk during physical restraint of the patient (Carmel & Hunter, 1989). Rapid and safe sedation of the patient would seem to be a priority, yet a survey of medical staff's familiarity with these techniques revealed gaps in knowledge and education (Ring *et al*, in preparation).

Research into the causes of violence on staff should continue, but every effort should be made to apply the findings to the clinical situation to minimise risk to staff and patient.

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