

and testing the appropriate hypothesis. Oakley *et al.* give no hint that this has been done, nor have they tested whether their data conflict with our scoring system. All their analysis shows is that if we had started with one of their sets of data we might be using a scoring system which superficially would look very different from our present one.

Oakley *et al.* report the results of applying our second scoring system to their data. Testing the hypothesis that infants with scores > 500 are at the same risk in Birmingham and Newcastle we find $P = 0.13$. When we compare their results with our evaluation (Table 9 of Carpenter *et al.*, 1977) we again find no significant differences ($P = 0.14$). Taking all these data together, 54% of cases had scores > 500 compared with 30% of controls. It is now clear that the choice of 500 as the critical score is too low if the high risk group is only to include about 16% of controls. Raising the critical score also reduces the proportion of cases in the high risk group. In any case there is no good reason for merely considering high and low risk groups as risk rises exponentially with score.

The principal criticism of Oakley *et al.* is that 'the degree of discrimination that the Sheffield "at birth" score achieved in either Birmingham or Newcastle during the study period is not one that would be of use in a prospective prevention programme, . . .' Sensitivity and specificity may be combined in the Youden index, J (Armitage, 1971) which is simply the difference between the percentage of cases and controls in the high risk group. For our prospective study, $J = 38\%$; for the Newcastle data, $J = 34\%$; for the Birmingham data, $J = 13\%$. Alberman and Goldstein (1970) made a statistical evaluation of at-risk registers and showed that maximum benefit is gained by the differential allocation of resources to a high risk group. The value of J for the risk register they discussed is 13%, which is identical with that observed in Birmingham.

We have never said that the scoring system developed for identifying high-risk infants in Sheffield would work in other cities. The wide range of postperinatal mortality rates indicates that differences between cities are likely, but so far the reported differences may be attributed to random variation. We believe a scoring system along the lines we have described provides a practical method of improving the effectiveness of primary care.

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R. G. CARPENTER AND ANGELA GARDNER
*Department of Medical Statistics and Epidemiology,
London School of Hygiene and Tropical Medicine,
Keppel Street, London WC1E 7HT*

J. L. EMERY
*Children's Hospital,
Western Bank,
Sheffield S10 2TH*

Drs Oakley and Stanton comment:

Our co-author Mrs J. Tavaré is now living in the USA, and we have had insufficient time to obtain her reply to the comments of Dr Carpenter and his colleagues on the statistical methods used in our paper.

There are always many ways of analysing a particular data set. Dr Carpenter and his colleagues are right in observing that our paper was primarily concerned with the *practical* application of the Sheffield scoring system to prospective prevention programmes, although we confirmed that the system discriminated at a statistically significant level between children who die, and the living control population.

A system which in Birmingham identified fewer than half the children who subsequently died while scoring one-third of the normal population at risk may be statistically valid, but we believe it has no place in primary care where we are dealing with the lives of infants and not statistics. Using the present system could well result in a positive maldistribution of primary care services by creating a false sense of security, and directing attention away from potentially vulnerable children who do not score at risk.

It is possible that future work in the Department of Health and Social Security's Multicentre Postneonatal Study will produce an effective at-risk system. Meanwhile, we are still of the opinion that scoring systems should only be used as research tools to indicate groups of infants that require particular study to investigate the aetiological factors of the sudden infant death syndrome.

J. R. OAKLEY
*Children's Hospital,
Western Bank,
Sheffield S10 2TH*

A. N. STANTON
*Princess Mary Maternity Hospital,
Great North Road,
Newcastle upon Tyne NE2 3BD*