To the Editor

Mortality and two indicators of morbidity

SIR—The article by Brennan and Clare[1] seeks to demonstrate the relationship between two indicators of self-reported morbidity derived from the 1971 census and age-band specific mortality data for all causes of death at a level of aggregation below county level. They argue from the strength and nature of this relationship that it is reasonable to use mortality data in the RAWP formula applied to area or health district level.

The conclusions of the paper are challenged on three grounds: (1) The data available is unsuited to the hypothesis being discussed; (2) The interpretation of the results is of doubtful statistical validity; and (3) The logic of the argument is open to question.

The authors acknowledge that the morbidity data available are restricted to persons expected to be economically active and relate only to self-reported conditions which prevent economic activity. The population is thus composed mainly of males of working age, a group which is a relatively low user of health service resources. The authors concede that the morbidity data for the group '65 years and over' are unreliable in that these represent only a small part of the total morbidity spectrum, but proceed to make an extrapolation of doubtful validity from the morbidity experience of a younger age group. They further acknowledge that the relationship of the indicators to the total spectrum of morbidity for all age groups did not appear to be constant at each geographical data point. The absence of data for children aged 0–15 years precludes the use of standardised mortality ratios; the width of age-banding required to match the two sets of data for age-specific rates is, however, such that standardisation for age is minimal. In view of these major reservations concerning the data, it is surprising that the authors felt justified in proceeding.

The interpretation of the results is contentious and in our view is of doubtful statistical validity.

We note with interest that the scattergram supplied for the age-group 45–64 years is 'of the most highly correlated data'. The overall impression is misleading in that it does not reveal the strength of the relationship for the lower values of the morbidity range in which most of the data points lie. Neither can it indicate the considerable variation which may occur among narrow age bands with the age-group as a whole.

The interpretation of the numerical values of the correlation coefficients, which are in effect only summary statistics, is notoriously difficult. The estimation of the likelihood of such values having occurred by chance alone is also suspect, being dependent upon the assumption of bivariate normality. No evidence for such an assumption has been introduced. In our opinion, there is a high probability that the distribution of both morbidity and mortality data is skewed by the effect of socioeconomic factors at the various geographical data points. The findings would have been more convincing if supported by a similarly high degree of correlation obtained by the use of a non-parametric test free from assumptions regarding distribution.

As the authors state, the use of the SMR in the RAWP formula has considerable implications for resource allocation. Its use, however, is not as implied, as an overall multiplier using the all-condition SMR, but on a grouped-condition specific basis. At a lower level of geographical aggregation, the problems we have noted before regarding the very small numbers of deaths in certain groups become readily apparent.

The authors have used throughout their paper and calculations age-specific mortality rates in broad age bands. The RAWP formula uses SMRs which are disease-group-specific. At no point can we find an explanation in the paper for the assumption that the effect of these will be the same.

In view of the above problems, the relationship claimed for morbidity and mortality must be regarded as not proven and the evidence insufficient to support the use of mortality data for resource allocation below regional levels. We welcome, however, the final conclusion that the RAWP formula should be tempered by planning aspirations.

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Reference

[1] Brennan ME, Clare PH. The relationship between mortality and two indicators of morbidity. *J Epidemiol Community Health* 1980; **34:** 134–8.

Brennan and Clare reply:

Available data and other research. Unlike the reviewers of our article we did not expect that one piece of research would answer all or even the majority of questions raised by the use of SMRs in the RAWP formula.[1] We believe that our results provide a useful addition to the accumulating evidence on mortality and morbidity relationships. It is true that our data allowed conclusions to be drawn only for the working population in the age range 16–64 years. However, other research has indicated similar conclusions for children.

It is fairly well documented that in certain social groups where common causes of death in children