sources outside the systematic review, such as relevant cohort studies.¹

Senn's concerns arise from what he calls the principle of "label invariance." We agree that many analyses of data from clinical trials are unaffected by which group is called the treated group and which the control group. The distinction does, however, need to be made in analyses of underlying risk, when this term usually refers to the risk in the placebo, control, standard, or reference treatment group. In a withdrawal trial the "standard treatment" group would comprise those patients receiving the active treatment, because then the question of interest is whether the effect of withdrawing this treatment is the same for patients who are at different levels of risk while they are receiving it. In a trial comparing two active treatments, A and B, the definition of underlying risk would depend on the precise question being addressed, which might be the effect of changing from A to B given the risk associated with A or, alternatively, the effect of changing from B to A given the risk associated with B.

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Britain was healthier than Germany in 1914

EDITOR,—In his review of my book *The Economic Laws of Scientific Research* Tom Wilkie writes that its thesis has been disproved by a historical experiment.¹ Since, however, I believe that it is he who has got the experiment wrong, and since it concerns matters of medicine, I should like to correct his statement.

Wilkie says that "when called up for service in the first world war those German peasants [were] taller, healthier, and stronger than the British proletariat." The standard authors in this field are Mitchell² and Winter.^{3,4} Their studies show that the British were much healthier than the Germans in 1914. Thus infant mortality was 160/1000 births in Germany but only 100 in England and Wales and 110 in Scotland. Between 1901 and 1914 life expectancy at birth was between one and three years greater in Britain than in Germany. None of this is surprising, as the British gross domestic product per capita was 125% of Germany's.⁵ Yet that increased wealth also threatened health as it was associated with urbanisation, so it is remarkable that British rates of tuberculosis were lower and that the British were taller, particularly when similar populations are compared. This error is widely believed, and this letter provides a useful opportunity of correcting it.

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Influences of practice characteristics on prescribing in practices

Multiple regression models depend on explanatory variables included

EDITOR,—Although Robert P H Wilson and colleagues acknowledge that demographics and morbidity are important influences on variations in prescribing costs at the level of health authorities, they proceed to consider multiple regression models for variation in prescribing at the level of practices that do not allow for either of these as explanatory variables.¹

Analysis of patient linked prescribing data has shown that, within practices, the prescribing rate for those aged 55-64 is about six times that for children and young male adults, and for those aged over 65 the factor is 10 or more.² The authors' use of rates per prescribing unit rather than per patient as the dependent variable (1 prescribing unit for those under 65; 3 prescribing units for those ≥ 65) may give some preliminary adjustment for age but makes no allowance for the wide variation between the age bands under age 65. Both the effect size and the significance of explanatory variables in regression models may depend heavily on the presence or omission of other explanatory variables.³ Furthermore, the authors' model for log (1993-4 costs), which includes historical costs as an additional explanatory variable, explains 67% of the variation, compared with 7% without this variable, and yet they quote only the estimated coefficients from this latter worse fit model.

On a more positive note, the use of log (prescribing rate) as the dependent variable is intuitively more plausible than the common practice of using the rate itself.^{4,5} The linear regression model for log (rates) transforms to a multiplicative model for effects of explanatory variables on the prescribing rate, which accords far better with reality. (Effects are then in terms of percentage change rather than absolute change.) Having embarked on using the multiplicative model for prescribing rates, however, the authors then consider the absolute difference in rates between the two years studied rather than the difference in log (rates), thus reverting to the additive case. Increases of £15 in practices with initial (1990-1) rates of £30 and £45 per prescribing unit are very different in percentage terms and should not be interpreted as equivalent.

The validity of results and conclusions drawn from multiple regression models depends heavily on the goodness of fit of the models, yet appropriate assessments, such as analysis of residuals,³ are rarely satisfactorily reported and probably never conducted in many cases.

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Authors' reply

EDITOR,—We agree with Sarah J Roberts that an ideal analysis would reflect all morbidity and demographic factors that may influence prescribing. However, breakdowns by age and sex were not available to us for all the practices in the former Mersey region for the period of our study. Thus we used the best available information for our analyses.

It is well known that prescribing in any year is strongly related to historical patterns of prescribing. In our paper, however, we aimed "to investigate the variation in prescribing among general practices by examining the contribution to this variation of fundholding, training status, partnership status, and the level of deprivation." The determinants that we were investigating would also have influenced historical costs. We therefore emphasised those analyses that did not include historical costs.

Goodness of fit was investigated for all models by examination of the percentage of variation explained and the distribution of the residuals (as stated in the methods). We used the log transformation of all the dependent variables, except the changes between years, to normalise the residuals from the regression and thus to improve the fit of the model. We did not transform the data for the changes between years because in these instances transformation did not change the fit of the model. We thought that interpretation of the analyses was easier in the natural scale.

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Postal surveys in general practice

More analytical studies should be carried out

EDITOR,—Having received many questionnaires (as a single handed general practitioner) and having produced many (as a trainee in public health medicine), I share Brian R McAvoy and Eileen F S Kaner's desire to see changes in both the quality and quantity of questionnaire surveys.¹ I believe, however, that the time has now come to move on from the emphasis on questionnaire studies if general practice is to develop a credible research base. Randomised controlled trials may often be inappropriate, but analytical studies (especially the case-control design) seem to have been largely ignored as a research method in primary care.² Analytical studies seem ideally suited to the examination of many issues in general practice and, if undertaken rigorously, provide stronger epidemiological evidence than a questionnaire survey does.³

Table 1 shows the results of a Medline search from 1992 to 1996 with three MeSH subject headings: case-control studies, questionnaires, and family practice. The overall ratio of