rise in antibody titre at all. In a small minority of these individuals there may be evidence of reinfection. This usually manifests as an entirely subclinical event with only a 4-8-fold rise in antibody titre, all the antibody being of the IgG class. There is no evidence that such events represent any risk to the fetus. Very rarely there is evidence of clinically apparent reinfection[1 2] and in the following case this appeared to be related to vaccine.

A 22-year-old staff member donated serum for rubella antibody screening on 13 January 1975. The rubella HI titre was 1/16 and all this activity fractionated as IgG on gel filtration with Sephadex G-200. On 18 February she was given rubella vaccine (Almevax) and on 24 February she developed a typical rubella-like illness with a rash. A serum sample taken on 4 March had a titre of 1/4096, and 50% of this activity was of the IgM class. The clinical features and the serological response in this case were similar to those occurring in primary infections. The patient described by Dr Snijder and his colleagues did not have a rash, but the magnitude of the serological response was again similar to that of a primary infection. Their failure to find specific IgM antibody in the serum taken in the 38th week does not prove that an IgM response did not occur, since specific rubella IgM antibody may become undetectable within 3-4 weeks of the acute infection.[3]

Thus it would seem possible that reinfection with evidence of a viraemia (the occurrence of a rash in the case described here and of congenital infection in the case described by Dr Snijder and his colleagues) may occur. However, whether these are reinfections or primary infections depends entirely on the significance of the low-titre rubella HI activity in the early sera. Haukenes and his colleagues have shown that all classes of lipoprotein can be non-specific inhibitors of rubella haemagglutination[4] and that some sediment in the IgG-containing fractions in sucrose density gradients.[5] The work of Freeman and Smith[6] suggests that some α-lipoproteins will fractionate with IgG on gel filtration with Sephadex G-200. Thus it is possible that rubella HI activity which fractionates as IgG may in reality be non-specific inhibitor.

It is likely that in the vast majority of cases rubella HI titres of 1/16 represent specific antibody and immunity to reinfection with viraemia. Very occasionally such low titres may represent residual non-specific inhibitors and this should be taken into account when investigating persons with low rubella HI titres as possible cases or contacts of rubella.

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[2] Northrop, R L, Gardner, W M, and Geittman, W P, *New England Journal of Medicine*, 1972, **287**, 615.
[3] Pattison, J R, and Mace, J E, *Journal of Clinical Pathology*, 1975, **28**, 377.
[4] Blom, H, and Haukenes, G, *Medical Microbiology and Immunology*, 1974, **159**, 271.
[5] Haukenes, G, Haram, K, and Solberg, C-O, *New England Journal of Medicine*, 1973, **289**, 429.
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Marathon running and atherosclerosis

SIR,—Your leading article on the prevention of coronary disease (10 April 1976, p 853) correctly calls for modification of risk-related traits in the prevention of coronary heart disease. Marathon running is being used in several rehabilitation centres in the United States and Canada with this in mind. The life style necessary to cover the 42 km on foot is a very demanding one and has few risk factors. Forty-three cardiac patients, graduates from formal exercise programmes, finished the 12 December Honolulu marathon and earned "non-competitive" trophies from the Hawaii Heart Association. Among the patients were cases of double and triple vessel disease, with and without infarctions, with and without bypass grafts. Physicians and nurses from the rehabilitation centres also ran.

Cardiac patients have been running marathons since the mid-1960s. They are so numerous that it is difficult to find a race without at least one. In some cases the clinical improvement on this new life style is quite remarkable. One bypass patient ran the 24 October New York marathon only four months after his heart surgery. Our surveillance of these distance runners, patients and non-patients, suggests that covering 42 km on foot is associated with a very high level of "protection" against atherosclerosis. To date we have been unable to substantiate a single case of necropsy-proved fatal atherosclerosis among these marathon runners.

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Units of measurement

SIR,—Dr Eva Lester (8 January, p 102) is to be congratulated on drawing attention to the geographical absurdities and the international isolation of the UK in respect of the recent changes in laboratory reporting. The controversy is not a moribund duck, however, as it still vigorously quacks on in Brighton and other areas in the country where, sensibly it now seems, those changes have not been made which are now described in your leading article (1 January, p 5) as "a futile and wasteful exercise."

As it is only a year since the implementation date was imposed by the DHSS irritated clinicians might request through their committee structure that a return be made to the more convenient and uniform traditional system of reporting which conforms with the majority internationally and the Système International.

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SIR,—While agreeing with the tone of your leading article about the SI (1 January, p 5) I must say I always felt the same about the old units as well. Seldom-used values have to be looked up each time; the precise significance of borderline results are obscure and the range of each and every value is different.

Would it not be beyond the wit of our "computers-in-medicine" men to "normalise" biochemical and other pathological data? The application of a formula to each value could result in a conventional normal of 100 (say), with 90 and 110 being placed one standard deviation from the normal and 80 and 120 two standard deviations away. Some data cannot be handled this way.

Normalisation would make for much greater intelligibility in laboratory reports and be an aid to communication between doctors and different disciplines and reduce (however minimally) the obscurantism which bedevils our profession.

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SIR,—I would like to see the authors in your journal, on your instructions (1 January, p 6), giving scientific measurements in either SI or traditional units followed by the normal range of values, in the same units, in parentheses. I submit that scientific measurements should never be given verbally or in print without stating the normal range of values. At the most the omission of the appropriate normal range can lead to severe injury or death of a patient and at the least infuriate the reader who has mislaid his list of normal values. At the best it would allow your readers, wherever they are in the world, to appreciate the significance of the scientific result immediately, without recourse to conversion tables. There is no need to increase the printed space by giving two sets of units. When HM Government accepted the Système International d'Unités our hospitals and surgeries were saturated with conversion tables.

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Chapatty intake, vitamin D status and Asian rickets

SIR,—We read with interest the paper by Miss Sandra Hunt and her colleagues on the dietary intake and vitamin D status of British Asians (4 December, p 1351). Because of our mutual interest in Asian rickets Miss Hunt generously provided us with her findings some months ago. After noting the magnitude of the correlation between chapatty intake and serum 25-hydroxycholecalciferol ($25\text{-}OHD_3$) we carried out a more detailed statistical analysis.

Although the data on chapatty intake, vitamin D intake, and outdoor exposure were not normally distributed, transformation to a logarithmic scale allowed the results to be adequately fitted using a linear model. The results of the analyses presented below were derived from these logged values. The parametric correlations of serum $25\text{-}OHD_3$ with chapatty intake, vitamin D intake, and outdoor exposure were $-0{\cdot}480$, $+0{\cdot}348$, and $+0{\cdot}345$ respectively. Although the correlation of chapatty intake with serum $25\text{-}OHD_3$ was the largest in magnitude, this might have partly reflected the correlation with vitamin D intake. The independent contributions of the three variables to the variation in serum $25\text{-}OHD_3$ were therefore assessed by multiple regression analysis.

The multiple regression of serum $25\text{-}OHD_3$ on outdoor exposure and vitamin D intake explained $19{\cdot}2\%$ of the variation in serum $25\text{-}OHD_3$ levels, whereas inclusion of chapatty flour in the model increased the amount explained by $15{\cdot}5\%$ to $34{\cdot}7\%$. This increase is significant at the $0{\cdot}1\%$ level as assessed by an F test in the corresponding analysis of variance ($F=13{\cdot}7$; 1,77 DF; $P<0{\cdot}001$). Hence chapatty intake provides a contribution to the serum $25\text{-}OHD_3$ level which is additional to and independent of the effect of dietary vitamin D and outdoor exposure.