elegant paper offered "for debate."⁶ It was lucid, but at a level of discussion at which many doctors will not feel at home; perhaps for this reason no debate followed. This letter is submitted as a contribution to that debate.

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Clinical importance of enteric communication with abdominal abscesses

SIR,—The paper by Dr S H Saverymuttu and others (5 January, p 23) highlights the difficulty of diagnosing and localising intra-abdominal abscesses and rightly emphasises the atypical clinical presentation and significant mortality associated with this condition. However, there is an assumption throughout that communication of an abscess with the bowel should be beneficial as it allows "drainage," whereas in fact most of these abscesses result from leakage of bowel content from the bowel, and the communication is the root of the problem.

Computed tomography, ultrasound scanning, and gallium scanning, as well as the indium-111 leucocyte scanning favoured by the authors, are all now available and their value in the localisation of abdominal sepsis has recently been investigated. Knochel *et al* achieved accurate localisation in 123/136 patients by ultrasound, 116/126 by ¹¹¹In leucocyte scanning, and 77/80 by computed tomography.¹ All large series show false negatives and false positives, which in the case of ¹¹¹In leucocyte scans may be due to uninfected haematomas and areas of inflammation without pus. Such patients with false positives are excluded by Dr Saverymuttu and others as only patients in whom the abnormality seen on the ¹¹¹In scan was confirmed as an abscess by other means were included. Similarly, the statement that "overall ¹¹¹In scanning was more accurate than ultrasound" also seems unfair when the criteria for including a patient was that the abscess had to be detected on the ¹¹¹In scan to begin with, thus also excluding false negative results. At present the various available scanning techniques have broadly similar diagnostic and localisation rates, but ultrasound is quicker and more readily available without the need to transport an ill patient to a specialist centre for a procedure that may take 18 to 24 hours.

Intra-abdominal sepsis, especially when it occurs postoperatively, as it does in most cases, is a difficult problem, but I share the authors' view that early drainage is desirable and am concerned at the modern tendency of "multi-scanning," which tends to delay drainage procedures. Pitcher and Musher reported only one death among 29 patients in whom early drainage was achieved but 29 deaths from 48 in whom drainage was delayed.² The demonstration of enteric communications using ¹¹¹In leucocyte scans is of interest, but as the authors themselves state, these patients need

surgical drainage of the abscess whether it communicates with the bowel or not.

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- 1 Knochel JQ, Koehler PR, Lee TG, Welch DM. Diagnosis of abdominal abscess with computed tomography, ultrasound scan and ¹¹¹In leucocyte scans. *Radiology* 1980;137:425-32.
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*.*Dr Saverymuttu replies below.—Ed, *BMJ*.

SIR,—Mr Sykes correctly emphasises the importance of early diagnosis to reduce the mortality of intra-abdominal abscesses. However, I do not believe that the routine ultrasound service available in most hospitals in Britain is adequate for this purpose.

Despite impressive results from specialist centres in the United States, reporting detection rates of 90% and greater,¹⁻³ there is no evidence that these figures can yet be matched in routine hospital practice either in the United States⁴ or here: detection rates are 50% or less.^{5,6} An approach based solely on ultrasound is liable in many hospitals to miss a significant number of abdominal abscesses. The extent of this problem in the UK is unknown, and there is an urgent need for assessment. Although our study was not primarily aimed at assessing this problem it illustrates that it is of concern even in an academic institution, with 14/24 abscesses in the series missed on ultrasound. This figure is an underestimate since it did not include the abscesses diagnosed only by computed tomography, laparotomy, and necropsy.

An "ideal" approach for abscess localisation has been recently proposed in which ⁶⁷Ga or ¹¹¹In leucocyte scintigraphy is used first in patients who are not critically ill or have no localising signs. Those with abnormal findings together with critically ill patients or those who have localising signs undergo ultrasound scanning or computed tomography. Those shown to have fluid collection then undergo percutaneous needle biopsy.^{7,8} Such a scheme is of unproved efficacy, but our series provides supportive evidence for the limited value of ultrasound in patients without localising signs—in whom ¹¹¹In leucocyte scanning should be the initial assessment. Quite clearly few centres in the UK have the resources to adopt this approach so an alternative is required. Since ultrasound alone is inadequate an additional diagnostic procedure is needed in patients with suspected abscesses. The choice is between additional imaging (¹¹¹In leucocyte scanning or computed tomography) and early blind laparotomy. It is hard to judge whether the costs of providing rapid access to ¹¹¹In leucocyte scanning/tomography for each district general hospital are justified to avoid the morbidity and mortality of a high unnecessary laparotomy rate. The arguments are complex since computed tomography and ¹¹¹In leucocyte scanning have many clinical applications apart from abscess localisation. A cost benefit analysis based on a controlled trial of the management options is needed. My personal view is that a service for ¹¹¹In leucocyte scanning is justified.

One final point which deserves emphasis is the rapid development in radiodiagnostic imaging. The conventional technique for saline ¹¹¹In leucocyte labelling used by all comparative series for detecting sepsis in the United States⁹⁻¹¹ has been superseded by plasma leucocyte labelling.¹² The new technique avoids artefactual pulmonary leucocyte sequestration¹³ and results in earlier detection of sepsis.¹⁴ Thus positive results can be routinely available on a four hour scan rather than the 18-24 hour scan with saline labelling.

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Infection with parvovirus during pregnancy

SIR,—We read with interest the report by Dr E P Wright and colleagues (19 January, p 241) describing human parvovirus infection in pregnancy with subsequent birth of a healthy baby and endorse their recommendation that further cases should be investigated virologically. During the 1983-4 outbreak of erythema infectiosum associated with human parvovirus in Grampian¹ we identified four similar episodes of serologically confirmed infection in pregnancy which were followed by normal deliveries.

Case 1—A 32 year old woman, 8-10 weeks pregnant, developed a rash which lasted two days. Her two young daughters had experienced a mild, erythematous illness one to two weeks previously.

Case 2—A 29 year old woman presented at 20 weeks' gestation with a severe, itchy rash on hands and feet. The rash lasted six days; there was no history of contact.

Case 3—The young son of a 33 year old woman developed serologically proved erythema infectiosum. The mother, who was then 23 weeks pregnant, remained clinically well.

Case 4—At 25 weeks' gestation a 27 year old woman developed a fleeting, scarlatiniform rash one day after onset of a rubella like illness in her young child.

Recent infection with human parvovirus was confirmed by significant serum concentrations of virus specific IgM and IgG antibodies. All four patients subsequently gave birth to healthy babies, although one boy (case 4) had a small penile cyst of doubtful importance. The babies' serum antibody concentrations did not indicate intrauterine infection; virus specific IgM antibody was not detected and the IgG concentrations generally reflected those of the mother at the time of birth.

We thank Dr G E D Urquhart, Virus Laboratory, Ninewells Hospital, Dundee, for help with one of our cases and Drs P P Mortimer and B Cohen, Virus Reference Laboratory, Colindale, for the serological investigations.

Reports of normal births despite serologically confirmed maternal infection with

human parvovirus in pregnancy are encouraging and substantiate previous epidemiological studies that have failed to reveal any evidence of teratogenicity.² Indeed, the severe fetal infections described recently^{3,4} may well represent rare events. Nevertheless, we agree with Dr Wright and colleagues on the need for serological identification of additional cases if the effects of human parvovirus in pregnancy are to be defined more precisely. Our experience suggests, however, that infection in some adults may be subclinical, as illustrated by our third case. It may be prudent, therefore, to consider human parvovirus serology not only in pregnant women who develop a non-rubella rash but also in those who are close contacts of children with erythema infectiosum.

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Interval between insulin injection and eating in relation to blood glucose control

SIR,—The paper by Dr M E J Lean and his colleagues (12 January, p 105) on the timing of insulin injections in relation to eating helps to clarify a subject that has received little attention. It confirms the significantly poorer diabetic control achieved if meals are taken immediately after insulin. Conversely, no cause for anxiety about premeal hypoglycaemia was identified if food was delayed for as long as 45 minutes after injecting insulin. Before accepting the authors' conclusion that a delay of 45 minutes is of positive value, however, we should ask how clinically relevant are the differences in postprandial blood glucose concentration observed with 15, 30, and 45 minute delays between insulin injection and breakfast. The overall mean blood glucose concentration was only 1.11 mmol/l greater with a 15 minute interval than with a 45 minute interval—of little statistical significance ($p < 0.03$). No significant difference in this measurement was in fact found between 30 and 45 minute intervals. There was also no significant difference in the incidence of hypoglycaemia occurring at any time between the different time schedules studied. Moreover, there was no difference in glycosylated haemoglobin concentrations between patients eating 10 minutes or less after insulin and those waiting for 30 minutes, although the authors argue that the glycosylated haemoglobin value may conceal rapid fluctuations in blood glucose concentration.

From the evidence presented it would certainly appear undesirable to eat immediately after taking insulin but not justified to advocate a general extension of the delay between insulin and meals to as much as 45 minutes. The 30 minute delay currently recommended seems quite sufficient. Breakfast time in particular is a hurried affair in many households. Insulin dependent diabetics have taken in their stride

the need to check their blood glucose concentrations as well as injecting insulin. Stronger evidence is required before adding further impositions.

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Abnormalities of cardiac conduction in diabetics

SIR,—Drs R L Blandford and A C Burden (15 December, p 1659) studied the resting electrocardiograms of 200 patients with diabetes of varying severity and unspecified duration and found a high incidence of first degree heart block and right bundle branch block. Their results must be interpreted with caution as comparison was not made with a normal control group. Their control group comprised 200 hypertensive patients, who were treated with "at least a β blocker, vasodilator, and thiazide diuretic." In such a hypertensive cohort the development of cardiac conduction abnormalities may lead to changes in drug therapy or even the insertion of a pacemaker prophylactically, which implies that the resulting hypertensive group was highly selected. The only valid comparison would be between this group and a group of hypertensive diabetics. Unfortunately, the authors make no mention of blood pressure measurements in the diabetics, nor were blood glucose and serum potassium concentrations recorded, all of which may affect the electrocardiogram. Furthermore, it is not clear whether the groups were assessed by the same observer or by different observers, and whether this appraisal was performed blind. In our opinion their observations provide no further insight into the existence of a possible diabetic microangiopathy affecting the heart.

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Role of the occupational health service in increasing the uptake of rubella immunisation

SIR,—The paper of Dr S J Jachuck and others (12 January, p 119) on the role of the occupational health service in screening and increasing the uptake of rubella immunisation draws attention to an important point. This is the concept of a second line in the attempt to eliminate the congenital rubella syndrome.

The first line is the vaccination of school girls aged 11 to 14. The second line is the identification of women of childbearing age who are seronegative for rubella antibodies and subsequently offering these women vaccination. Shepherd showed that 96% of the mothers of children suspected or confirmed as sufferers of congenital rubella syndrome on the national register would not have been eligible for school age vaccination¹ (the national programme was introduced only in 1970). Hinman *et al* also pointed out the importance of identifying the "at risk" population of seronegative women of childbearing age.²

Dr Jachuck and his colleagues identified 51 such women out of 487 tested in an occupational health department. Only 29 women (57% of seronegative group) accepted vaccination. It would be interesting to establish,

firstly, what was the follow up of the 22 women (43%) proved to be seronegative and not accepting vaccination? Secondly, were their general practitioners informed, with concomitant advice to offer the women vaccination during a routine general practice consultation? Thirdly, were the women further counselled during routine visits to the occupational health department? Fourthly, did any of the 22 women subsequently become pregnant and encounter problems from rubella contacts in the first trimester?

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- 1 Shepherd S. Towards elimination of congenital rubella. *Community Med* 1983;5:271-82.
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*.*The authors reply below.—ED, *BMJ*.

SIR,—We are very grateful for the useful suggestions of Dr Rosenfelder, which will be incorporated into our current practice for future benefit. The aim of our evaluation was to quantify the "at risk" population and review the effect of intervention. The general practitioners are always kept informed of our activities. It would have been extremely useful to pursue the points raised in the letter, but the limitation of scope of the existing NHS occupational health service does not permit us to provide a comprehensive complementary service to primary care.

Another reader has kindly brought to our attention an unfortunate printing error which has significantly altered the message that we wanted to convey. In the methods and results section the third paragraph was meant to convey that the only *exception* (not *exclusion*) to the aim of the rubella campaign was the inclusion of all staff working in the antenatal clinics, irrespective of age and sex, for preventive screening as well as protecting the clinics from medicolegal complications. We apologise for the unintentional oversight.

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SIR,—Dr S J Jachuck and his colleagues (12 January, p 119) report on a rubella screening and immunisation campaign run by the Newcastle General Hospital occupational health department. Their results show an increase from 89.5% to 95.5% in the immunity of the prospective female employees screened. They say that the latter figure is in line with DHSS policy. However, the objective of this policy is to increase uptake of rubella vaccine in schoolgirls to 95%.¹

Of the 5% of schoolgirls who escape immunisation 90% are likely to have acquired natural immunity by the age of 20,² resulting in a 0.5% susceptible adult female population. The authors accept 4.5% susceptibility, they have not achieved their aim "to prevent the congenital rubella syndrome" in their community, merely reduced the risk by half.

The authors imply that occupational health departments can prevent rubella more cost effectively than can general practices. However, they do not state their costs; they are less effective in vaccinating their susceptible