stood Mendelian inheritance well. They found it virtually impossible to accept the concept of the healthy carrier. The usual response was to agree politely that the child was perfectly healthy and did not need any treatment, but that children should be tested as young as possible—"so that it can be treated in time."

Since completing this study we have been aware of the comparative simplicity of counselling families who come for testing, or have already been tested, if there is prior knowledge of their condition. They might, for example, have relatives with a haemoglobinopathy or trait, might have been tested themselves in pregnancy, or might have been referred by a doctor of their own ethnic background.

We conclude that mass screening for haemoglobinopathy is unjustified, at least in this country. We advocate instead further health education about haemoglobinopathies together with financial support for hospitals recognised as able to offer both adequate testing and counselling. The UK Thalassaemia Society's booklet contains a list of such hospitals in the London area.

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Vaginal bleeding in early pregnancy

SIR,—At the end of your leading article "Mortality in the British rubber industries 1966-76" (16 August, p 471), you remark, "At a time of financial stringency money should be spent on preventive measures only when the evidence is sound and not simply because doubts have been raised." It is a pity that in your leading article "Vaginal bleeding in early pregnancy" (p 470) you did not think about that warning before advocating hospital antenatal care, serial oestrogen estimations, ultrasonography, and cardiotocography for every woman who bleeds in early pregnancy.

You rather reluctantly concede that some of this bleeding may be "physiological." In these women the extremely expensive surveillance suggested is not only unnecessary but also meddlesome. You might usefully have suggested ways in which we general practitioners could differentiate between those women in whom bleeding compromises the fetus and those in whom it does not, instead of making a recommendation which (if we acted on it) would further overload hospital antenatal clinics.

Those who preach and practise this sort of defensive obstetrics might find it interesting to join the end of the queue at their next antenatal clinic and find out for themselves what it feels like to be processed in the modern manner. We all have the safety of the mother and child at heart, but surely we should have very sound reasons indeed, certainly sounder than those your editorial advances, for asking a woman to submit to the delays, anxieties, and indignities of high-technology hospital antenatal care.

It is also an awful waste of money. The

general practitioner is paid £37.90 for a woman's antenatal care. I dread to think what the corresponding hospital costs would be.

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SIR,—Your leading article (16 August, p 470) omits to mention that there are infective causes of bleeding in pregnancy, notably *Trichomonas vaginalis* infection and gonorrhoea. At the speculum examination vaginal and cervical swabs may well reveal an avoidable cause of "threatened abortion."

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Screening for the small-for-dates fetus

SIR,—I note with great interest the comment on my letter made by Dr J P Neilson and others (12 July, p 147). I suspect that both sides are partially correct. If we use crown-rump length $\times$ trunk area (CRLA) we identify correctly 94% of small-for-dates fetuses, and with them a number of normal ones which depends on the prevalence of small-for-dates fetuses in the population under test. Using crown-rump length $\times$ trunk circumference (CRLC) we identify correctly 89% of small-for-dates fetuses and a rather smaller number of normals. If we ignore the test altogether, simply treating all fetuses as small-for-dates, we identify correctly 100% of small-for-dates fetuses and a very large number of normals. Which of these is the optimal policy depends on the relative risks of allowing small-for-dates fetuses to go to term and premature delivery of normal ones.

Space does not permit me to deal with the problems of applying monitoring to identify the false-positives generated at the first stage of testing. Instead I wish to submit a mathematical model relevant to the situation over which we are arguing for your readers' scrutiny and criticism.

Definition of terms

k is the proportion of the tested population with the disease (prevalence);
 T is a general test with only two outcomes—positive and negative;
 S is the sensitivity of T , defined as the proportion of a population consisting entirely of positives that T will identify as such;
 s is the specificity of T , defined as the proportion of a population consisting entirely of negatives that T will identify as such;
 r is the probability of a morbid event occurring in a subgroup of the main population which is defined by the suffix of r ;
 D is the total number of morbid events occurring in a population of unit size.

Suffixes

1 and 2 are suffixes of T , S , s , and D referring to two tests. The suffixes defining the subgroups to which risks r pertain are:
 dis, Rx The group which has the disease and to which treatment is given.
 $-Rx$ The group which does not have the disease, but to which treatment is given.
 $dis,-$ The group which has the disease, but to which no treatment is given.
 $-,-$ The group which does not have the disease and to which no treatment is given.

If $S_1 > S_2$ and $s_1 > s_2$, T_1 is a better criterion of

management under all circumstances than is T_2 . The problem to which this model addresses itself is the situation in which $S_1 > S_2$ but $s_1 < s_2$. The object of management on the basis of T_1 and T_2 is to minimise D . We shall investigate under what circumstances T_2 is a better criterion of management than T_1 , even though it is less sensitive. We can identify four groups, and their sizes and their associated risks for the general test T .

Group	Size	Associated risk
True+	kS	$r_{dis,Rx}$
False—	$k(1-S)$	$r_{dis,-}$
True—	$(1-k)s$	$r_{-,-}$
False+	$(1-k)(1-s)$	r_{-Rx}

$$\text{Thus } D = kSr_{dis,Rx} + k(1-S)r_{dis,-} + (1-k)sr_{-,-} + (1-k)(1-s)r_{-Rx} \quad (1)$$

Writing two such equations for T_1 and T_2 respectively, subtracting and simplifying we obtain $D_1 - D_2 = k(S_1 - S_2)(r_{dis,Rx} - r_{dis,-}) + (1-k)(s_1 - s_2)(r_{-,-} - r_{-Rx})$ (2)

For T_2 to be a better criterion of management than T_1 , $D_1 - D_2 > 0$.

Making this substitution in (2) and simplifying we obtain

$$((1-k)(s_2 - s_1))/k(S_1 - S_2) > ((r_{dis,-} - r_{dis,Rx})/(r_{-Rx} - r_{-,-})) \quad (3)$$

provided $r_{-Rx} > r_{-,-}$. The inequality is reversed if T_1 is a better parameter than T_2 . For simplicity, we shall define the right-hand side of (3) as a risk ratio, R . Rearranging to make k the subject yields

$$k < \frac{(s_2 - s_1)/(S_1 - S_2)}{R + (s_2 - s_1)/(S_1 - S_2)} \quad (4)$$

It is thus possible to determine the prevalence below which greater specificity is at a premium over greater sensitivity.

Applying (4) to the parameters CRLA (T_1) and CRLC (T_2), we find that $(s_2 - s_1)/(S_1 - S_2) = 0.6$. As workers in the relevant field, Dr Neilson and his colleagues are better placed than I to estimate R , and thus to determine whether CRLA or CRLC is the better criterion of management at the prevalence of small-for-dates fetuses in their experience.

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Fetal subdural haemorrhages presenting as hydrocephalus

SIR,—In their recent article Dr M J Robinson and others (5 July, p 35) suggest that hydrocephalus may result from subdural haemorrhage in utero secondary to maternal anticoagulation with warfarin. We are concerned about the lack of confirmatory information for the diagnosis of hydrocephalus. In addition, recent data from this institution prompts us to caution against the assignment of specific factors in the development of intracranial haemorrhage and hydrocephalus.

The determination of hydrocephalus was apparently made on fetal biparietal diameter alone. There was no mention of other ultrasound parameters which are required for this determination, nor were confirmatory necropsy findings reported. The diagnosis of fetal and neonatal hydrocephalus requires the evaluation of the ventricular:cortical ratios for the lateral ventricular system. An abnormally enlarged biparietal diameter is not diagnostic of hydrocephalus. In this case the biparietal diameter of 10.4 may have been the result of the proposed intrauterine subdural haematoma or several other possible factors.

We have been impressed with the advantages

of real-time B-scanning (dynamic image scanning) for the diagnosis of intracranial haemorrhage and anomalies and have applied this technique in 107 neonates born at the Los Angeles, California, and University of Southern California Medical Center. Sixteen of 57 (28%) term infants delivered either vaginally or abdominally were found to have either subarachnoid haemorrhage, intraventricular haemorrhage, or both. Half of these babies were symptomless and scanned as controls. Positive scans were confirmed with either computed tomography scan or lumbar puncture.

These findings suggest that, irrespective of the route of delivery, intracranial haemorrhage may develop at any gestational age. Anticoagulation may play a contributory but not a necessary role. These data further suggest that following an intracranial bleed brain atrophy or necrosis develops more commonly than does hydrocephalus. This has not, to our knowledge, been reported in the literature. Furthermore, posthaemorrhagic hydrocephalus is more likely to be a consequence of intraventricular haemorrhage than subdural haemorrhage.

Should the diagnosis of hydrocephalus prevail in this case, it may have resulted from a small intraventricular haemorrhage not appreciated at necropsy.

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¹ Beamer PR, Courville CB. *Chicago Medical School Quarterly* 1972;31:77.

² Pape KE, Cusick G, Hovang MT, et al. *Lancet* 1979; ii:1261-4.

³ Krishnamoorthy KS, Shannon DC, DeLang GR, Todres ID, Davis KR. *Pediatrics* 1979;64:233-7.

⁴ Nyka WM. *Z Geburthsh Perinat* 1976;180:290-4.

⁵ Mitchell W, O'Tuama L. *Pediatrics* 1980;65:35-9.

⁶ Serfontein GL, Rom S, Stein S. *Pediatrics* 1980;65:40-3.

Site of action of intrathecal morphine

SIR,—While congratulating Dr Peter V Scott and his colleagues (2 August, p 351) on successfully relieving the pain of first-stage labour by the intrathecal injection of morphine, may I interject a word of dissent. During the past 18 months I have heard and read many reports of the responses to narcotics administered intrathecally or extradurally. In almost every account the assumption is made that the drug has acted by virtue of a direct effect on cells in the spinal cord. Repetition appears to be establishing credence for this assumption in the opinion of many. Yet there appears to me to be no sound basis for this belief.

The current evidence is surely to the contrary. In most clinical reports there are references to "side effects," which include nausea, vomiting, facial itching, and respiratory depression; and our own experience mirrors this. These are the well-known complications of narcotics administered systemically or orally, and are related to dissemination of the drug throughout the brain. It is surely pharmacologically literate to assume, until it is proved otherwise, that narcotics injected into the cerebrospinal fluid (CSF)—either directly or via the extradural space—exert their efforts

by virtue of similar dissemination, and that these effects include analgesia.

The proportion of a standard dose (10 mg) of systemically administered morphine which, having traversed the blood-brain barrier, reaches the critical sites in brainstem, mid-brain, or cortex must be extremely small. It is not unreasonable to anticipate that a similar mass of narcotic would reach these sites by diffusion following deposition of 1.5-2.0 mg of morphine directly into the CSF. We have another piece of evidence which possibly supports this. We have injected "hyperbaric" morphine (2 mg in 6% dextrose) intrathecally in two patients who required evacuation of uterine contents. The technique used was that which would have produced a block up to T10 had we injected a hyperbaric solution of local anaesthetic. There was no evidence of analgesia. I take it that the morphine was sequestered, under the influence of gravity, in the thoracolumbosacral compartment of the CSF and not sufficient reached the brain to provide pain relief.

Such considerations do not, of course, diminish the value of the technique, but I believe that an understanding of the pharmacokinetics involved to be important to clinical considerations as well as to academic teaching.

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The anaesthetist and the pain clinic

SIR,—In his otherwise excellent paper on the anaesthetist and the pain clinic (9 August, p 439) Dr J W Lloyd makes some remarks about drugs which must not go unchallenged.

When adequate doses are given at the proper, pharmacokinetically determined, interval tolerance rarely develops to narcotics in cancer patients. On the contrary, hospice experience indicates that once pain is controlled the daily intake of narcotics may be reduced. High doses (for example, diamorphine 350 mg orally every four hours) do not produce sedation so long as this is the correct analgesic dose for the patient. Two-hourly administration should never be necessary, especially if some of the longer-acting preparations are used, such as sublingual phenazocine or sustained-release morphine.

Dr Lloyd makes no distinction between central and peripheral cancer pain; since patients in this group usually have both, it is logical to give a non-steroidal anti-inflammatory agent simultaneously with a centrally acting drug rather than to regard them as opposite ends of a continuum.

The Brompton mixture should now be regarded as obsolete and replaced by simple narcotic preparations, which are just as effective and have fewer complications.

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Nocturnal enuresis and the buzzer alarm

SIR,—Before Dr G C Close recommends that family doctors should further burden their stretched expense accounts by purchasing enuresis alarm equipment (16 August, p 483)

he should know that most community health services departments stock a number of these machines and they can be loaned out.

Perhaps the reason for the high failure rate in the series he describes was that children were seen only at intervals of three months. Surely a most important part of treatment is adequate support and discussion with both mother and child at least every four weeks. Indeed, many of these cases are cured simply by regular interview and the keeping of a daily chart indicating success or otherwise, which seems to act as a therapeutic spur.

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SIR,—It is generally accepted that buzzer alarms are a safe and effective treatment for enuresis. In comparison, the tricyclic antidepressants are known to be both dangerous and overprescribed.¹

Dr G C Close (16 August, p 483) makes a strong case for the management of enuresis and buzzer alarms in general practice, but although these alarms cost only around £20 I would be surprised if the manufacturers were to receive increased orders from GPs.

Outpatient departments might better encourage general practitioners to advise enuresis alarms, rather than tricyclics, if they sent patients back with their alarms to the family doctor for supervision. In many cases the alarm could be loaned directly to the GP for use by a specific patient and the child need never attend a clinic. Having managed patients with this form of treatment, the practice will then be more likely to buy its own enuresis alarm to avoid the long waiting list for outpatient equipment.

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¹ Fraser NC. *Br Med J* 1980;280:1595-8.

SIR,—I was interested in the article by Dr G C Close (16 August, p 483) with his comments and concern about nocturnal enuresis. I have been seeing enuretic children (picked up by school medical officers and with the consent of their GPs) at a special clinic for a few years now. A detailed medical history and a comprehensive social history often gives the first clue to the nature of the aetiology of the enuresis. In our area, where we have a good mix of varying ethnic, cultural, and socioeconomic groups, I have found this alone a sufficient pointer to the course of management.

One child needed removal of an unabsorbed suture left under his prepuce 18 months before at a private ceremonial circumcision abroad; a girl of 10 years with secondary enuresis had arrived in Britain in the autumn from abroad. She attended the clinic in winter, dressed in a summer dress and plimsolls. We discovered that she was sleeping without adequate warm clothes at night. Here treatment was the provision of a mattress and blankets and a discussion about suitable clothes for the varying seasons.

These rarities aside, my policy has been not to offer the buzzer until a thorough psycho-analytical study of the child's problems has been made and conservative help offered with charts and discussion of routine at home, whilst assessing the parental attitude. Many children