mixture). The infant was given 1 mg of vitamin K intravenously and all clotting abnormalities were totally corrected within 15 hours; there was no further bleeding. Seven weeks later, at the age of 11 weeks, he was still fully breast-fed, was clinically healthy and no longer jaundiced, and had normal serum bilirubin and clotting tests.

The vitamin K deficiency in this baby could be attributed solely to inadequate intake, as breast milk is known to be relatively deficient in the vitamin. The prolonged neonatal jaundice was considered to be due to the inhibitory effects of breast milk on liver enzymes, which occur in 2-3% of breast-fed babies.¹ It is not known if changes in the bile occur in breast-milk jaundice which could materially affect intestinal absorption of vitamin K, but if present these would have been a contributory factor.

Administration of vitamin K at birth would clearly have prevented the haemorrhagic disease in this patient. Now that increasing numbers of babies are breast-fed during the first month of life a case could be made for the routine administration of intramuscular vitamin K at birth. Intramuscular injections are, however, not without their disadvantages and before we consider such a policy the risks of haemorrhagic disease in fully breast-fed babies born at term need careful scientific appraisal.

We thank Professor J K Lloyd for permission to report this case under her care.

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¹ Winfield, C R, and MacFaul, R, *Archives of Disease in Childhood*, 1978, **53**, 506.

Caring for babies of very low birth weight

SIR,—I would like to add support to Dr R R Gordon's reply (25 November, p 1492) to your leading article (21 October, p 1105) on caring for babies of very low birth weight.

A register of all cases of cerebral palsy diagnosed in children born in Western Australia since 1956 provides an annual incidence of cerebral palsy around 2 per 1000 live births. The incidence fell from 3 to 1.5 per 1000 from 1966 to 1975, during which time neonatal intensive care was introduced (in 1970-1).

However, as shown in tables I and II, the total rate of cerebral palsy and the rate of spastic cerebral palsy in low-birth weight infants have remained high and the improve-

ment in the cerebral palsy rate has been in those over 2500 g. Thus the low-birth weight infants who have received neonatal intensive care have recently contributed more to the cerebral palsy rate than previously.

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Induction of labour and postpartum haemorrhage

SIR,—The observations reported by Mr P R S Brinsden and Mr A D Clark (23 September, p 855) showing an increased incidence of postpartum haemorrhage following induced labour compared with spontaneous labour has prompted a similar analysis for the Oxford obstetric unit.

A total of 7295 consecutive vaginal deliveries during 1976-8 have been analysed; patients with a history of significant antepartum haemorrhage were excluded. Primigravidae and multigravidae were analysed separately, and grouped according to labour onset and management; during the period covered the intravaginal administration of prostaglandin E₂ gel before formal induction of labour was introduced¹ and patients thus treated have been analysed as a separate group (see table). Postpartum haemorrhage was defined as blood loss exceeding 500 ml at delivery as recorded in the patient's notes. Almost invariably patients were given intramuscular syntometrine with delivery of the anterior fetal shoulder.

Induced labour resulted in a significantly increased rate of postpartum haemorrhage compared with spontaneous labour; mode of delivery (spontaneous, forceps, breech, ventouse), did not appear to influence the incidence, and there was a similar negative association in relation to the use of epidural analgesia in labour. Postpartum haemorrhage occurring in the group of patients given vaginal PGE₂ gel the evening before planned formal induction was comparable with the augmented labour group. However, some patients treated this way established labour without any further oxytocic being given and postpartum haemorrhage rates of 6.3% and 3.2% for primiparae and multiparae respectively were observed, similar to those in the spontaneous labour group; while those requiring subsequent formal induction had postpartum haemorrhage rates of 9.8% and 8.2% respectively, equivalent to those in the routine induction group.

The increased postpartum haemorrhage rates associated with induced labour are thus similar to those reported by Brinsden and Clark, while the postpartum haemorrhage rates in augmented labour, not analysed by them, were between those for spontaneous and induced labour. There are two possible explanations for these findings. There is evidence that the dosage of intravenous oxytocin given to induce labour is greater than necessary,² causing the uterus to contract more than required or desirable and so reducing myometrial efficiency following delivery. PGE₂ possibly acts primarily on the cervix and lower uterine segment when

used as above, and provokes uterine contractions which are more frequent but of much lower pressures than with oxytocin; thus it does not overstimulate the contractile upper segment so results in postpartum haemorrhage rates similar to those in spontaneous labour. Alternatively, when labour results from PGE₂ gel treatment alone, high levels of PGE₂ persist in the myometrium throughout labour, enhancing the normal contraction-retraction processes following delivery; our finding of higher cord plasma levels of PGE at delivery following labour induced in this way than at formally induced labour provides indirect evidence to support this hypothesis.

These observations on postpartum haemorrhage rates are important if a change in the attitude towards the management of induction of labour is advocated. It has previously been shown³ that there are advantages to the outcome of induced labour initially treated with vaginal prostaglandin gel, to which the reduced frequency of postpartum haemorrhage can now be added.

I thank Sister Sue Bradley in helping with the data collection and Ms Pat Yudkin for help with the statistical analyses.

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¹ MacKenzie, I Z, and Embrey, M P, *British Medical Journal*, 1977, **2**, 1381.

² Woolfson, J, et al, *British Journal of Obstetrics and Gynaecology*, 1976, **83**, 934.

³ MacKenzie, I Z, and Embrey, M P, *British Journal of Obstetrics and Gynaecology*, 1978, **85**, 657.

Variations in number of births and perinatal mortality by day of week

SIR,—In his letter (24 February, p 549) Dr M J V Bull compared his estimate of the proportion of births taking place in general practitioner maternity units based on claims made by GPs for care during confinement with the lower figures given in my paper (16 December, p 1670). My data were based on births in hospitals classified in the Registrar General's statistical review as "NHS hospitals A." These are hospitals with GP maternity beds but without specialist obstetric beds. Thus I did not take into account hospitals with both specialist obstetric and general practitioner maternity beds.

There is a third source of data which can shed further light on this question. This is the Hospital In-patient Enquiry (HIPE), which gives an estimate of the total number of women delivered in general practitioner beds regardless of whether the hospitals concerned have specialist obstetric beds. In the accompanying table I have combined data from HIPE and birth registrations to derive estimates of the proportion of women delivered in each type of

TABLE I—Total cerebral palsy rates

Birth weight (g)	1968-71 Rate*		1972-75 Rate*		% of 1968-71 rate
	No	per 1000	No	per 1000	
≤ 2000	32	17.5	21	14.1	81
2000-2499	24	7.3	21	7.2	99
≥ 2500	137	1.8	65	0.9	50

*Excluding all under 500 g.

TABLE II—Spastic cerebral palsy rates

Birth weight (g)	1968-70 Rate*		1971-75 Rate*		NS
	No	per 1000	No	per 1000	
≤ 2000	13	11.1	20	10.6	NS
2000-2499	14	5.7	20	5.3	NS
≥ 2500	86	1.5	55	0.6	P<0.01

*Excluding all under 500 g.

Postpartum haemorrhage (PPH) and onset of labour in Oxford 1976-8

	Primigravidae		Multigravidae		Total
	Total	No (%) with PPH	Total	No (%) with PPH	
Spontaneous labour	1495	77 (5.1)	2209	56 (2.5)	3704
Augmented labour	547	41 (7.5)	346	20 (5.8)	893
PGE ₂ gel before induced labour	657	54 (8.2)	426	24 (5.6)	1083
Induced labour	638	66 (10.3)	977	71 (7.3)	1615
Total	3337		3958		7295

χ² test, 3 DF: primigravidae P<0.001; multigravidae P<0.001.