

ambulance service trust involved. By law the trust was liable for employees involved in accidents while on duty, but nevertheless the recourse to obtain compensation was through the courts with significant delays.

As a result of our experiences we have undertaken a comprehensive review of our neonatal transport operations. Initial problems of incubator security have been temporarily addressed with ring bolts set into the floor of ambulances which allow secure anchorage with cargo straps. Incubators are loaded using portable ramps. In the long term, in cooperation with our ambulance service, we have redesigned our transport system with a reduced payload around a no lift platform that will be compatible with all types of stretcher. The ambulance service has also undertaken to modify ambulance anchorages to accommodate newer stretcher types with transport incubators on board.

The standards of safety for neonatal transport incubators need to be reviewed. Attention needs to be given to reducing payload, and to the design of systems for loading and securing incubators within ambulances, whether road vehicle or aircraft. The problems of different incubators, ambulances, and stretcher designs can be avoided by using a universal mating platform. Each unit needs to be aware of its responsibilities to its staff regarding liability in the event of an accident.

R J MADAR
Department of Paediatric Cardiology,
Freeman Hospital,
Newcastle upon Tyne NE7 7DN

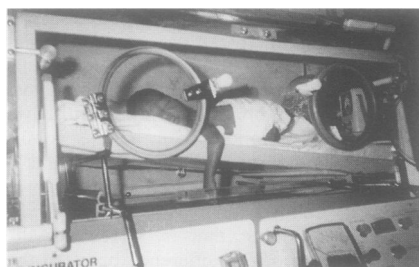
D W A MILLIGAN
Newcastle Neonatal Service,
Royal Victoria Infirmary,
Newcastle upon Tyne NE1 4LP

1 Health and Safety Executive. *Manual handling, guidance on regulations L23*. London: HMSO, 1992.

Unfriendly incubators

EDITOR.—Fractures in infants of very low birth weight (≤ 1500 g) not related to birth trauma are being recognised with increasing frequency.^{1,2} These fractures are usually associated with bone demineralisation, which is frequently present in very low birthweight infants,³ and almost two thirds of them involve the extremities.¹ Fractures in these infants can occur as the result of 'trauma' during physiotherapy or other procedures such as placement of intravenous lines.^{1,4,5}

We have observed four infants with birth weights under 1000 g who sustained traumatic fractures of the extremities (one arm in three cases, one leg in the other), and we believe that the contributing factor was accidental trapping of the extremity by or under the plastic tray on which the mattress of the incubator lies. The fractures, diagnosed radiologically between 4 and 6 weeks of age, were associated with overlying bruising. Two of these babies also had well documented bone demineralisation. Subsequent to these independent observations in Athens and Montreal, we conducted a survey of incubators used in neonatal intensive care units and found that in many (even in some of the latest models) there was sufficient gap between the plastic tray and the incubator wall for an arm or a leg of the baby to slip between the incubator's wall and the plastic tray (figure). In many instances the nursing staff had tried to cover this gap with rolled sheets. In some incubators the tilting mechanism could not be securely locked at the desired tilted position



Incubator showing gap between plastic tray and wall allowing arm to be trapped.

and the plastic tray could therefore accidentally fall or jolt on the trapped arm or leg. Injury might also occur if the baby is pulled or turned by a nurse or a doctor unaware that a limb is trapped. The possibility that a fracture may be caused in this manner is enhanced if the bones are significantly demineralised.

The design of an incubator should be such that the plastic tray extends to the wall of the incubator such that any gap is too small for a baby's extremity to slip through and the tilting mechanism should be securely locked at the desired tilt. Incubators currently in use should be checked for this potential hazard.

H D DELLAGRAMMATICAS
Neonatal Intensive Care Unit,
2nd Department of Pediatrics,
University of Athens,
Aglaia Kyriakou Children's Hospital,
Athens, Greece

A PAPAGEORGIU
Department of Neonatology,
The SMBD-Jewish General Hospital,
3755 Cote St Catherine Road, Room B-511,
Montreal, Quebec H3T 1E2,
Canada

- 1 Koo WW, Sherman R, Succop P, *et al*. Fractures and rickets in very low birthweight infants: conservative management and outcome. *J Pediatr Orthop* 1989; 9: 326-30.
- 2 Amir J, Katz K, Grunebaum M, Yosipovich Z, Wielunsky E, Reisner SH. Fractures in premature infants. *J Pediatr Orthop* 1988; 8: 41-4.
- 3 James JR, Congdon PJ, Truscott J, Horsman A, Arthur R. Osteopenia of prematurity. *Arch Dis Child* 1986; 61: 871-6.
- 4 Helfer RE, Scheurer SL, Alexander R, Reed J, Slovis TL. Trauma to the bones of small infants from passive exercise: a factor in the etiology of child abuse. *J Pediatr* 1984; 104: 47-50.
- 5 Phillips RR, Lee SH. Fractures of long bones occurring in neonatal intensive therapy units. *BMJ* 1990; 301: 225-6.

Excessive rates of asphyxia - anecdote or fact?

EDITOR.—It is well known that hypoxic ischaemic encephalopathy (HIE) in neonates is associated with adverse neurological outcomes.^{1,2} The incidence of HIE can be a useful indicator of quality of intrapartum care provided to term infants,³ while the severity relates to subsequent neurological outcome.² The Doncaster perinatal service has received much adverse publicity suggesting that their incidence of HIE was excessive ('Trial of labour', *World in Action*, Granada Television, 2 Nov 1992). We analysed data from the Trent Regional Neonatal Survey in order to establish if these criticisms were valid.

The Trent Regional Neonatal Survey collects data on all high risk babies admitted to perinatal units within the region. All babies greater than 35 weeks' gestation admitted because of HIE were included in this analysis. HIE was diagnosed using modified criteria of Levene *et al*.² Grade II HIE was defined as the infant having a history suggestive of asphyxia plus convulsions, while grade III was defined

The incidence of HIE in Trent perinatal units between 1990-3

Unit (deliveries /year)	No of babies with HIE			Rate of HIE/1000 live births	95% Confidence interval
	Grade II	Grade III	Total		
<3000					
1	1	4	5	0.58	0.24 to 1.42
2	4	0	4	0.98	0.13 to 7.24
3	7	8	15	1.8	1.07 to 3.02
4	14	5	19	5.1	3.22 to 8.07
5	14	4	18	3.0	1.87 to 4.81
3001-4500					
6	10	9	19	1.9	1.20 to 3.01
7	1	7	8	0.76	0.37 to 1.54
8	4	11	15	1.49	0.89 to 2.50
9	7	3	10	1.08	0.57 to 2.03
10	11	7	18	1.71	1.07 to 2.74
11	8	14	22	1.85	1.21 to 2.83
>4500					
12	13	8	21	1.53	0.99 to 2.37
13	16	8	24	1.53	1.02 to 2.30
14	12	8	20	1.16	0.74 to 1.81
15	7	9	16	1.1	0.67 to 1.81
16	12	17	29	1.73	1.20 to 2.40
Total live births (168 435)	141	122	263	1.56	1.38 to 1.76

as grade II plus the need for respiratory support. Data was collected by two independent visiting observers. The last three years of complete data were analysed (1 April 1990-30 March 1993).

There were a total of 168 435 live births in 16 perinatal centres (five subregional units and 11 smaller units) and 263 babies with HIE; 141 grade II and 122 grade III (table). The incidence of HIE for the region was 1.56 per 1000 live births (range 0.58-5.1 per 1000 live births). The Doncaster unit (number 6 in the table) had an incidence of 1.53 per 1000 live births - that is, similar to the region as a whole.

It is clear that criticisms levelled at this perinatal unit were unfounded and based on anecdotal evidence rather than fact. Data relating to HIE is not routinely collected by most perinatal units, however, we believe such data provide a valuable method of evaluating perinatal care. Only if the rate of HIE falls outside the 'normal range' is concern warranted.

S BOHIN
E S MASON
D J FIELD
Department of Child Health,
Leicester Royal Infirmary,
PO Box 65,
Leicester LE2 7LX

- 1 Levene MI, Kornberg J, Williams THC. The incidence and severity of post asphyxial encephalopathy in full-term infants. *Early Hum Dev* 1985; 11: 21-6.
- 2 Levene MI, Sands C, Grindulis H, Moore JR. Comparison of two methods of predicting outcome in perinatal asphyxia. *Lancet* 1986; i: 67-8.
- 3 Dennis J, Chalmers I. Very early neonatal seizure rate: a possible epidemiological indicator of the quality of perinatal care. *Br J Obstet Gynaecol* 1982; 89: 418-26.

Diagnosis and management of non-immune hydrops in the newborn

EDITOR.—We read with interest the article by Stephenson *et al* on the diagnosis of non-immune hydrops in the newborn,¹ and we would like to emphasise that a wide range of inborn errors of metabolism (IMD) have been reported to be associated with non-immune hydrops and in many cases a feasible pathogenetic mechanism can be hypothesised.² As a cause of hydrops they are rare