

Requirements for neonatal cots

Northern Neonatal Network

Abstract

A prospective survey of activity in neonatal nurseries associated with 17 specialist maternity units delivering some 38 700 babies in the Northern region was undertaken during 1991. Data were collected concerning the numbers of babies requiring various forms of neonatal care, using a nursing dependency scale validated by work study.

Facilities for prolonged high dependency care are partially decentralised in the Northern region, with a network of five units operating on a flexible and collaborative basis. The data collected suggest that, with such arrangements, even peak demands for non-surgical high dependency nursing care can be met by the provision of 1.0 cot per 1000 births. The requirement for high dependency cots would increase by some 50% if the referral centres were required to function independently for administrative or financial reasons.

Because neonatal units act independently in providing low dependency care, allowance must be made for day to day variations in the pattern of admission of infants requiring such care. These variations will have a lesser impact in larger obstetric units than in those with small caseloads. Within an apparent average regional requirement for only 2.1 cots per 1000 births, a unit with 6000 births per year would need 4.5 cots per 1000 births to accommodate low dependency neonates, apart from those admitted for no other reason than relatively low birth weight; for a unit dealing with only 1000 births, this level of provision would need to be increased to 9.0 cots per 1000 births.

It is demonstrated that the prevailing organisational arrangements, which were developed to meet the needs of a widely scattered population, offer a similar degree of efficiency in cot use to that which would be provided by a single, large, centralised reference unit.

(Arch Dis Child 1993; 68: 544-549)

Over the past two decades, three major reports have offered recommendations regarding the requisite level of provision of cots for neonatal intensive care in Britain.¹⁻³ In part, the progressive increase in the levels advocated, from 0.5 cots per 1000 births in 1971, to 1.0 in 1977, and 1.5 in 1988, must reflect the progressive growth of activity and increasingly successful outcomes in this field of clinical work. However, all of these reports have been criticised for failing to adduce objective

evidence in support of their recommendations.^{4,5} A more recent study in the Trent region used two methods of data collection, and suggested that the minimum requirement for neonatal intensive care cots was 1.1 per 1000 births, but acknowledged that, because of the statistical techniques that had to be employed, this requirement might lie anywhere between 0.9 and 1.25 cots per 1000 births.⁵

It has long been recognised that it is not appropriate simply to equate intensive care with artificial respiratory support. Some infants not receiving respiratory support require more skilled care, and generate more nursing work, than infants who are stable on a ventilator. Unfortunately, it has proved difficult to secure agreement regarding what constitutes 'intensive care', or to devise a method of definition that is sufficiently precise and objective to produce consistent and replicable results when it is employed by different staff or used in different neonatal units.^{4,5} Indeed, the very term 'neonatal intensive care' had become so debased by variable usage that, in 1984, a report to the Northern Regional Health Authority recommended that the term be no longer used.⁶ Instead, that report advocated use of a nursing dependency classification, sufficiently unambiguous to permit little opportunity for variation in its application. This classification may be summarised in the terms indicated in the appendix.

Recent work has confirmed that this neonatal nursing dependency scale does, in fact, constitute a replicable and validated means of identifying those babies who not only generate substantially more than the customary amount of nursing work on each shift, but also most of the need for technically skilled nursing care.⁷ A study was therefore undertaken throughout 1991, using this dependency scale to classify all of the non-surgical neonatal nursing care provided in the region. The objectives were to ascertain how much high dependency nursing care was being provided, where it was being provided, and how many cot spaces were required to cope with peak demands for high dependency care, given that the 'waiting list' concept cannot be used to deal with fluctuating needs in this service.

In 1984, it was suggested that all specialist obstetric units in the Northern region should be capable of providing neonatal special care; that all but the smallest units (dealing with less than 1000 births each year) should be able to provide high dependency care for short periods, to deal with transient problems; and that the care of infants requiring longer term high dependency support should be concentrated in a few of the larger centres.⁶ The decision not to pursue a policy of fully centralised high dependency care was quite deliberate. First, it was

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Accepted 17 November 1992

Table 1 Incidence and survival of low birthweight infants: Northern region and England and Wales, 1990

Birth weight (g)	Northern region		England and Wales	
	Percentage of all livebirths	Neonatal mortality*	Percentage of all livebirths	Neonatal mortality*
500-749	0.07	862	0.11	666
750-999	0.17	309	0.18	311
1000-1249	0.23	149	0.26	132
1250-1499	0.37	72	0.33	54
1500-1999	1.32	36	1.26	25
2000-2499	4.50	8	4.34	6

*Deaths/1000 livebirths in specified birthweight category.

considered unsuitable for the population of the region, much of which is distributed among relatively small, scattered communities; second, it was felt that a more decentralised pattern of provision would allow 'closer co-operation between units, especially in dealing with a peak of workload or a local outbreak of infection'. Since then, an increased number of maternity units have developed the capability to deliver prolonged high dependency care, so that the region now has a network of five neonatal nurseries providing such care.

In receiving infants transferred for prolonged high dependency care, these units operate in a coordinated, collaborative manner. In the normal course of events, when a neonate requires transfer for high dependency care, a call is made to the Newcastle neonatal service which, in collaboration with the other units providing prolonged high dependency care, identifies the most suitable place of admission, taking account of the availability of cots and geographical considerations. By placing the responsibility on the Newcastle service, it is possible to obviate the necessity for referring clinical staff to 'shop around', seeking accommodation for a seriously ill baby, rather than devoting their energies to the immediate care of the infant. In addition, transfer to the unit currently best able to provide optimum care and attention, after taking account of geographical factors, enables more balanced and efficient use of high dependency facilities throughout the region.

Methods

The Northern region, with a population of 3 million people, currently has 19 specialist obstetric units and five general practitioner maternity units, jointly responsible for the delivery of some 40 000 babies each year. Available statistics afford no evidence that the Northern region is in any way unique in its requirements for neonatal cots. As indicated in table 1, the proportions of low birthweight infants born in the region are not significantly different from the proportions found in England and Wales as a whole.

Neonatal 'special' care is provided in all of the specialist units, but prolonged high dependency care is provided in only five of them. Because of the configuration of hospitals in Newcastle, specialised surgical and cardiological care for neonates is currently provided at hospitals that do not contain obstetric units. Of the cots occupied by infants admitted for

surgical care during the first four weeks of life in 1991, as many as eight (average 3.9) were used to accommodate infants receiving high dependency care. However, data relating to such infants have been excluded from this study, which is concerned with facilities for 'medical' neonatal care associated with obstetric units.

Throughout 1991, nurses in the neonatal nurseries of each of the 19 specialist units kept day by day records of all their work, using the four point nursing dependency scale described previously. Spot checks were conducted, to assess the validity of the returns made, and the validity of the dependency ratings. As well as dealing with all infants admitted to the neonatal nurseries, the returns also covered any infant receiving low dependency 'special care' (category C) on a 'transitional' or postnatal ward.

The two maternity units in South Cumbria district usually look to referral units in the Yorkshire, Mersey, and North-Western regions for help with babies requiring prolonged high dependency care; hence, for the present purpose, the work generated by infants born in these units was excluded from analysis. Data were not collected from the general practitioner maternity units in the region, which do not provide neonatal special care, and deal with less than 2% of the hospital births in the region. Evidence of the level of support and collaboration in the study is manifest in that the full year's data were available for analysis by the end of January 1992.

The pattern of demand for neonatal high dependency care is similar to that for any other form of emergency care, and is thus subject to the same statistical parameters long recognised as applicable in predicting both the numbers of cases needing care and the numbers of beds required to accommodate them. Various studies have endeavoured to assess or predict the numbers of beds required to deal with emergencies, using the observation that the daily demand for such beds may be statistically represented by the Poisson distribution.⁸⁻¹⁰ Newell⁸ presented a series of tables indicating the numbers of beds required to provide for probable emergency demand, at various specified levels of mean daily demand; and, in a hospital unit concerned only with emergency admissions, Pike and his colleagues⁹ were able to demonstrate that the numbers of beds occupied from day to day also approximate to the Poisson distribution.

Applying these findings, it is possible to calculate the numbers of cots that would be required to accommodate a specified caseload of neonatal care, as well as to illustrate the consequences of centralised or decentralised patterns of provision on this requirement. This method was used to calculate requirements for low dependency care, where each neonatal unit acts independently, and to demonstrate the numbers of cots which would have been required to deal with the high dependency caseload in the Northern region, if all five of the receiving units had worked independently of each other. In the latter instance, the

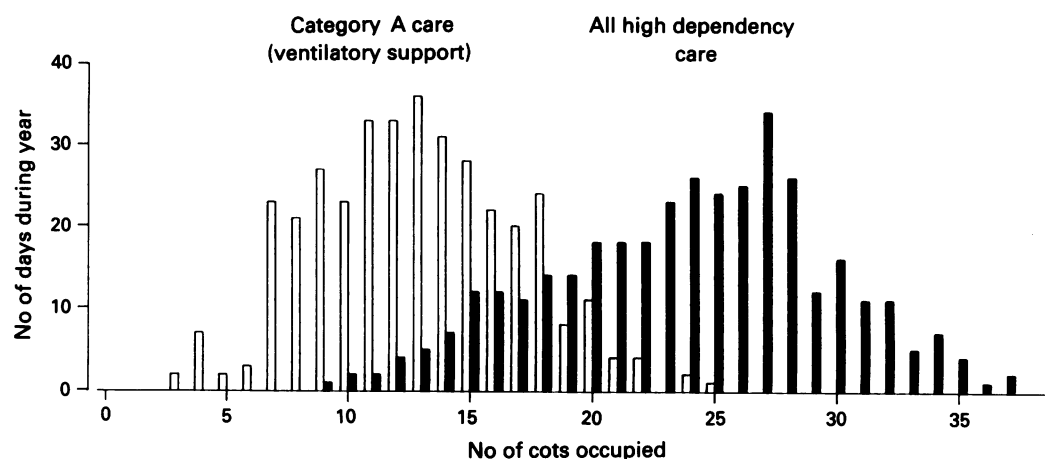


Figure 1 Frequency distributions of cots occupied by neonates receiving high dependency care, Northern region, 1991.

comparison between this theoretical requirement and the actual use of cots under prevailing collaborative arrangements is significant.

Results

Throughout the region in 1991, the numbers of infants receiving non-surgical special care in all dependency categories at any one time varied between 96 and 170. As illustrated in fig 1, the highest number of category A (ventilated) infants on any one day was 25 for all 17 units; and, for all high dependency care, the highest number was 37. The irregularity in the latter histogram, with a 'spike' of occupancy at 27 cots, is of interest; this is the current number of cots notionally available for high dependency care in the five referral units.

Table 2 summarises the use of cots by infants in each of the dependency categories,

showing separate data for the five 'referral' units providing prolonged high dependency care. As will be seen, 94% of category A care took place in the referral units; the remaining 6%, undertaken in other units, would reflect infants requiring only short term ventilatory support, or for whom transfer arrangements were still being effected at the time of the daily count. However, almost 37% of category B (non-ventilated high dependency) care was provided in non-referral units, so that 20% of all high dependency care was undertaken outside the five referral units. High dependency care represented 17.5% of all neonatal special care throughout the region, but almost 30% of all neonatal care in the five referral units.

The data indicating numbers of cots occupied per 1000 births are derived by relating the averages or upper limits of the frequency distributions of cot occupancy by infants in each dependency category to the 38 742 livebirths occurring in the 15 districts during 1991. Because it would be imprudent to base any assessment of cot requirements on average levels of use, the maximum levels of use for each dependency category are presented. Experience in the Northern region would suggest that all infants in the two high dependency categories used less than 1.0 cot per 1000 births, even when the highest numbers of these infants had to be accommodated simultaneously.

Table 2 Use of neonatal cots in Northern region during 1991 by infants in various dependency categories

Dependency category	Cot days occupied during 1991		Percentage of total cot occupancy in 'referral' units	Cots occupied/1000 livebirths	
	In 5 high dependency 'referral' units	In all 17 neonatal units		Average	Maximum
A	4 421	4 686	94.3	0.33	0.65
B	2 537	4 010	63.3	0.28	0.62
All high dependency	6 958	8 696	80.0	0.61	0.96
C	14 357	29 810	48.2	2.11	2.74
D	3 584	11 143	32.2	0.79	1.34
All low dependency	17 941	40 953	43.8	2.90	3.56
Categories A, B, and C	21 315	38 506	55.4	2.72	3.46
All categories	24 899	49 649	50.2	3.51	4.39

Table 3 Numbers of cots required to accommodate non-surgical neonatal high dependency caseload in variable numbers of units (99% requirement for annual caseload of 770 neonates, occupying 6958 cot days)

Schedule	No of units	No of cot days occupied in each unit	Approximate percentages of overall cot occupancy used in each unit	No of cots required in each unit	Total cot requirement
A	1	6958	100	31	31
B	2	5219:1739	75:25	25:11	36
C	2	4175:2783	60:40	21:16	37
D	2	3479:3479	50:50	18:18	36
E	3	3479:1739:1740	50:25:25	18:11:11	40
F	3	2784:2087:2087	40:30:30	16:13:13	42
G	3	2320:2319:2319	33:33:33	14:14:14	42
H	4	3479:1739:1044:696	50:25:15:10	18:11:8:7	44
I	4	2783:2087:1392:696	40:30:20:10	16:13:10:7	46
J	4	2087:2087:1392:1392	30:30:20:20	13:13:10:10	46
K	5	2784:1392:1392:696:696	40:20:20:10:10	16:10:10:7:7	50
L	5	1739:1739:1392:1392:696	25:25:20:20:10	11:11:10:10:7	49
M	5	1740:1739:1739:1044:696	25:25:25:15:10	11:11:11:8:7	48

HIGH DEPENDENCY CARE

The caseload of high dependency neonatal care dealt with in the five referral units comprised 770 infants. The average duration of such care in each of the five units varied between 5.6 days and 14.1 days; the overall average duration of high dependency care in these units, taken together, was marginally greater than 9.0 days. From the fact that these infants occupied 6958 cot days, table 3 was constructed, to illustrate the numbers of cots which would have been sufficient to accommodate such a caseload on all but three or four days during the year, depending on the configuration of independent neonatal units involved and their respective shares of the caseload. The numbers of cots indicated in this table derive

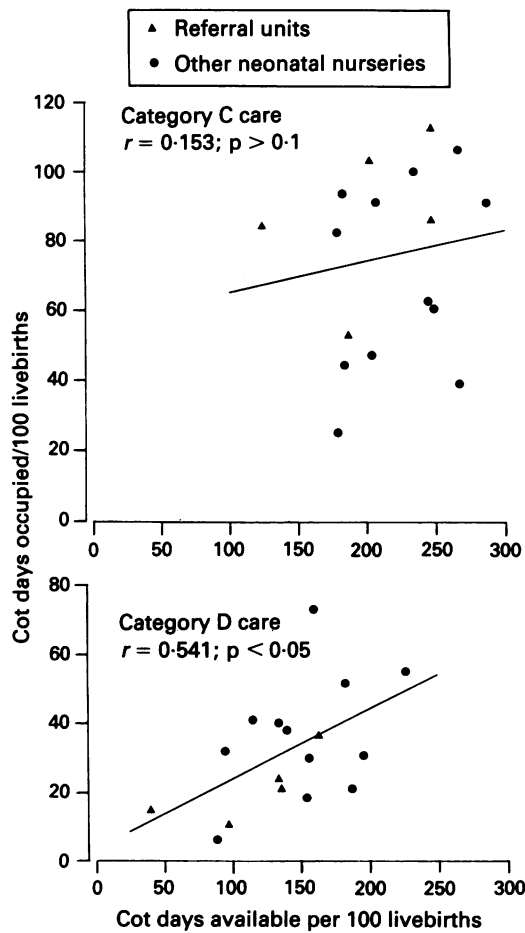


Figure 2 Relationship between availability and use of cots for low dependency care (categories C and D).

from the upper limits of Poisson distributions, with means determined by the average numbers of occupied cot days in each of the units postulated.

If the high dependency neonatal caseload accommodated in the five referral units had been admitted to a single, centralised facility, 31 cots would have been sufficient to accommodate them most of the time. Division of the caseload between a number of independent units leads to a greater theoretical cot requirement, which increases progressively with the number of units involved. Of the schedules set out in table 3, that which most closely approximates to activities in the Northern region is schedule M, which would necessitate provision of 48 high dependency neonatal cots, divided between five independent units. In fact, the highest number of cots occupied by high dependency infants in the five referral units working in a collaborative fashion was 32,

almost identical with the number which would have been expected, theoretically, if this service were fully centralised.

LOW DEPENDENCY CARE

In endeavouring to assess the cot requirements for low dependency care, it is necessary to address two issues: how much of the low dependency care provided was actually special care? and what allowance needs to be made for the way in which variations in demand for low dependency care differentially affect units dealing with large or small caseloads?

If low dependency special care is undertaken purely on grounds of clinical need, and there are sufficient cots to accommodate infants requiring such care, it might be anticipated that the volumes of low dependency care provided would relate directly to the caseloads of the units involved, and would be largely unaffected by the cots available in these units. Figure 2 presents the scatter of cot availability and occupancy during 1991 among the 17 units included in this study, for infants in categories C (low dependency special care) and D (observation of infants with birth weights over 1750 g). In calculating these values, hierarchical allowance has been made for cot use by neonates in higher dependency categories; so that cots occupied by infants in categories A and B are considered to be not available for use by low dependency neonates, and cots occupied by category C infants are not available for those in category D.

As will be seen, there is wide variation in use of cots for provision of category C care, regardless of caseload; but the association between cot availability and cot occupancy is very weak. With category D care, however, the variation in cot use is relatively less marked, and the correlation between availability and use is statistically significant.

The apparent finding (table 2) that low dependency special care was undertaken in less than 3.6 cots per 1000 births is, of course, a global observation, which takes no account of the fact that neonatal nurseries function independently for the provision of low dependency care, regardless of the arrangements for high dependency care. As shown in table 2, the 38 742 liveborn infants in the region received 29 810 cot days of category C low dependency care during 1991 and 11 143 cot days of category D care. Applying these figures *pro rata* to varying numbers of births, it is possible to calculate the average and maximum levels of cot requirements in obstetric units with

Table 4 Apparent cot requirements for medical low dependency neonatal care associated with differing caseloads

Annual caseload (no of births)	Category C low dependency care			Apparent requirement (cots/1000 births)	All low dependency care			Apparent requirement (cots/1000 births)
	Occupied cot days required	Cots occupied			Occupied cot days required	Cots occupied		
		Average	Maximum			Average	Maximum	
1000	769	2.1	9	9.0	1057	2.9	11	11.0
1500	1154	3.2	11	7.3	1586	4.4	14	9.3
2000	1539	4.2	14	7.0	2114	5.8	16	8.0
2500	1924	5.3	15	6.0	2643	7.2	19	7.6
3000	2308	6.3	17	5.7	3171	8.7	21	7.0
4000	3078	8.4	20	5.0	4228	11.6	25	6.3
5000	3847	10.5	24	4.8	5285	14.5	30	6.0
6000	4617	12.6	27	4.5	6342	17.4	34	5.7

caseloads of various sizes, as shown in table 4. Once again, the numbers of cots indicated in this table derive from the upper limits of Poisson distributions, whose means are determined by the average numbers of occupied cot days in each of the units postulated. The maximum numbers of cots likely to be used for low dependency care increase with the caseload, but the association is not rectilinear. In consequence, the required levels of provision of cots for low dependency care are relatively higher in units with small caseloads than in those with large caseloads.

Discussion

Existing health service information systems take insufficient account of the detail of care of the newborn, and thus assemble data that are completely inadequate for application to studies such as these. In part, this may be attributable to a continuing failure, until very recently, to define 'neonatal intensive care' with sufficient clarity and precision to leave no room for ambiguity in its application. Although the revised British definitions, published while this study was nearing completion,¹¹ offer a 20 point classification of what constitutes high dependency care, many of the indicators suggested are disturbingly imprecise; and others, such as recourse to total parenteral nutrition, are influenced as much by differences in clinical practice as by underlying differences in the infants' actual needs for nursing care.

By contrast with other publications, which have grappled with the question of facilities and services for neonatal intensive care, these studies in the Northern region are based on a classification of neonatal nursing dependency that is explicit and unambiguous and based on validated work study data.⁷ While the conclusions reached, regarding levels of cot provision and the pattern of organisation of services, may seem to run contrary to much recent guidance, we have endeavoured clearly to define our terms, affording the opportunity for comparison of our findings with experience elsewhere in Britain. Observations from the Northern region during 1991 would suggest that, where facilities for high dependency neonatal care are centralised, or function in an effectively co-ordinated fashion, the requisite level of cot provision may be less than has been advocated in recent guidance.³ Even allowing for the wide fluctuations that occur in the numbers of infants requiring high dependency care, the maximum level of requirement for such care need not exceed 1.0 cot per 1000 births.

As indicated earlier, up to eight cots were occupied during 1991 by infants receiving surgical intensive care, representing an apparent additional requirement of some 22% above the numbers of cots used for medical high dependency care. However, had it been possible to associate these surgical cots with one of the larger neonatal nurseries, and use them in the same flexible and collaborative manner as prevails with the use of the 'medical' cots, the overall regional requirement for high

dependency cots would have increased by only some 16%.

Because most obstetric units are self sufficient and work independently of each other in providing low dependency care, the levels of cot provision required will vary with the caseloads of the units under consideration. Applying the findings of the present study, it would appear that units with larger obstetric caseloads need some 5.0 cots per 1000 births to deal with category C infants; in the smallest units, however, this level may be above 7.0 per 1000. These observations indicate that the general application of 'normative' levels of provision for low dependency special care is inappropriate. This issue is of particular significance in the Northern region, where many obstetric units have relatively small caseloads. Of the 17 units involved in this study, only five deliver more than 2500 babies each year, seven deliver approximately 2000, and five others deliver appreciably less. It must be emphasised, however, that these estimates of cot requirements for low dependency care derive from average usage across the region, and are based on the perhaps untenable assumption that variations in demand for low dependency care can be expressed in the Poisson distribution. Given the considerable variation in use observed, even among units with similar caseloads, it is possible that the admission policies and patterns of use of the more efficient units might be more widely emulated so that the calculated requirements could be substantially reduced.

There is much greater variation than might have been expected in the pattern of provision of category C care (fig 2). A possible explanation for this might be found in the five referral units, if infants initially transferred in for high dependency care were retained after such care was no longer required. However, the positions of the five referral units on the scatter diagrams indicate that this was not the case. Casenote sampling suggests that much of this variation is attributable to differences between neonatal units regarding the perceived need for provision of 'tube feeding' for otherwise well preterm babies. This is a matter of some concern, as tube feeding is one of the main factors involved in the distinction between infants receiving low dependency 'special care' (category C), and babies of 1750 g or more, who are bottle fed, and admitted only 'for observation' (category D).

Category D infants (breast or bottle fed babies weighing more than 1750 g) present a particular problem in that their access to special care may be related more to availability of cots than to clinical judgment of need. In the Northern region, the level of provision of special care cots (excluding those used for high dependency care) is relatively generous. Overall provision is 5.2 per 1000 livebirths, varying from 3.4 per 1000 in one of the larger referral units to 7.9 per 1000 in one of the region's smallest units. Perhaps as a consequence, infants in category D accounted for rather more than 20% of special care nursery cot use in the region. It has been argued that many of these babies do not, in fact, require

special care, but could be safely nursed with their mothers.¹² However, given the presence of 'spare capacity' in many neonatal nurseries, and the absence of consistently applied admission policies, it is probable that appreciable numbers of infants will continue to be accommodated temporarily in special care nurseries, without in fact receiving special care.

Despite the widely held view that efficiency in the use of highly specialised services can derive only from centralisation, neonatal care in the Northern region has developed in a partially decentralised manner. Clearly, location of facilities for prolonged high dependency neonatal care at a limited number of obstetric units in the region is far more cost effective than providing the staff and equipment to enable such care in all obstetric units. Conversely, the prevailing pattern of partial decentralisation and transfer obviates the substantial capital investment that would be entailed in moving towards a totally centralised service, and allows a greater chance that care for infant and mother may be provided in reasonable proximity to their home. The data now available demonstrate that, given flexible and collaborative use of facilities, this pattern of decentralisation need not entail provision of any additional special care cots.

Cardinal to the prevailing pattern of organisation of neonatal care in the Northern region is the neonatal transfer service, by which the postnatal transfer of infants is achieved between the various obstetric units in the region. This service, which evolved progressively during the 1980s, currently deals annually with the emergency interdistrict transfer of some 200 infants with medical problems, who require high dependency care. Recently, it has been possible to assess the clinical safety of the service now operating. The region's own internal audit has demonstrated that, for districts which have no facilities for prolonged high dependency neonatal care, the transfer system affords clinical outcomes no different from those experienced in the districts to which the neonates are transferred. Using data derived from the Regional Perinatal Mortality Survey,¹³ it has been established that properly conducted interhospital transfer immediately before or after birth does not expose the baby to any increased risk of death or disability.¹⁴

For all of these reasons, it is strongly felt that the pattern of organisation of neonatal care that now exists in the Northern region is that most suited to the needs of the region's population. The concentration and centralisation of high dependency neonatal care, appropriate for metropolitan centres, would entail much greater domestic upheaval and family hardship, if it were imposed on small scattered communities, than does the compromise that has evolved in the Northern region.

It is suggested, however, that collaborative arrangements for the effective delivery of prolonged high dependency care, of the type described in this paper, must be subject to regional specification and contract negotiation, to prevent the disorderly development of more fully decentralised services. Anxiety has been

expressed by specialist staff that the new purchaser/provider arrangements within the NHS could lead to disintegration of existing regional arrangements, and the devolution of high dependency care into a multiplicity of small, ineffective provider units.¹⁵ Despite receiving reassurances from a government minister and a senior NHS manager, the parliamentary committee considering this issue was 'not persuaded that the establishment of contracts for regional services for . . . neonatal intensive care can be left to market forces and audit'.

This unfunded study would not have been possible without the active support of clinical staff in every neonatal nursery in the region. We are particularly grateful to the midwives and nurses for the diligence with which, each day throughout 1991, they evaluated and recorded the degree of nursing dependency of every baby. This report was prepared for the Neonatal Network, and for a Northern Regional Health Authority Working Party, by Dr David Morris, with assistance from Dr Andrew Cottrell and Dr Edmund Hey.

- 1 Department of Health and Social Security. *Report of the expert group on special care for babies*. Reports on Public Health and Medical Subjects No 127. London: HMSO, 1971.
- 2 British Paediatric Association and Royal College of Obstetricians and Gynaecologists Liaison Committee. *Recommendations for the improvement of infant care during the perinatal period in the United Kingdom. A discussion document*. London: Royal College of Obstetricians and Gynaecologists, 1977.
- 3 Royal College of Physicians of London. *Medical care of the newborn in England and Wales*. London: Royal College of Physicians, 1988.
- 4 Anonymous. Medical care of newborn babies [Editorial]. *Lancet* 1988; ii: 1344-6.
- 5 Field DJ, Hodges S, Mason E, Burton P, Yates J, Wale S. The demand for neonatal intensive care. *BMJ* 1989; **299**: 1305-8.
- 6 Northern Regional Health Authority. *Second report on neonatal services in the region*. Newcastle upon Tyne: NRHA, 1984.
- 7 Northern Neonatal Network. Measuring neonatal nursing workload. *Arch Dis Child* 1993; **68**: 539-43.
- 8 Newell DJ. Provision of emergency beds in hospitals. *British Journal of Preventive and Social Medicine* 1954; **8**: 77-80.
- 9 Pike MC, Proctor DM, Wyllie JM. Analysis of admissions to a casualty ward. *British Journal of Preventive and Social Medicine* 1963; **17**: 172-6.
- 10 Morris D, Handyside AJ. Effects of methods of admitting emergencies on use of hospital beds. *British Journal of Preventive and Social Medicine* 1971; **25**: 1-11.
- 11 Report of working group of the British Association of Perinatal Medicine and Neonatal Nurses Association on categories of babies requiring neonatal care. *Arch Dis Child* 1992; **67**: 868-9.
- 12 Hey EN. Special care nurseries: admitting to a policy. *BMJ* 1983; **287**: 1524-7.
- 13 Northern Regional Health Authority Co-ordinating Group. Perinatal mortality: a continuing collaborative regional survey. *BMJ* 1984; **288**: 1717-20.
- 14 Wariyar U. How safe is emergency transfer after birth? *Report of collaborative survey of perinatal, late neonatal, and infant deaths in the Northern region*. Newcastle upon Tyne: NRHA, 1988.
- 15 House of Commons Health Committee. Second report, session 1991-92. *Maternity services*. London: HMSO, 1992: vol I, paras 291-303.

Appendix

Classification of neonatal nursing dependency

High dependency special care:

- Category A ● Infants requiring artificial respiratory support
- Category B ● Infants receiving 40% or more oxygen
 - Infants whose entire fluid intake is provided intravenously
 - Infants whose current weight is less than 1000 g
 - Infants with a stoma, or a pleural, peritoneal, or urethral drain in place

Low dependency special care:

- Category C ● Infants receiving less than 40% supplemental oxygen
 - Infants receiving some intravenous fluid
 - Infants who are being at least partially tube fed
 - Infants currently weighing between 1000 and 1750 g
 - Infants who have had a fit, or a sustained (>20 sec) apnoeic attack during the previous 24 hours
- Category D ● Bottle or breast fed infants, weighing more than 1750 g admitted for observation only