

Referrals for neonatal medical care in the United Kingdom over one year

British Association of Perinatal Medicine Working Group

Abstract

A survey of referrals for neonatal medical care was conducted by neonatal paediatricians in the United Kingdom from 1 August 1986 to 31 July 1987. It was intended to estimate the unmet need for neonatal medical care and to find out what happens after an attempt to transfer a pregnant woman or a baby has been unsuccessful. A total of 3734 attempts had been made, of which 1646 were for in utero cases and 2088 were for postnatal cases. Nationally, about 9% of attempts to transfer (331) were unsuccessful. In most regions a high proportion of attempts that were eventually successful had taken a considerable amount of time to arrange.

It is concluded that despite a twofold increase since 1980 in the number of cots available for neonatal intensive care, arrangements for such provision in the UK are not adequate to meet every request for transfer. No health region in England or country in the UK was able to meet every request immediately, and some regions had great difficulties in arranging even those transfers that had been accepted. Such delays in transfer may lead to appreciable extra morbidity and considerable costs in future.

Introduction

Every maternity unit should be prepared to meet the immediate needs of all babies delivered in it; but because not all maternity units and associated neonatal units have the necessary facilities or staff expertise to meet the continuing needs of all small or seriously ill babies, some may have to be transferred to units which have such facilities.

Maternity Services Advisory Committee¹

Despite the recommendations made by the Maternity Services Advisory Committee in 1985, staff at neonatal nurseries that provide a regional service for neonatal intensive care are not always able to accept all requests for their help because the unit's facilities are often already fully committed to the care of babies. In a survey of requests for neonatal medical care in the North Western Region between July 1979 and June 1980 it was found that 65 of the 170 requests were refused by the regional neonatal unit.² In 1985 neonatologists in two of the Thames regions found that babies who were refused a cot at their own regional centres were not always accepted at another centre which offered appropriate care.

To find out whether this was part of a widespread problem in the United Kingdom the British Association of Perinatal Paediatrics (now the British Association of Perinatal Medicine) set up a working party of neonatal paediatricians, which planned and conducted a national survey of requests for neonatal medical care during one year. The aims were (a) to measure the extent to which

requests are met for neonatal medical services beyond the hospital booked for delivery and (b) to describe the outcome for babies who were not successfully transferred, even though this had been requested.

Methods

Neonatal paediatricians representing each health region in England and in Wales, Scotland, and Northern Ireland were responsible for collecting data and for validation within their own regions. In the Northern Region the data were provided from the routine regional perinatal data system. Data were collated and analysed at the National Perinatal Epidemiology Unit.

Between 1 August 1986 and 31 July 1987 staff in each maternity unit which had consultant obstetric beds were asked to complete a form every time they tried to transfer a baby in utero or postnatally to another hospital for neonatal medical care. Apart from in Northern Ireland referrals were not counted from units with general practitioner maternity beds but no consultant obstetric beds because referrals from these units are very rare in other parts of the UK and are almost always made to the local consultant obstetric unit. Referrals that were clearly for neonatal surgery were excluded.

A transfer may be requested in circumstances ranging from a clear emergency to a phone call to a regional centre to discuss the best management of a case. Such a call may result in a transfer, even though it was not at first intended; it was left to the staff who initiated requests to decide whether a request was made and if it had been successful.

On the form details were recorded about the baby (or mother), how many hospitals were contacted, and whether or not the attempt to transfer was successful. If a transfer was not successful the regional coordinator followed up the outcome and obtained further details about gestation and birth weight for the babies concerned.

Each regional coordinator was also asked to estimate the number of cots available for neonatal intensive care in their region.

At national level the number of attempts to transfer patients in utero or postnatally were counted for each region for one year. The results were tabulated by the proportion of requests that were successful and by subsequent outcome for unsuccessful attempts. The numbers of requests were related to the numbers of births to residents in each region. Some coordinators analysed patterns of requests within their own regions, but this was not attempted at national level and is not reported here.

DEFINITIONS

Transfer attempt was a session of one or more phone calls to neonatal units trying to find one that would

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accept a baby for neonatal care. (More than one attempt may have been made for one baby.)

In utero—A transfer attempt was recorded as in utero if the request was made before delivery.

Postnatal—A transfer attempt was recorded as postnatal where the request was made after delivery.

Successful attempt—A transfer attempt was considered to be successful if a cot was found at that session of telephoning.

Unsuccessful attempt—A transfer attempt was unsuccessful if the session of telephoning ended without finding a cot.

Outcome—Outcome was recorded for unsuccessful attempts. The survey recorded whether babies who had been refused at one transfer attempt died or survived until a subsequent transfer attempt or until discharge home from the hospital that initiated the request. Outcome after discharge or successful transfer was not recorded.

Surgical care—The survey was designed to record requests for cots for neonatal medical care. This excludes referrals to specialist units for cardiac or surgical assessment or care.

VALIDATION

Interpreting the results of any survey depends on confidence about the completeness and lack of bias in the data. We checked the validity of the data in three ways. Firstly, regional coordinators were able to check

TABLE 1—Recorded numbers of attempts to transfer for neonatal medical care, United Kingdom, August 1986–July 1987. Percentages in parentheses

	In utero (n=1646)	Postnatal (n=2088)	Total (n=3734)
Successful	1478 (89.8)	1925 (92.2)	3403 (91.1)
Unsuccessful	168 (10.2)	163 (7.8)	331 (8.9)

TABLE 2—Unsuccessful attempts to transfer for neonatal medical care, United Kingdom, August 1986–July 1987

	In utero				All (n=168)
	<32 weeks	32 weeks and <37 weeks	37 weeks or over	Unknown gestation	
Survived (includes outcome unknown)	50	23	0	79	152
Died	9	2	0	5	16
	Postnatal				All (n=163)
	<1500 g	1500 g to 2499 g	2500 g or over	Weight unknown	
Survived (includes outcome unknown)	63	20	11	43	137
Died	16	4	0	6	26

TABLE 3—Transfer attempts and calls made at each attempt in 15 regions

Region*	No of transfer attempts	Percent of transfer attempts with:			
		One phone call	Two or three	Four or more	Unknown No
Northern	191	99.0	0.5	0.5	0
Yorkshire	92	88.0	10.9	1.1	0
Trent	131	69.5	22.9	7.6	0
East Anglia	183	77.1	21.3	1.6	0
North West Thames	231	50.2	21.7	22.9	5.2
North East Thames	321	63.9	18.7	16.2	1.3
South East Thames	380	47.4	26.8	25.8	0
South West Thames	319	56.7	26.0	15.1	2.2
Oxford	50	52.0	24.0	24.0	0
West Midlands	286	82.5	16.4	1.1	0
Mersey	85	75.3	17.7	7.1	0
North Western	348	57.2	33.3	9.5	0
Wales	71	87.3	12.7	0.0	0
Scotland	253	26.9	3.6	1.2	68.4
Northern Ireland	426	57.0	19.3	2.6	21.1
Total	3367	Mean 66.0	Mean 18.4	Mean 9.1	Mean 6.5

*No data are available for Wessex and South Western Regions.

whether requests made to the regional unit were also recorded in the survey. Secondly, in London the Emergency Bed Service provides a neonatal cot finding service, which is used mainly by the hospitals in the four Thames regions. During the survey neonatal paediatricians in the London Perinatal Group, together with the Emergency Bed Service, were also collecting data about babies who were transferred using the service. Data from the two surveys were compared to identify any transfers recorded in one but not both surveys. Thirdly, a check was made on whether any unrecorded attempts had been made to transfer babies who died in units other than the regional neonatal centres. Coordinators wrote to paediatricians at each of these units requesting details about the deaths.

Of the 17 regions of the UK taking part in the survey, reports of validation exercises were received from nine, and the reporting in these regions is thought to be reasonably accurate. In a further eight regions formal validation was not reported. There are probably no large gaps in reporting for these regions such as might arise if a maternity unit in the region did not participate, but there is likely to have been some underreporting. In Scotland there were difficulties with data collection, and thus the data from this survey almost certainly underestimate the position there.

In general, it is thought that requests for in utero transfer were less well reported than postnatal requests because in utero transfer is less well defined. Requests for in utero transfer can take place in more settings than is the case for postnatal transfer requests, and it was therefore more difficult to arrange for staff making such requests to have survey forms available at the moment of request.

Outcome data, collected some time after the event, are undoubtedly incomplete, and a substantial proportion of failed transfer attempts, especially in utero, have an unknown outcome.

Results

THE NATIONAL PICTURE

Data were received from all of the English health regions and from Wales, Scotland, and Northern Ireland. A total of 3734 transfer attempts were recorded in the UK over the year of the survey. Table 1 shows that 1646 were in utero requests and 2088 were postnatal requests. Attempts were unsuccessful in nearly 9% of cases (331 cases). Of the 331 transfer attempts that failed (table II), just under half of the unsuccessful postnatal attempts were for babies weighing under 1500 g and 35% of unsuccessful in utero transfer attempts were for pregnancies of gestation under 32 weeks. Data about the weight or gestation were not available for a further 133 (40%) of cases of unsuccessful transfer.

Transfer attempts were made for babies from twin or higher order multiple births in 482 recorded cases (13% of all transfer attempts): 213 in utero and 269 postnatal. Data about triplet and higher order births were not available for three English regions, but for the other areas surveyed there were 22 sets of triplets and two sets of quadruplets for whom transfer was requested either in utero or postnatally.

Even if a transfer is successful, arranging it can take a long time as several units may have to be contacted. Two regions provided no data about the number of hospitals contacted at each attempt. In the remaining 15 regions one third of recorded attempts could not be arranged with one telephone call, and about a tenth took more than four calls to arrange.

There were regional differences in the number of units contacted at each attempt to transfer a baby. Table III shows the distribution of all recorded attempts by the number of units telephoned at that attempt for

the 15 regions where data were available. The Thames regions had much difficulty, with over 15% of attempts taking four or more calls, and Oxford and North Western Regions also had very few attempts where only one call was made. In Scotland and Northern Ireland the number of calls was not recorded for a large proportion of transfer attempts. The total number of calls that can be made is limited in most regions by the number of units within a reasonable distance of the requesting unit.

MORTALITY

No attempt was made to trace outcomes where a transfer was arranged successfully, but when the mother or baby was not accepted at any unit contacted regional coordinators tried to find out whether the baby died at the referring unit (before subsequent transfer or discharge home). This presented considerable difficulties, especially in the case of requests for in utero transfer or where there was inadequate identification on the form recording the transfer request. Forty two deaths are known to have occurred. In none of these deaths was the weight over 2500 g, and in one weight was not recorded. Of these deaths recorded, 16 were after an unsuccessful attempt to transfer in utero and 26 followed an unsuccessful attempt to transfer after delivery. Fourteen deaths were from twin or higher order births: three after unsuccessful in utero transfer and 11 after unsuccessful postnatal transfer.

UNITS AND COTS FOR NEONATAL CARE

Data about facilities for neonatal intensive care in England in 1980 were published in reply to a parliamentary question.³ At that time there were 176 cots available for intensive care in England. Regional coordinators were asked to update these data in October 1986. There was some difficulty over the correct definition of a neonatal intensive care cot and whether figures given would agree with official regional figures (if these existed). It is important to bear these reservations in mind when interpreting table IV. Regional coordinators were asked to estimate the number of cots for intensive care in units where intensive care was regularly practised. Thus only units with three or more cots for intensive care or more than 30 cases of intensive care a year, or both, are included. The total number of cots for intensive care available in the UK in October 1986 therefore was 442—in England alone there were 341. Table IV gives comparative data for England as data for 1980 were not available for Scotland, Northern Ireland, and Wales.

TABLE IV—Facilities for neonatal care, 1980 and 1986, England

	1980	1986
No of consultant obstetric units*	268	242
No of neonatal nurseries with intensive care facilities:		
Units	42‡	65‡
Intensive care cots	173‡	341‡
No of live births (all)	618 371	623 609
Rate per 1000 live births	0.28	0.55

*Data from SH3 Hospital Return, Department of Health and Social Security.

‡Units with three or more intensive care cots or more than 30 intensive care cases in a year, or both.

‡Data from *Hansard*, quoted in *Birth Counts*.³

The estimated number of cots in each region is significantly related to the number of births of very low birth weight to residents. There is, however, considerable variation from expected values in each region. Differences in definition may explain this. Even where there is agreement on what intensive care is, the resources available per intensive care cot are known to vary between different units. Provision of cots may also

depend on the number of obstetric units in a region, irrespective of the number of births, as it is generally held that an adequate level of neonatal care must be maintained in each unit where "high risk" births take place.

The provision of cots might be better related to "catchment" populations. Several regions have cots designated for the care of babies from outside the regional boundary, and other regions provide such care on an ad hoc basis. Births to resident populations may not therefore be a suitable denominator for neonatal cots in a region.

The relation between the available number of cots and transfer activity in the English regions and Wales is not likely to be simple. Linear regression confirms that there is no significant linear relation either between overall numbers of attempted transfers and numbers of cots available for intensive care or between the proportion of unsuccessful transfer attempts and numbers of cots.

A regional policy for neonatal care that emphasises in utero transfer where possible presupposes that there will be adequate obstetric facilities as well as neonatal cots at the referral centres. Information about staffing and facilities for obstetric care is not routinely available nationally. Facilities for delivery were surveyed in 1984.⁴

Discussion

The main conclusion of this survey is that in most parts of the UK arrangements for the provision of neonatal intensive care are not adequate to meet every request for transfer. The fact that the group of babies who were refused transfer appears to have been a high risk group suggests that requests for transfer were appropriate. Some regions experienced more acute problems than others, and this is reflected both in an appreciable proportion of unsuccessful transfer requests and in the time taken to arrange transfers.

The results of the validation of the data suggest that this survey may not have counted the total number of requests made for transfer for neonatal medical care. The number of cases for which a transfer was thought necessary but was not requested because the staff at the unit concerned thought that it was impossible were not counted.

This survey was not planned to compare outcomes for babies who were refused transfer with those for babies who were accepted. The selection processes that lead to a transfer request indicate that the group for whom transfer is requested are sick enough to need intensive care but are in a condition to be moved. A further selection effect in the decision to accept or refuse a referral was observed in Manchester by Sims and colleagues,² who found that some babies were refused because their condition was so poor that transfer would not help them. On the other hand, anecdotal evidence from participants in the survey suggests that some babies who might benefit are never referred because staff know about the lack of beds in referral centres. These would not have been counted as transfer attempts in our survey.

There may be several reasons for the lack of a clear relation between unsuccessful transfer requests and numbers of cots. Firstly, there are regional differences in the quality of data and in definitions of intensive care cots. Secondly, the need to transfer depends on the proportion of births taking place in units with neonatal facilities and on the distribution of those facilities between the units in each region. Regions differ widely in their policies in this respect. There seem to be great differences in the arrangements for transfer within each region.

The difficulties experienced by the four Thames

regions may partly reflect the increased complexity of transfer arrangements. There are at least 19 units in the four regions which are prepared to accept neonatal transfers, and they are often open to transfers from units outside their own region. The Emergency Bed Service keeps a daily record of cots available at all "receiving" units, but not all requests are made through the service. This may be because a cot is sought in a unit outside Greater London and so is not covered by the service or because the member of staff requesting the transfer did not know about or want to use the service.

In 1985 the Maternity Services Advisory Committee asked a series of questions on an "action checklist" for care of small and ill babies.¹ The following questions are relevant to the findings of this survey:

- Does each maternity unit have ready access to a designated regional perinatal centre to which mothers who are expected to have babies who will require intensive care can be referred for care and delivery?
- Do the staff of each maternity unit understand the arrangements for the emergency admission or transfer of babies to an appropriate neonatal unit?
- Are arrangements for the acceptance and transfer of babies to regional perinatal centres satisfactory?
- Are arrangements monitored regularly to maintain them at a high point of efficiency?

Many regions have perinatal working parties or committees that ask these questions and occasionally report on the position.^{5,8} There are inadequate national data to monitor or compare the position in different regions, except through surveys such as this. If regional neonatal services were reviewed regularly according to an agreed format, as has been recommended,^{1,9} the findings might confirm whether the differences that we have observed between regions indeed indicate unequal provision of resources or unequal access to neonatal care.

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The Gatekeeper and the Wizard: a fairy tale

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The recent discussion document *Review of Restrictive Trade Practices Policy* threatens to make illegal the near monopoly of general practitioners to refer patients to hospital consultants.¹

Once upon a time in a green and pleasant land there lived a Gatekeeper and a Wizard. The Wizard lived in a great white castle above a town. In this castle he had a marvellous crystal ball that could tell him why people were poorly. He would then use one of his powerful magic potions to make them better again. The Wizard was a very clever man.

The Gatekeeper lived in a big house next to the entrance of the castle. His job was to decide who was poorly enough to need to see the Wizard and open the gate into the castle for them. The Gatekeeper was also very clever, and he too had magic potions to make poorly people better. After all, the Wizard and the Gatekeeper had both gone to the same school for wizards, although they had learnt different sorts of magical powers after leaving it.

Now most of the poorly people who came to see the Gatekeeper didn't need to see the Wizard. They were usually only slightly poorly or worried about being poorly and the Gatekeeper was very good at deciding who needed to see the Wizard. Most of the people seen by the Wizard were very poorly and the Wizard could

cast his spells to make them better. The Wizard and the Gatekeeper needed each other.

The Queen offers two solutions

The problem was that as more people got older more and more of them needed to see the Wizard, and a queue began to form in the courtyard of the castle waiting to see him. Well, the people in the queue made such a noise that the Queen heard, and she summoned her Minister to explain what all the noise was about.

"The Wizard says he doesn't have enough money to treat all these poorly people," the Minister replied.

"There isn't enough money for all these new crystal balls and magic potions he keeps wanting," said the Queen. "He will just have to work faster and see more poorly people. He will have to send them home earlier before the magic potions have finished working and the Gatekeeper can look after them—it is about time that lazy Gatekeeper did more work and less golf."

Well the Wizard tried and the Gatekeeper tried but it was no good—in fact, the queue in the courtyard got longer and longer. Sometimes the Gatekeeper had to send back poorly people to the Wizard because they hadn't had enough of the magic potions before they came home. You have never heard such a noise that the people made—after all, they had given their money to

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