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ADMISSIONS AND READMISSIONS FROM DISTRICT TO THE SPECIAL BABY-CARE UNIT OF A MATERNITY HOSPITAL

BY

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Recent years have seen the development in a number of maternity hospitals of a paediatric nursery section for ailing and premature neonates. Policy in the matter of use of such nurseries varies from hospital to hospital, more especially with regard to the admission of babies born on district and in nursing-homes. Necessarily, policy is influenced to a large extent by the adequacy of alternative facilities available but gives first consideration to the prior claims of babies born in the maternity hospital, of which the paediatric section constitutes an integral part.

This contribution reviews experience gained over a nine-years period in the special baby-care nursery of a maternity hospital in an industrial city. During that period 4,212 newly born babies were admitted to the nursery, of whom 3,434 came from the labour ward or lying-in ward nurseries, and 778 from their own homes, nursing-homes, or other maternity hospitals. With a few exceptions babies admitted from outside were referred by general practitioners and obstetric and paediatric colleagues as in need of urgent hospital care. The exceptions consisted of readmissions numbering 55. A total of 283 babies were admitted from places of birth outside the city boundaries. Distances between 5 and 10 miles (8 and 16 km.), between 10 and 50 miles (16 and 80 km.), and in excess of 50 miles (80 km.) were involved in the case of 167, 105, and 11 respectively. There was no alternative to admission of the 778 babies to the maternity hospital baby-care unit because of the special clinical requirements of the babies and the inadequacy of suitable facilities in the local general hospitals. Infants admitted to the maternity hospital were aged 2 weeks or less.

The Babies

Of the 778 babies 683 were born in their own homes, 92 in nursing-homes or maternity hospitals, and 3 in ambulances while being transferred from home to the maternity hospital. There were 396 premature infants, and the remaining 382 were born at term or after. Among premature babies there were 101, and among babies born at term 9 infants of twin pregnancies. One premature infant was the only live-born baby of triplets.

Reasons for Transfer to Hospital

The reasons prompting transfer to hospital are summarized in Table I. Prematurity without apparent complication was the most common single indication (107 babies), and prematurity was an accompanying feature in 289 (44%) of the remaining 671 infants. Requests for admission were almost invariably based on the presence of abnormal features or signs and only occasionally on a precise diagnosis. Cyanosis, vomiting, and a tendency to chilling were the most frequent causes of anxiety. Other not uncommon causes of concern were persistent respiratory embarrassment, haematemesis, melaena, jaundice, feeding difficulties, superficial infections, and convulsions. Unsatisfactory home conditions were a factor of importance in only a small minority of instances. Examples of congenital anomalies were usually sent on account of doubts concerning prognosis and the desirability of early surgical intervention. Babies admitted for prearranged transfusions consisted in the main of infants being kept under observation for anaemia after discharge from hospital. Of infants sent with a tentative diagnosis of haemolytic disease some were known to have rhesus-negative mothers but did not show clinical evidence of haemolytic disease.

TABLE I.—*Major Clinical Findings Prompting Transfer to Hospital (778 Babies)*

Major Finding*	No. of Babies			Percentage Incidence in		
	Premature†	Term	Total	396 Premature Babies	382 Term Babies	All 778 Babies
Uncomplicated prematurity	107	—	107	27	—	14
Multiple pregnancy ..	86	9	95	22	2	12
Cyanosis	24	69	93	6	18	12
Vomiting	17	50	67	4	13	9
Chilling	16	46	62	4	12	8
Congenital anomalies ..	45	17	62	11	4	8
For prearranged transfusion	9	42	51	2	11	6
Bleeding	16	32	48	4	8	6
Respiratory embarrassment	24	20	44	6	5	5
"? haemolytic disease" ..	6	36	42	<2	9	5
Jaundice	16	23	39	4	6	5
Feeding difficulties ..	22	14	36	>5	<4	4
Superficial infection ..	7	12	19	<2	4	2
Convulsions	6	16	22	<2	4	2
Social conditions	9	4	13	—	—	1
Failure to thrive	4	6	10	—	—	1
Oedema	3	5	8	—	—	1
Intracranial disturbance ..	1	5	6	—	—	}
Pyrexia	—	7	7	—	—	}
Anuria	1	5	6	—	—	}
Collapse	—	5	5	—	—	} 4
Anaemia	1	2	3	—	—	}
Superficial trauma ..	1	2	3	—	—	}
Distension	1	1	2	—	—	}
For observation	2	7	9	—	—	1

* More than one finding was present in 39 babies.
† Of birth weight 5½ lb. (2·5 kg.) or less.

Readmissions numbered 55, of which 39 were for repeat-transfusions in the treatment of haemolytic disease (33) and of the anaemia of prematurity (6). Seven infants were readmitted with feeding difficulties, including three for the establishment of breast-feeding. Symptoms necessitating readmission were attributable

to superficial infection (4), deep infection (3), congenital heart disease (1), and a recurrence of convulsions (1). Among the babies readmitted, one died of bronchopneumonia and another of massive renal infarction complicating cyanotic heart disease. Readmissions are not dealt with separately elsewhere in the text.

Immediate Results of Hospital Care

Surviving Babies

Of the total number admitted, 622 (80%) survived. The final clinical diagnoses at the time of discharge are given in Table II. There were 302 *premature infants*. The birth weight of 74 was 5 lb. (2,265 g.) or over; of 136 between 4 and 5 lb. (1,815 and 2,265 g.); of 71 between 3 and 4 lb. (1,360 and 1,815 g.); and of 20 between 2 and 3 lb. (910 and 1,360 g.). One baby who survived weighed 1 lb. 15 oz. (880 g.) at birth.

TABLE II.—*Clinical Diagnosis in Surviving Babies* (622)

Clinical Diagnosis	No. of Babies			Approx. Percentage of All Surviving Babies		
	Premature*	Term	Total	Premature*	Term	Total
Prematurity:						
Uncomplicated ..	99	—	99	16	—	16 } 24
Multiple pregnancy only	41	—	41	7	—	7
Hyperbilirubinaemia	5	—	5	1	—	1
Congenital anomalies	27	62	89	4	10	14 } 14
Intestinal obstruction	1	3	4†	<1	<1	<1
Haemolytic disease ..	6	51	57	1	8	9
Feeding problems ..	21	32	53	>3	>5	9 } 10
Pyloric stenosis ..	1	5	6	<1	<1	1
Infection	14	39	53	2	7	9
Bleeding	8	23	31	1	4	5 } 7
Swallowed blood ..	—	13	13	—	2	2
Chilling	39	1	40	<7	<1	7 } 10
"Cold injury" ..	11	11	22	>1	>1	3
Intracranial disturbance	6	20	26	1	3	4 } 7
Asphyxia	7	11	18	1	2	>3
"Traumatic cyanosis"	1	7	8	<1	<1	1
Multiple pregnancy ..	—	9	9	—	1	1
Anaemia	1	1	2			} 1
Tetany	1	—	1			
Mucoviscidosis ..	—	1	1			
Undiagnosed	1	1	2			
Home conditions unsuitable	8	1	9	>1	<1	2
Healthy	4	29	33	<1	>4	5
Total ..	302	320	622	48	52	100

* Of birth weight 5½ lb. (2·5 kg.) or less.
† 4 babies who died post-operatively in another hospital have *not* been included.

Congenital anomalies in surviving babies consisted of spina bifida (18), hydrocephalus in the absence of spina bifida (3), cleft palate (6), heart disease (10), oesophageal atresia (4), cerebral agenesis (3), urogenital deformities (6), hiatus hernia (4), intestinal atresia (2), mesenteric bands (1), anal atresia (1), biliary atresia (1), tracheo-oesophageal fistula (1), and choanal atresia or stenosis (6). There were 13 mongols with no detectable cardiac lesions, and 10 infants with multiple anomalies.

In some instances the *feeding problems* (Table II) were attributable to difficulties with breast- or bottle-feeding technique which responded to nursing care. Pylorospasm secondary to the swallowing of maternal secretions or blood was a feature of 12 cases, and there were six babies with pyloric stenosis. Incoordination of swallowing and breathing, never persisting for longer than 10 days, explained feeding difficulties in four infants.

Among *deep infections* there were staphylococcal septicaemia (5), coliform septicaemia (1), meningococcal meningitis (1), staphylococcal meningitis (1), coliform meningitis (3), and *Escherichia coli* pyelonephritis (3). Viral infection probably accounted for one case of hepatitis and two cases of colitis. Seventeen babies had respiratory infections. Of these, five had pneumonia, the organism in the case of two being *Staphylococcus aureus*. Other infections involved superficial structures (19) such as the salivary glands, subcutaneous tissues, and mammae. There were two examples of severe monilial infection.

Haematemesis and/or melaena was a feature in 37 babies with "*bleeding*," and was due to swallowed blood in 13 and to a coagulation defect of the blood in 24. Defective coagulation explained also haematuria, epistaxis, and bleeding from the cord in one, two, and three cases respectively. In another infant haemorrhage from the umbilicus started when separation of the cord involved an anomalous arterial supply, and in two babies the source of bleeding was a palatal ulcer.

For the purposes of Table II the term "cold injury" has been reserved for those babies with chilling in whom a temperature persisting below 95° F. (35° C.) was associated with generalized induration of the tissues, refusal of feeds, oliguria, and pronounced albuminuria.

After careful clinical observation over a period of not less than 48 hours 33 babies were considered to be *healthy*. The reasons prompting the family doctors to send these infants to hospital were delay in passing urine for the first time (2); the possibility of intracranial trauma following difficult and precipitate delivery, or delivery in the absence of an accoucheur (10), and the presence of jaundice of uncertain significance (18). There were three instances of feeding difficulties attributable to maternal anxiety and not to any functional or other abnormality of the baby.

Deaths

There were 156 deaths, the causes of which are listed in Table III. The deaths include eight infants who died after transfer to another hospital for operation on account of acute intestinal obstruction. Of the babies who died, 94 were *premature*, the birth weight of 78 being less than 5 lb. (2,265 g.). Of these 78 infants the birth weight of 24 was between 4 and 5 lb. (1,815 and 2,265 g.); of 31 between 3 and 4 lb. (1,360 and 1,815 g.); of 18 between 2 and 3 lb. (910 and 1,360 g.); and of 5 less than 2 lb. (910 g.).

TABLE III.—*Fatal Cases* (156): *Diagnoses*

Diagnoses (Primary Cause of Death)*	No. of Babies Dying			Approx. Percentage of All Fatal Cases		
	Premature	Mature	Total	Premature	Mature	Total
Prematurity:						
Uncomplicated (10) ..	14	—	14	9	—	9
Twin pregnancy only (9)	15	—	15	10	—	10
"Hyaline membrane" (13)	13	—	13	8	—	8
Hyperbilirubinaemia (2)	2	—	2	1	—	1
Congenital anomaly (29)	16	27	43	10	17	27
Acute intestinal obstruction (8) ..	4	4	8	>2	>2	5
Intracranial haemorrhage (33)	18	15	33	>11	>9	21
Infection (15)	9	8	17	6	5	11
"Cold injury" (4) ..	2	2	4	>1	>1	3
Haemolytic disease (2)	1	2	3	<1	>1	2
Haemorrhage (other than intracranial) (3) ..	—	3	3	—	2	2
Undiagnosed (1) ..	—	1	1	—	<1	1
Total	94	62	156	60	40	100

* The numbers of necropsies are indicated in parenthesis.

Congenital anomalies encountered in the 156 babies who died included heart disease (19), spina bifida with or without hydrocephalus (16), intestinal atresia (4), mesen-

teric bands (1), renal agenesis (2), cerebral agenesis (2), diaphragmatic hernia (2), oesophageal atresia (1), malrotation of gut (1), Hirschsprung's disease (2), and mucoviscidosis (1). The fatal *infections* included pneumonia (9), and septicaemia (8) complicated by meningitis in five cases. *Staph. aureus* was cultured from the lungs of two of the cases of pneumonia. The causative organisms in the cases with meningitis were *E. coli* (3), *Staph. aureus* (1), and *Pseudomonas pyocyanea* (1), and in the remaining examples of septicaemia *Staph. aureus* (2) and *E. coli* (1). The three instances of *haemorrhage* other than intracranial were haematemesis from a duodenal ulcer (1) and massive suprarenal haemorrhage (2).

Age at Time of Death

Of the 94 premature babies, 68 (72%) were admitted within 12 hours, and 81 (86%) within 48 hours of birth (Table IV). The corresponding figures for the remaining 62 infants who died were 34 (55%) and 46 (75%) respectively. Forty (43%) of the deaths in premature babies occurred within 12 hours and 71 (76%) within 48 hours of birth. Of deaths among infants born at term or after, 18 (29%) occurred within 12 hours and 34 (55%) within 48 hours of birth.

TABLE IV.—*Fatal Cases* (156). *Age at Time of Admission and of Death. Comparison of Infants Born Before and at Term*

Age	Admission				Death			
	% of 94 Fatal Cases Among Premature Babies		% of 62 Fatal Cases Among Mature Babies		% of 94 Fatal Cases Among Premature Babies		% of 62 Fatal Cases Among Mature Babies	
Within 2 hours of birth	38	72	2	55	11	43	2	29
Within 2–12 hours of birth	34	86	53	75	32	76	27	55
Within 12–24 hours of birth	6		10		15		13	
Within 24–48 hours of birth	8		10		18		13	
On 3rd day of life or later	14		25		24		45	

Of the 51 deaths which occurred on or after the third day of life, infection accounted for 11, traumatic haemorrhage for 10, and developmental anomalies of the central nervous system (15), heart (8), and kidneys (2) for 25. Two deaths were attributable to primary cold injury. One infant with a facial teratoma died aged 4 weeks and another with mucoviscidosis at the age of 7 weeks. The cause of death was not determined in one baby who lived three weeks.

Early Clinical Signs and Eventual Diagnosis

Correlation of some of the signs prompting transfer to hospital with the eventual diagnoses gives an indication of the bewildering challenge that can be met by the family doctor in domiciliary obstetrics.

Prematurity presented its own special problems. Of the 107 babies sent to hospital on account of prematurity without apparent complications, 10 died as a result of intracranial bleeding. There were four instances of subdural and subarachnoid haemorrhage of natal origin, and six of intraventricular haemorrhage developing at varying intervals after admission. Two infants developed a fatal septicaemia shown bacteriologically in each instance to be of maternal origin. Another delayed cause of sudden death was suprarenal haemorrhage (1). There were several instances of delay in appearance of clinical signs due to the presence of congenital anomalies in premature babies. This was encountered in connexion with congenital disease of the heart, kidneys, and brain. Nor was it possible to foretell the occurrence of the severe hyperbilirubinaemia and prolonged pronounced hypothermia which characterized the subsequent clinical course in a limited number of cases. Early assessment of the newly born premature baby's condition was inevitably complicated by an element of unpredictability. This applied particularly to the premature baby of a multiple pregnancy. Lapse of time was necessary before a reasonably confident opinion could be given concerning a baby's prospect of healthy survival.

Cyanosis was the most common single sign occasioning anxiety. No other single sign arose in such a wide variety of associated clinical circumstances. These circumstances were only rarely recognizable in the hours immediately following birth. Of 93 babies sent into hospital because of cyanosis 20 developed signs of severe intracranial disturbance, including nine with fatal intracranial haemorrhage. Fourteen infants had congenital heart disease, five being mongols. Cyanosis prompted the admission of another mongol child in whom no cardiac anomaly was detected; was attributable to pulmonary conditions in 12 babies; and was associated with septicaemia or meningitis in 5, hypothermia in 6, and diaphragmatic hernia in 2 infants. Inhalation of feeds by babies with unsuspected oesophageal atresia (2) and of tenacious mucus following difficult delivery (5) accounted for sustained cyanosis in 7 babies. Other causes detected only after detailed observation included choanal atresia or stenosis (4), occlusion of the nares by mucus plugs (2), temporary incoordination of breathing and swallowing (3), and partial obstruction of the pharynx by the tongue in the presence of a loose mandibular joint (1). Internal hydrocephalus was a feature of one and cerebral agenesis of another infant who came to necropsy. There were nine examples of uncomplicated traumatic cyanosis. The cause of cyanosis in five babies remained unexplained. Thirty-five infants admitted because of cyanosis died.

Vomiting resembled cyanosis in the variety of clinical conditions with which it was associated, and in its variable prognostic significance. It occurred as a complication of feeding problems in 32 babies, of whom pylorospasm was present in 13 and incoordination of breathing and swallowing in three. Organic diseases of the alimentary tract giving rise to vomiting included pyloric stenosis (6), hiatus hernia (4), intestinal atresia or stenosis (8), and Hirschsprung's disease (1). By way of contrast vomiting occurred as early evidence of general systemic disturbance in septicaemia (5), pyelonephritis (2), intracranial haemorrhage (3); and as a late event in cyanotic congenital heart disease (2), cold injury (2), kernicterus (1), and bile-duct atresia (1). Vomiting was the reason for admission of two of the babies who died.

Chilling was a common source of apprehension. In 46 of 62 babies in whom it was a feature it was attributable to unsatisfactory conditions of environmental temperature. The remaining examples of chilling occurred in the presence of congenital heart disease (4), foetal malnutrition (4), septicaemia (3), abdominal obstruction (2), intracranial haemorrhage (1), hydrocephalus (1), and the cardio-respiratory syndrome with hyaline membrane (1). Deaths among babies admitted on account of hypothermia numbered four.

As a sign prompting transfer of babies to hospital *persistent respiratory embarrassment* was one of the most difficult to explain. Diagnosis in a number of cases had to await necropsy, at which the findings were sometimes wholly unexpected. The conditions associated with persistent respiratory embarrassment were fatal intracranial haemorrhage (9), severe post-natal intracranial disturbance (11), fatal "hyaline membrane disease" (5), "cold injury" (2), terminal suprarenal haemorrhage (2), persistent extensive atelectasis (1), pneumonia (1), and inhaled mucus (1). Respiratory embarrassment of delayed onset was a feature of one baby with mucoviscidosis and another with cerebral agenesis. Seventeen infants admitted on account of respiratory embarrassment died.

Twenty of the 39 babies admitted because of *jaundice* were found to be healthy. In six cases jaundice was attributable to haemolytic disease and in four was an example of hyperbilirubinaemia in premature infants. Jaundice resulted from infection in two cases of coliform septicaemia and one of viral hepatitis, and was explained by congenital anomalies in one case of bile-duct atresia and in another of cardiac failure. A large subdural haematoma was present in another severely jaundiced infant. In three babies the only finding other than jaundice was difficulty in feeding. Three babies admitted with jaundice died.

Of 22 babies transferred with a history of *convulsions* six died as a result of cerebral haemorhage; eight developed signs characteristic of severe traumatic intracranial disturbance; five were found to be suffering from purulent meningitis; and in two the presence of cerebral agenesis was established. One baby had no recurrence of convulsions and progressed satisfactorily without a diagnosis being made. There were six deaths among babies with a history of convulsions.

All five babies admitted following sudden *collapse* died. Death was the result of massive intracranial haemorrhage in three cases and of bilateral suprarenal haemorrhage in another. The fifth case was one of staphylococcal septicaemia with early meningitis.

No evidence of organic disease was found in 12 of the 36 infants sent to hospital because of *feeding difficulties*. Four undiagnosed mongol infants were admitted because of reluctance to feed. Infections explaining feeding problems included septicaemia (3), thrush (2), and pneumonia (1). Difficulty in feeding arose also in association with prolonged post-natal asphyxia (1), and the development of cold injury (2). Obvious sources of difficulty recognized before transfer of the babies were cleft palate and hare lip (6), choanal atresia (1), cardiac disease (1), meningomyelocele (1), erupted teeth (1), and loose mandibular joint (1). All 36 babies survived.

Impressions and Reflections

Tables I, II, and III are evidence of the wide variety of clinical material involved. Of no less practical importance was the frequent similarity of initial signs given rise to by numerous basically different clinical and pathological conditions. Furthermore, the conditions giving rise to any particular early sign included some involving a serious prognosis and others involving no more than temporarily disturbed progress.

Confronted with these or other signs in the newly born baby, the family doctor had to arrive at a rapid appraisal of the infant's general state. The seriousness or potential seriousness of the baby's condition had usually to be assessed without its being possible to make a firm diagnosis. Decision whether or not to transfer to hospital had to be prompt, and often within an hour or less of birth. It would not have been surprising had a considerable number of transfers subsequently proved unnecessary. This was not, however, a feature of the series. Indeed, exception could not be taken to the transfer of one infant in the total series of 778 babies, including those sent in for vomiting or jaundice later found to have a simple explanation. In every instance the circumstances in which the signs appeared fully warranted reference for investigation. There was no suggestion of alarmist or inconsiderate misuse of the hospital services. Furthermore, there was a general awareness among family doctors and domiciliary midwives of the need to anticipate and not to delay transfer which was considered necessary.

Over the years a rewarding, understanding relationship has been established between family doctors and the hospital. Practitioners over a wide area do not hesitate to telephone concerning their problems, and, where indicated, arrangements for immediate admission were agreed. Decisions to transfer without delay were invariably effectively reinforced by admirable promptitude on the part of the ambulance services. Table IV provides evidence in support of this. Delay in transfer to hospital was not a contributory factor of any significance so far as deaths were concerned. One possible reservation that might be made is that prognosis in cases of descending respiratory infection might have been improved by earlier admission of one or two babies had the initial signs of illness been recognized as related to infection present in the household. By way of contrast the possible detrimental effects of disturbance during transit of three babies with signs of intracranial disturbance suggested that sedation prior to transfer might have been clinically advantageous.

The creation of emergency resuscitation teams has been recommended (Ministry of Health, 1961) for the special care of premature babies. My personal opinion is that in the series under review the results would not have been significantly different had the service of such a squad been available. In the series the consistently sound clinical judgment of the family doctors and the promptitude with which transfers were effected were of fundamental importance in the saving of life. Had transfer to hospital been dependent upon the prior arrival and advice of a flying squad the immense advantage of prompt transfer would have been lost. A finding of some importance was that at necropsy five babies sent to hospital with signs of severe asphyxia persisting for more than 30 minutes were found to have extensive intracranial haemorrhage from which recovery was scarcely possible. Two other infants with similar post-natal histories recovered and at the age of 3 years showed no evidence of late sequellae. These are seven cases in which resuscitation by intratracheal intubation before transfer could have been undertaken, but it is extremely doubtful if the ultimate clinical results would have been modified.

Dogmatic conclusions cannot be based on the relatively limited experience of this series, and impressions based upon an isolated local study are not suited to general application. Nevertheless it is open to question if a neonatal flying squad is suited to the needs of all areas. Factors of distance and availability of staff have to be considered.

Forty-eight per cent. of all the babies transferred and 60% of the babies who died were premature. Of babies transferred on account of prematurity which was not thought at the time to be complicated by infection, trauma, or anomalies, 20 subsequently developed signs of disease. A review of obstetric and neonatal clinical features, and of pathological and bacteriological findings, suggested that the infections causing death were acquired before admission. Among the babies with haemorrhage, bleeding in some may have occurred before transfer but in others began in hospital. Instances of primary cold injury developing in hospital were explained by previous chilling in the home. Observations made on infants at the time of admission and compared with controls admitted from the hospital labour ward did not suggest that babies were subjected to significant risk of chilling while being transported from home. In common with practice elsewhere, the ambulances employed have special equipment to assist the infant to maintain body temperature.

Important Clinical Features

Two clinical features of importance in relation to prematurity were illustrated in the series. Firstly, the appearance of recognizable evidence of infection or vascular accidents was often delayed. Secondly, the physical weakness of prematurity was apt to mask or modify the clinical picture, with the result that a tendency to chilling and failure to progress were sometimes the only outward evidences of such conditions as intracranial haemorrhage, septicaemia, or deep infection.

Chilling must be seen in perspective. As a reason for transfer it occurred in 13% of infants born at term as compared with 4% of premature babies. Moreover, cold injury occurred with the same frequency in babies born at term as in those born prematurely. Analysis of the cases with chilling and cold injury established the fact that the incidence among infants " born at term " was almost wholly accounted for by involvement of babies with birth weights only a few ounces in excess of 5½ lb. (2.5 kg.). The incidence of chilling of all degrees is striking and testifies to the necessity for the attention focused upon it in the latest issue of the *Rules of the Central Midwives Board*. Clinically it is important, however, to remember that not all cases of extreme hypothermia are attributable solely to environmental conditions (primary cold injury) and that cold injury may be secondary to deeply situated infection or haemorrhage. The term " cold syndrome " is to be preferred to that of "cold injury."

In the total series of 778 babies under consideration, few if any of the deaths were preventable, and among surviving babies recovery was dependent upon hospital care in the great majority of cases. Tribute is due to the nursing skill of the midwives, without which many of the infants would not have survived. Two further points deserve emphasis. In no case during the nine years under review did it appear that infection in a baby admitted from outside was transmitted to an infant born in hospital; and there was no clinical evidence of an infant transferred from home acquiring infection in hospital.

The skilled experience of the midwife is an overriding argument in favour of the admission of the ill newly born baby to a special baby-care section within a maternity unit or maternity hospital. The midwife is unique in the specialized knowledge she possesses of the clinical picture presented by the ill newly born baby, and of the nursing techniques required in the treatment of diseases peculiar to the newborn. There is the additional argument that in the paediatric section of a maternity hospital trained midwives in adequate numbers are usually available throughout the 24 hours, whereas in many general hospitals there is a lack of suitably trained staff in adequate numbers during the night if not also during the day. Care of ill newly born babies brooks no relaxation of standards during the night.

Planning for the Future

A Hospital Plan for England and Wales (Ministry of Health, 1962) holds out hopes of new hospital construction. The siting of accommodation for ill newly born babies requires special consideration. Contrary to views expressed in some quarters, local experience points to the desirability, and in my opinion the necessity, for such accommodation being incorporated in the maternity and not the children's unit of a general hospital. It is essential that a neonatal section should have constantly and immediately available surgical, radiological, and laboratory services, with experience of the special requirements of the newly born. Nor, as does occur, should ill infants a few days old be admitted to hospital wards staffed by nurses who have not had midwifery training or *special* training in the care of small sick babies.

Both administrative and clinical efficiency in care of the ill baby newly born on district would benefit from association of each maternity hospital special baby unit with a defined domiciliary district or districts. The distances involved should not be too great. Regardless of the extent to which success attends the official policy of encouraging hospital confinements, there will always remain the need to make special provision for babies newly born on district. Changes in the day of discharge of mothers recently delivered in hospital are unlikely to modify greatly the extent and size of the overall need. The series described in this paper gives some indication of the challenge to clinicians, administrators, and planners.

Summary

Among 778 newly born babies transferred from outside to the special baby-care unit of a maternity hospital the birth weight of 396 was 5½ lb (2.5 kg.) or less, and of 382 over 5½ lb. (2.5 kg.). Requests for admission were usually based on the presence of abnormal signs and only occasionally on a precise diagnosis.

The most common reasons prompting transfer were prematurity, cyanosis, vomiting, and chilling, in that order of frequency. Other reasons included persistent respiratory embarrassment, bleeding, jaundice, and feeding difficulties. Unsatisfactory home conditions were a feature in only a small minority of cases. There were 156 deaths, the major contributory cause being congenital anomalies in 32%, prematurity in 28%, intracranial haemorrhage in 21%, and infection in 11%. Among the 622 surviving infants the clinical signs prompting transfer were attributable to prematurity, congenital anomalies, feeding problems, chilling, haemolytic disease, infection, and stress of birth in 24, 14, 10, 10, 9, 9, and 7% respectively. Chilling was not limited to premature babies. Severe hypothermia was usually attributable to environmental circumstances, but

it also occurred occasionally as a complication of, among other conditions, deep infection and intracranial haemorrhage. The term "cold syndrome" is preferable to "cold injury."

A wide variety of clinical conditions was encountered. Numerous basically different clinical and pathological conditions gave rise to closely similar initial signs; and of conditions giving rise to any particular early clinical sign some were associated with a grave prognosis and others with only temporarily disturbed progress.

The challenge to the family doctor was to arrive at a rapid appraisal of an infant's general state, and decision to transfer to hospital was often made within an hour of birth. Few, if any, of the deaths were avoidable. Life-saving factors included the awareness of the domiciliary midwife of the need to anticipate, the consistently sound clinical judgment of the family doctor, the invariably prompt response to requests for transport, and the skilled experience of the hospital midwife in specialized nursing care of the ill newly born baby. It is debatable whether an emergency resuscitative team is needed in all areas.

Whatever results may follow official encouragement of hospital confinements a need will remain for special hospital provision for ill, and small premature, babies newly born on district. Where provision is made in a general hospital, the special unit for the care of the newly born baby should be incorporated in the maternity and not in the children's unit, and provision should include surgical, radiological, laboratory, and post-mortem services, with experience of the special requirements of the newborn. It is in the interests of administrative and clinical efficiency that any special baby-care unit for newborn infants should serve a defined domiciliary district or districts.

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LATE RESULTS OF ARTERIAL RECONSTRUCTIVE SURGERY

BY

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Peripheral arterial occlusions and aneurysms due to atherosclerosis have been treated by reconstructive surgery in 230 patients between 1954 and 1961. Methods employed for arterial blocks have been either reconstitution of the arterial lumen by thromboendarterectomy or the by-pass graft, and in aneurysms by excision with graft replacement. The purpose of this paper is to review the long-term results from reconstructive surgery, based on the first 200 patients (Table I), who were followed up for at least one year after operation, some as long as seven years. Results were judged successful if the peripheral pulses (femoral and posterior tibial) were restored (Table II) and the symptoms relieved; otherwise they have been classified as failures.

TABLE I.—*Type of Arterial Reconstruction Carried Out in First 200 Cases*

Type of Reconstruction	No. of Cases
Aorto-iliac thromboendarterectomy	24
,, and femoral by-pass grafts	25
Resection of aortic aneurysm, replacement with graft:	
Abdominal	28
Thoracic	1
Femoro-popliteal thromboendarterectomy	38
,, by-pass grafts	76
Common and internal carotid thromboendarterectomy	6
Subclavian thromboendarterectomy	1
Resection of popliteal aneurysm, replacement with graft	1

It is a small series and therefore detailed statistical analysis is out of place, but the results are comparable with those published by Cockett and Norman (1958) and Tibbs (1960), and are even in line with the large series reported by Crawford *et al.* (1960) and Rob and Downs (1960).

The late results of these reconstructive operations are shown in Table II. It is evident that the benefits from surgery in aorto-iliac disease are substantial and better than the long-term results obtained in blocks in the femoro-popliteal arteries.

Errors in surgical technique have accounted for several of the failures, partly because this work has been carried out as a side-line of general surgery and operations have not been repeated often enough to become technically perfect. Even when the operative technique has been adequate some immediately good results have been short-lived because atherosclerosis is nearly always a generalized disease and further thrombosis is likely to occur. Our experience is very similar to that of Pratt (1960b), who records that he does not see enough patients in whom the atherosclerosis is sufficiently localized to produce good and lasting results after surgery.

Direct reconstructive surgery can be of much benefit to a patient, but there are many pitfalls in its application, particularly when an abdominal operation is involved; the long-term results in the smaller arteries are disappointing. The results shown in this series make a conservative attitude in selection desirable, and reconstructive surgery (except in expert hands) ought to be

TABLE II

	Aortic Aneurysms		Aorto-iliac and External Iliac			Femoro-popliteal		
	Homograft	Synthetic Graft	Thromboendarterectomy	Homograft	Synthetic Graft	Thromboendarterectomy	Homograft	Synthetic Graft
No. of cases	14	15	24	12	13	38	23	53
Early failures	4	6	3	1	2	2	3	13
Patent vessels on discharge from hospital	10	9	21	11	11	36	20	40
Thrombosis of segment in 1st year	—	—	5	1	1	9	10	12
Patency at:								
1st year	—	4	5	—	3	13	0	18
2nd ,,	1	2	8	2	2	8	7	8
3rd ,,	3	3	3	3	4	6	2	2
4th ,,	2	—	—	2	1	—	1	—
5th ,,	2	—	—	1	—	—	—	—
6th ,,	—	—	—	1	—	—	—	—
7th ,,	2	—	—	1	—	—	—	—
Deaths in hospital	4	6	1	1	0	1	—	1
Late deaths up to 3 years	3	3	3	2	2		4	4
Amputations	—	1	3	1	2	6	4	18