



The transport service nurse checks the oxygen equipment and the temperature of the pre-heated compartment.

A Transport Service for Premature Babies

The New York City Departments of Health and Hospitals initiate a program for better care of premature infants.

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SINCE premature birth is the largest single cause of infant and neonatal mortality throughout the United States today, many state and local health departments are becoming increasingly interested in preventing prematurity and in providing better medical and nursing care to the prematurely born infant. The basic phases of the New York City program for the care of premature infants, as it is being developed, are:

The provision of a safe and swift transportation system

The development of special centers for the care of premature infants

The training of physicians and nurses

Improvement in antepartum care

Only one phase of the program is reported in this paper—the initiation of

the transport service. It was begun on November 1, 1948, and, when this report was written, had been functioning for six months. It is a joint project, planned and operated by the Department of Health and the Department of Hospitals. Babies are transported at the request of individual hospitals, physicians, families, and public health nurses.

THE PLANNING STAGE

Personnel

It is well recognized that skilled nursing care is essential in the care of the premature baby, and such care should be constantly provided from the moment of birth. The transport service is staffed by nurses who are assigned on the basis of their interest in the care of premature babies.

In preparation for her assignment each nurse was sent for four weeks clinical experience in the care of premature babies in one of the leading premature centers in this country. In addition a planned schedule of orientation was ar-

ranged in hospitals and in the various community public health nursing services. This orientation had a two-fold purpose: to give the nurses some knowledge of the hospitals with which they would be working and to give them some understanding of the broader aspects of community health.

To cover the 24-hour period, seven days a week, five nurses were assigned. This unit of five nurses works on a rotating schedule so that only one nurse is on duty at any time. The tours of duty are from 8:00 A.M. to 3:00 P.M., 3:00 P.M. to 10:00 P.M., and 10:00 P.M. to 8:00 A.M. The 10:00 P.M. to 8:00 A.M. tour is the longest and was arranged by the nurses themselves, so that they would not have to travel home after 10:00 P.M.

A clerk is assigned solely to the transport service to assume responsibility for the clerical work of the program.

Four ambulance drivers are assigned to the service on a rotating basis. Before assignments they were given an orientation to their responsibilities in relation to special handling of equipment, the importance of checking and replacing oxygen tanks in the ambulance, and the importance of keeping the ambulance clean. Since the ambulance drivers carry the portable incubator, they were instructed in careful handling of the incubator, particularly when it is occupied.

To give the ambulance drivers an appreciation of the service they are rendering, the objectives of the program were explained to them. After the service was begun it was encouraging to note the keen interest these men displayed. They made many helpful suggestions toward the improvement of transportation.

Physical Setup

The Maternity and Newborn Division of the Department of Health is the hub of all transport service activities. For the period from 5:00 P.M. to 9:00 A.M. and on Saturdays, Sundays, and holidays, a suboffice was provided at Bellevue Hospital, one of the municipal hospitals. In addition to the office activities provision was made at Bellevue Hospital for a work area, storage area, laundry, and sterilization facilities.

Equipment

The supplies and equipment for the transport service were selected from the

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standpoint of simplicity, facility, and efficiency of operation. After various types of portable incubators were examined and considered, a light-weight aluminum one, weighing nine and one-quarter pounds was selected. It provides the following features:

Sliding, unbreakable windows on both sides permit the nurse to attend the infant without opening the top.

A built-in thermometer is visible from the top of the incubator and can be conveniently read, and a removable crib facilitates cleaning. A specially constructed handle assures a horizontal position of the infant and ease in carrying.

An oxygen rack to accommodate a size "B" 40-gallon oxygen cylinder is attached to the side of the incubator. The amount of oxygen in the cylinder and the rate of flow are controlled and indicated by a pressure reducing regulator. The oxygen is administered by means of a funnel and rubber tubing which connects with the oxygen cylinder.

Heat is maintained through the use of four covered hot-water bottles, which are so placed within the incubator that there is no direct contact with the infant. A thermometer inside the incubator indicates the need for refilling the bottles by showing a drop in temperature.

Several incubators are set up and ready for use; to have one always heated for immediate use, a protected 60-watt electric light bulb is kept burning in it.

This bulb is removed and hot-water bottles are substituted when a call is received.

Linens are packaged in the two bundles: one containing incubator lining, blanket, quilted pad and four hot-water bottle covers; the other a gown with a hood, diaper, and blanket. These supplies are arranged in the order in which they will be used so that the baby can be dressed with the least possible handling and loss of time. The packages are kept autoclaved for immediate service.

The contents of the ambulance bag are:

Sterile Supplies

De Lee mucus trap with a soft rubber French catheter, size 12
 Rubber bulb syringe
 Tuberculin syringe, 1 cc.
 Hypodermic needles, 26-gauge, 1/4-inch length
 Umbilical cord tape
 Two hemostats
 Surgical scissors
 Cotton

Other Supplies

Rectal thermometer and lubricant
 Flashlight and batteries
 Nurse's apron, tube of soap, paper towels
 Bottle of water for baptism
 Alcohol sponges
 Reserve supply of glass connecting tubes

Medications

Aromatic spirits of ammonia
 Ampules of caffeine sodium benzoate, 1 grain
 Ampules of adrenalin 1-1000

An ambulance was reconstructed to meet the special needs of supplying and

At the Maternity Center, in November, seventeen babies drank a toast (in formula) to the first anniversary of the transport service which saved their lives.

maintaining heat and oxygen to the infant during transit. A glass enclosure to hold the portable incubator was built and fitted with an electric ceiling light and wall thermometer. This enclosure rests on a platform, under which is a compartment with a special heating device connected with the motor of the ambulance; the heat generated by the motor is transmitted into the glass enclosure. The compartment is constructed to contain two large "H" oxygen cylinders which lie horizontally and are equipped with oxygen regulators. The two large cylinders are used during the transport to obviate the necessity of frequently changing the smaller "B" cylinders which are attached directly to the portable incubator. The ambulance itself is provided with the conventional type of heater. In a closet compartment of the ambulance an additional supply of "B" cylinders is held in reserve, as well as extra linen bundles. All supplies used in caring for the babies are washed and autoclaved after each use.

Policies

Policies were established for the routine operation of the transport service and also for handling emergencies which might arise during transport. After approval by the pediatric staff these policies were expanded and incorporated into a procedure manual to guide the personnel in the operation of the service. These policies include instructions on procedures for home deliveries; the management of requests to transport infants known to have infections; transport of infants from a hospital where infection is present in the new-born nursery; priority of service in cases of simultaneous requests; death of an infant during transit; and other general directions and standing orders.

Publicity

An announcement of the establishment of the transport service for premature infants was sent to hospital administrators, chiefs of obstetrics and pediatrics, and directors of nursing in the 106 hospitals having maternity services in New York City, as well as to all medical, nursing, and health agencies and organizations. The police department was likewise notified. Announcements were published in the various medical, nursing,



Supplies, equipment, and the transport incubator, are kept ready for immediate use at all times.

and hospital bulletins and journals. Some newspaper publicity, with pictures of the ambulance equipment, was released to acquaint the public with the new service.

THE PROGRAM IN OPERATION

Supervision

The premature transport service operates under the supervision of the pediatric medical and nursing staff of the Maternity and Newborn Division of the Department of Health. Immediate supervision of the nursing activities is given by a public health nursing consultant who is assigned by the Bureau of Public Health Nursing to the Maternity and Newborn Division. The direct service is given by five transport nurses and a full-time clerk.

When special problems arise, such as the selection of the premature center to which the baby is transported or the occurrence of infection in a baby to be transported, they are referred by the transport nurse to the public health nursing consultant and the pediatrician. The pediatrician's primary role has been to handle questions and problems raised by private physicians and hospital administrators.

Functions of the Transport Nurses

The primary function of the nurse is to safely transport the baby, in accord with the cardinal principles for the care of the premature infant. Reassuring the family and hospital where the baby was born that he is in safe hands and will be carefully transported to a premature center is inherent in this function. Unless it is contraindicated, the nurse shows the baby in his portable incubator to the mother before she takes him to the ambulance.

When a hospital makes its first request for service, the nurse makes out the transportation record form and explains to the hospital staff members how to make out the form for subsequent requests. She also reports to the transport clerk when the hospital is in need of a supply of forms. When it is filled out, the transportation record form provides identifying data about the infant, a record of the mother's health during pregnancy, history of previous pregnancies, history of labor and delivery, pertinent data regarding the condition of the infant while in the hospital nursery, medications given, length of time in transport, amount of oxygen administered, temperature of the incubator, condition of the baby during transport, and his condition

TABLE I
BIRTH-WEIGHT DISTRIBUTION OF PREMATURE INFANTS TRANSPORTED FROM NOVEMBER 1948, THROUGH APRIL 30, 1949

Weight Group	Number Transported	Per cent of Total
Under 1000 grams	34	13 per cent
1000-1499 "	69	27 " "
1500-1999 "	121	44 " "
2000-2500 "	44	16 " "
Total	268	100 per cent

at the time of admission to the premature center in any of the hospitals.

At the end of each trip the nurse writes a narrative report describing the trip in detail. These reports have kept other members of the Maternity and Newborn Division informed on such details as the existence of infection in hospitals, the quality of records kept in the hospitals, the care of the premature baby immediately after birth, and to what extent the premature center was prepared to receive the baby. In the event of a home delivery, the nurse discusses the availability and value of public health nursing service; when requested, she notifies the community public health nursing agency directly. The record form used in this instance differs from that used for a hospital delivery, insofar as it does not contain detailed medical information.

The transport nurses themselves have been the best means of advertising the program as they interpreted it to physicians, hospital administrators, and nurses with whom they are in constant touch. In this initial stage of the program the nurses have had to accept the responsibility for the preparation and upkeep of supplies and equipment. It is anticipated that this work will ultimately be done by a nonprofessional worker, such as a health assistant or aide.

Functions of the Transport Clerk

During the day the clerk receives all incoming calls for transport and makes out the "Request for Transfer" card. The clerk checks with each premature center daily to determine available vacancies. She checks all reports and files all data relating to the transport service. In addition

she keeps an inventory of supplies and equipment, checks the data on a study of nursing time which is discussed below, and compiles the monthly record of babies transported.

Premature Infants Transported

In the six-month period, 246 transport trips were made and 268 babies were transported; 40 were born at home and 228 were born in 40 different hospitals. These 268 babies were transported to 21 hospitals which accept premature infants born outside the hospital. The group included twins and triplets.

Study of Nursing Time

A detailed study was made of nursing time expended in transport. This study applied to the 246 transport trips made. Table II shows the monthly expenditure of nursing time.

It is seen from Table II that, as more experience was gained in the transport of premature babies, the average length of time per trip decreased gradually from approximately two and one-half hours to one hour and forty minutes. An average of two hours and nine minutes per trip has been used in this six-month period. This includes the time spent from the moment the nurse left the office to pick up the premature baby at the place of birth to the moment she returned to the office after the transport was completed.

Future of the Transport Service

In the first six months of this service favorable comments have been made by physicians, nurses, and parents. There is real reason to believe that the transport service has not only provided safe care during the trip but has made many new friends for the Departments of Health and Hospitals.

When premature centers are more fully developed in this city and when all premature births are reported by telephone, there will be a greater demand for these services. It is, therefore, likely that additional transport units will be put into operation as they are needed.

TABLE II
MONTHLY EXPENDITURE OF NURSING TIME IN THE TRANSPORT SERVICE

Month	Number of Trips	Number of Minutes Spent	Number of Hours and Minutes per Trip
November, 1948	37	5,675	2 hours, 34 minutes
December, 1948	47	6,635	2 hours, 21 minutes
January, 1949	45	6,481	2 hours, 24 minutes
February, 1949	27	3,195	1 hour, 58 minutes
March, 1949	45	5,184	1 hour, 55 minutes
April, 1949	45	4,533	1 hour, 41 minutes
Total	246	31,703	2 hours, 9 minutes (average)