

Use of Mobile Unit to Provide Health Care For Preschoolers In Rural King County, Washington

JO McNEIL, RN, MN, and LAWRENCE BERGNER, MD, MPH

THE PROVISION OF health services to families in sparsely populated areas has been widely discussed (1-4). Even in King County, Wash., which includes the city of Seattle and has 3,203 physicians to serve a population of 1.2 million, many people do not have ready access to health services.

The Southeast Health District, one of five districts served by the Seattle-King County Health Department, extends to the Kittitas County line on the east and to the Pierce County line on the south. The total population of this area was more than 221,000 at the time of the 1970 census; 23,554 or 10.6 percent were children under 5 years of age. Since 1969, the Southeast Health District has suffered a high unemployment rate—one of the largest Boeing Aircraft plants is located there—and about 11,000 people have been receiving public assistance. Because of the low income levels of families, a number of low-cost housing projects have been developed. Most of these have been constructed in outlying areas of the county, where public transportation is not available. Even in the cities, public transportation is limited.

Planning

Although there were unmet needs among all age groups, it was decided that preschool children would benefit most from the mobile unit. It would be used for immunizations, diagnostic screening, health education, and followup of patients referred to other sources.

In addition to the medical segment of the project, a dental program was planned to provide preventive education and some restorative care. It later became evident, however, that provision of dental preventive education is best provided in the schools in the geographic area that was to be covered by the mobile van. Restorative care is provided in the Renton office by part-time dentists for children who have no other resources.

□ The authors are with the Seattle-King County Health Department. Ms. McNeil is district administrator of the Southeast District Health Center, and Dr. Bergner is director of public health. Tearsheet requests to Jo McNeil, 3001 North-east Fourth St., Renton, Wash. 98055.



The organization and early development of the program was the responsibility of the director of the health department's Maternal and Child Health Program, but eventually operation of the project was transferred to the administration of the Southeast Health District Health Office.

During the planning stage, many of the private physicians in the area were contacted and informed of the program. Both the individual physicians and the medical society recognized that children to be served by the mobile health unit were from families they did not reach, and who were not expected to be reached any other way. Members of the administrative team and the mobile health unit were invited to staff meetings of local hospitals to inform the physicians of progress being made.

During 1971, the administrators of the county government, being concerned with social and health services in the area, decided to bring health services closer to the public by means of a mobile unit. This decision was based on the following factors: (a) the people were spread over a large geographic area with poor public transportation, (b) each group of potential patients was too small to support continuous medical coverage, (c) an effective preventive program required the use of the kind of equipment that could not be transported by automobile and set up in portable clinics each month, and (d) a mobile van would draw attention to the availability of free preventive health services. When general medical care is difficult to obtain, the less urgent preventive services often are not sought.

Mobile Health Unit

The mobile health unit team began providing service for children in June 1972 at the Renton office while awaiting delivery of the bus from which it would operate. This period was used to set up the teamwork procedures necessary for operation of the unit in remote areas. The purpose of the service was to provide health screening and treatment for the preschool children of southeast King County, rather than to test whether the health problems noted when the children entered school could have been corrected by early care.

Patients sit in the reception room of the mobile health unit, Seattle-King County, Wash.



Nurse-practitioner examines child in the mobile health unit

Most of the funds for the mobile unit and for the built-in equipment (\$46,000) were provided by the Boeing Employees Good Neighbor Fund. Funds for operation of the mobile unit are from reimbursement of the Early and Periodic Screening, Diagnosis, and Treatment Programs and King County taxes. Presently, there are no departmental fees for many of the personal health services to low income families. A direct charge to families would discourage them from using this preventive service.

During 1972 and 1973, 2,078 visits were made to the mobile health unit and to the substitute clinics used before the arrival of the bus. The unit is located 1 or 2 days a month in the following towns: Federal Way, Algona-Pacific, Timberlane, Springwood, Wilderness Village, Ravensdale, Black Diamond, and Cumberland. Twice a year the team goes to the remote town of Lester by helicopter to save travel time. The bus remains in Federal Way and Springwood overnight once a month to hold an evening clinic because of the great demand for service. The schedule is set 30 days in advance in cooperation with local community groups, and it is widely publicized in shops, clubs, housing developments, and community newspapers.

Problems. When the mobile unit was first put into service, there were many shakedown problems, including the basic systems used on the bus such as battery, heating, water, and telephone. Other questions that arose concerned relief drivers, security for the bus at night, the large amount of travel time for the team when



Technician tests a child's hearing

Children leave the mobile health unit



the bus was locked up in outlying security spots, freezing in winter, cleaning, securing electrical sources, and how to continue the clinic in the community when the bus was being repaired. A more difficult problem to resolve was how the driver could best contribute to the program when he was not driving or maintaining the unit. Screening, outreach, and recordwork were some of the duties tried, and the current driver does these and also maintains the grounds surrounding the southeast district health office. Staff turnover is a continuing problem. Slightly more than a year after the unit was put into operation, the entire staff—including the project director—had to be replaced.

Staff. The project director, a pediatrician, in addition to administrative duties, examines and treats patients and provides consultation, direction, medical supervision, and backup to the pediatric nurse practitioner. The director works on the unit a portion of the day 2 to 3 times a week.

The pediatric nurse practitioner is a public health nurse with special training in clinical pediatrics. She examines children, evaluates, makes diagnoses, and within limits, treats certain illnesses under the direction and supervision of a physician. This nurse directs and supervises the activities of the clinic nurse, the clinic aide, and the unit driver. She is a key person in planning, developing, and carrying out the service.

Services. The population served varies to some degree, depending on where the unit is operating. In the more remote and sparsely populated areas, adults and older children are encouraged to come for immunizations and advice on resources available for treatment of their health problems. In the more populated areas, preschool-age children are given priority; the average age is 4 years. Nearly one-fourth of the children come from broken homes, and almost 70 percent are from families of very low socioeconomic levels.

The team screens for vision, hearing, ear infection, urinary tract infection, anemia, and speech, dental, and developmental problems. Basic screening tools such as the Denver Developmental Test and the audiometer are used; the impedance measurement bridge is used in screening for ear infections. At least once a year a history is taken and a physical examination is given each patient. The mother and child may receive consultation, health education, and treatment or referral (or both), depending on the problem.

Costs of Operation

The mobile clinic was operated only 8 months during 1973, and staff was added during the year as the demand for service increased. Therefore, the 1973 budget of \$57,523 does not represent the cost as accurately as the cost for the first half of 1974. Cost comparison with the usual service at a fixed facility was attempted by use of the following costs for operating the mobile clinic from January through June 1974.

Month	Salaries and benefits	Supplies and maintenance	Number of examinations ¹
January	\$ 2,779.10	\$ 293.73	100
February	3,073.60	393.51	148
March	3,178.87	649.04	130
April	4,578.98	589.45	164
May	4,608.54	916.38	213
June	3,643.81	568.42	156
Total	\$21,862.90	\$3,410.53	911

¹ Does not include immunizations.

² Estimate based on previous 5 months.

The monthly budget for operating the stationary clinic for January through June 1974 averaged \$811.36 for salaries and benefits and \$376.72 for supplies and maintenance. An average of 41.6 examinations were performed monthly, and total cost for operating the clinic in the 6-month period was \$7,128.48. (The stationary clinic staff consisted of one physician, one pediatric nurse practitioner, two public health nurses, two registered nurses, one aide, and one or two volunteers.)

The mobile clinic is in operation 40 hours a week, while the stationary clinic is in operation a half-day, once a week. The cost of a child health visit to either of the two clinics, including salaries, benefits, supplies, and maintenance, is similar under the present staffing patterns—\$27.74 in the mobile clinic and \$28.55 in the stationary clinic. More staff and a larger amount of space are used in the fixed clinic. Also, the physician examines most of the children in the fixed clinic, while the nurse practitioner examines most of the children in the mobile clinic. This cost pattern has led to a re-examination of current programs in all of the child health clinics operated by the department.

The public assistance patients who attend the mobile clinic comprise 6 to 40 percent of all the patients (fig. 1). The peaks in public assistance patients occurred when groups of Head Start children were being examined during the same month. The department is partially reimbursed for screening and examination of patients who receive public assistance.

Figure 1. Number of examination visits by public assistance patients and total examination visits to mobile health clinic, June 1973-June 1974

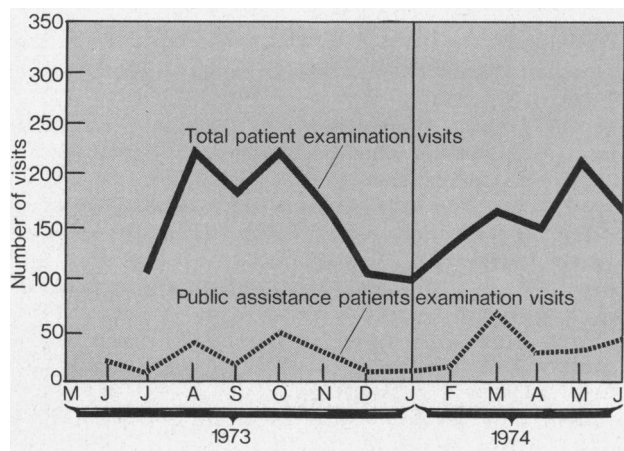
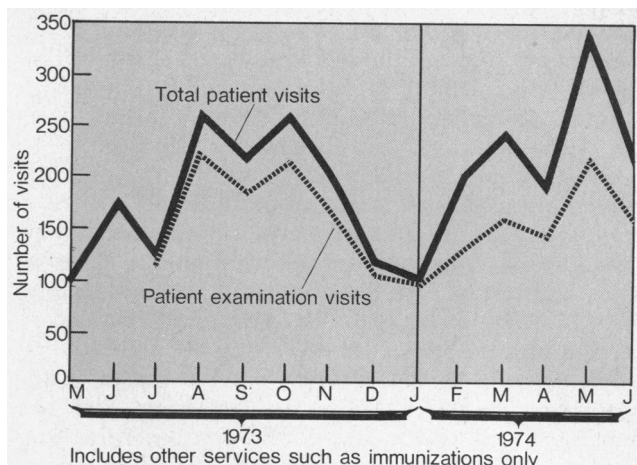


Figure 2. Number of examination visits and total visits¹ to mobile health clinic, May 1973-June 1974



A total of 1,248 patient visits were made in the first half of 1974, an increase of 106 over the number from May through December 1973 (fig. 2). The examination visits decreased from 1,051 to 911 during this period. Holidays, less publicity, illness among the staff, and the absence of the bus in the community for 3 weeks in January 1974 when defects in the plumbing and wiring on the bus were being corrected accounted for the drop in attendance.

Findings

The statistics for the last quarter of 1973 indicated that 25 percent of the children had no problems when they were examined. (Because of technical problems with a new data system, some of the statistics were unreliable during the early months of the program. Therefore the more accurate data from the last quarter of 1973 are used.) Upper respiratory diseases accounted for 37 percent of the problems. Two of the more serious conditions which needed correction were anemia (17 percent) and ear infections (10 percent). Anemia may result in learning problems; often untreated, repeated ear infections lead to permanent hearing loss and resulting educational handicaps (5). About 6 percent of the children required care for allergic rashes. During the year, several heart defects were identified for the first time; these children were referred for treatment.

The mobile health unit provided definitive care for 52 percent of the children who needed it. Twelve percent were referred to private physicians, 8 percent were referred to other agencies such as the Children's Orthopedic Hospital, and the remaining 28 percent needed no care.

Not all of the children's health problems were resolved by one or two visits to the unit or other resources, but 33 percent of them did improve and 17 percent were actually resolved. About 29 percent of the problems remained the same as at the time of the last visit; 7 percent became worse. For 14 percent of the children no

RURAL HEALTH

relevant outcome of their problems was expected. Some of the children with more serious infections and anemias required several visits for correction. These percentages indicate the status of the problem on the last visit and not the ultimate outcome for the child.

Children who are referred by the project director or the pediatric nurse practitioner are followed up to assure that they receive needed care. Of 142 referrals made during the last 2 months of 1973 and the first 2 months of 1974, 90 (67 percent) of the parents followed through and obtained care for their children. Forty-eight percent of the families who received public assistance, 75 percent of the Head Start families, and 64 percent of all others followed through.

Nearly half of the children were completely immunized when they came to the unit, and the remainder were immunized at the unit according to a recommended schedule. Half the families who used the unit had changes in residence or changes in jobs or other changes that might be associated with an increased risk of illness or accident (6).

Following is a statistical summary of the findings for the last quarter of 1973 for the 494 children examined:

Item	Percent
<i>Condition:</i>	
Acute nasopharyngitis (upper respiratory diseases)	37
Well children	25
Anemia	17
Otitis media and otitis media serosa (ear infection)	10
Allergy (rash)	6
Other	5
<i>Disposition of case:</i>	
Mobile health unit	52
None needed	28
Private physician	12
Other agencies	8
<i>Status of condition:</i>	
Improved	33
No change	29
Problem resolved	17
Worse (at time of last visit)	7
<i>Referral followthrough by families:¹</i>	
Public assistance	48
Head Start	75
Others	64
<i>Immunizations:</i>	
Completed or in process	86
Completely immunized when registered	47
<i>If no mobile health unit, family would go to—</i>	
Private physician	34
Health department (half would have transportation problems)	9
No place	19
Unknown	38

¹ Figures taken from referrals made from November 1973 through February 1974.

Discussion

In an attempt to evaluate the impact of this child care program on the community, each family was asked where they would go for health care if the mobile unit did not come to the community. As shown in the preceding summary, 34 percent said they would go to a private physician; but we do not know if they would

make the extra effort if their children were not ill. Nine percent said they would go to the health department clinic, but about half of these would have transportation problems. Fifty-seven percent of the families said they would not go elsewhere or did not know what they would do. Thus, continuous efforts are needed to make the service known and useful to the new and unserved families.

Despite many months of planning for the mobile unit and an opportunity for the team to work together before delivery of the unit, the early months of the operation required considerable learning and adaptation. By mid-1974, however, significant changes had been made, and a smoothly operating service had evolved. The pediatric nurse practitioner has been well received in the communities, and physicians in the area are pleased that appropriate referrals have been made to them. The maintenance of the unit, a major problem in the early months has become minimal. Knowledge of the project has become more widespread in the community, and patients are now being admitted at a steadier rate.

A 10-hour day, 4 days a week, has been implemented to decrease travel costs and increase the team's time in the community. As a result of this change, more people are being served. The unit is loaned to an adjacent health district 1 day a week, an arrangement which also expands the use of expensive equipment. Plans for more units in the county are being explored. Additional services have been added, according to need and interest of the community, including immunizations for adults, screening for health problems at the two adult evening clinics, and a nutrition program for mothers and infants. Continued efforts are being exerted to reduce the cost per visit. Additional communication with the communities via the news media and newsletters has been established to seek out those who are new in the area or who have not heard of the service. A full-time outreach effort is being undertaken.

Although efforts continue to increase the effectiveness and efficiency of the service, the response from parents and the needs identified in their children indicate that there is a real necessity for preventive and educational health services.

References

1. Belleville, M., and Green, P. B.: Preschool multiphasic screening programs in rural Kansas. *Am J Public Health* 62: 795-798, June 1972.
2. Drobny, A.: Latin American experience related to the solution of rural health problems in the United States. *Am J Public Health* 63: 66-70, January 1973.
3. Law, G., and Howell, J. M.: Planning a multiphasic screening clinic for preschoolers. *Am J Public Health* 60: 423-428, November 1969.
4. Penn, R. L., Jr.: The application of a model for health care services in a rural setting. *Am J Public Health* 63: 33-36, January 1973.
5. Kessner, D. M.: A strategy for evaluating health services. Vol. 2. Institute of Medicine, National Academy of Sciences, Washington, D.C., 1973.
6. Holmes, T. H., and Rahe, R. H.: The social readjustment rating scale. *J Psychosom Res* 11: 213-218 (1967).