
A Model Program for Providing Health Services for Migrant Farmworker Mothers and Children

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Synopsis

A bilingual, multidisciplinary team of health professionals collaborated with a migrant health center in North Carolina to develop a model program to deliver primary health care services to migrant farmworker women and children. The program included case finding and outreach, coordination of maternal and child

health services locally as well as interstate, and innovative health education programming.

Data were collected on the health status of 359 pregnant migrant farmworker women and 560 children, ages birth to 5 years, the majority of Mexican descent, who received primary care services at the center. The mean age of the women was 23.1 years and their mean gravidity was 2.9. Dietary assessments showed that the protein intakes of most met or exceeded the U.S. Recommended Dietary Allowances, but their consumption of foods in the milk-dairy group and the fruit-vegetable group was below recommended standards. Low hemoglobin was a common problem among the women (43 percent) and, to a lesser extent, among the children (26 percent). Among the infants and children, 18 percent were obese. Black American women had the highest proportion of low birth weight infants.

The project emphasized coordinated services for migrant farmworker mothers and children, such as transportation services, language translation, followup, and advocacy. An outreach strategy involved case finding, home visits, and services by lay health advisors. By the third year of the project, there were increases in the average number of prenatal visits, the proportion of women entering prenatal care in their first trimester, and in the use of well-child services. The project demonstrated effective methods for delivering culturally appropriate health care services to migrant farmworker mothers and children using bilingual public health professionals.

AN ESTIMATED 3 MILLION MIGRANT AND SEASONAL farmworkers and their dependents spend each winter planting and harvesting crops in the southern States, moving northward in the spring (1). There are three migratory streams, west coast, central States, and east coast. In the east coast stream, workers usually spend the winter in Florida and move with the growing season as far north as the New England States.

North Carolina receives more migrant farmworkers than any other east coast upstream State owing to its long growing season and the size of the area devoted to agriculture. An estimated 80,121 migrant and 417,131 nonmigrant, seasonal farmworkers, including dependents, are employed in the State annually (according to a July 1988 report by P. Garrett and M.D. Schulman, "Migrant and Seasonal Farmworkers in North Carolina: A Report Prepared on the Basis of Existing Data," for the North Carolina Primary Health Care Association.)

Reliable data are not available on the total population of the east coast stream, but it is composed of whites, Hispanics, American blacks, Haitians, and a small percentage of other minority groups (1). Most of the migrant farmworker families in the United States are from Mexico. Because Hispanics often travel with extended families, they compose a large part of the maternal and child health population at health agencies serving migrant farmworkers.

The 30 percent increase in the Hispanic population in the nation since the 1980 census is reflected in the characteristics of farmworkers receiving care in migrant health centers in the east coast stream. For example, from 1982 to 1988, Hispanic prenatal patients served by the Tri-County Community Health Center, Newton Grove, NC, increased from 45 percent to 85 percent (2) (and preliminary data from a report in preparation, "Migrant Lay Health Advisors: A Strategy for Health

Table 1. Ethnic characteristics of migrant farmworker maternity patients, Tri-County Community Health Center, North Carolina (percentages)

Ethnicity	1985 (N = 113)	1986 (N = 134)	1987 (N = 112)	Total (N = 359)
White	13	12	11	12
Black ¹	22	24	30	25
Hispanic ²	53	62	58	58
Haitian	12	2	1	5
Total	100	100	100	100

¹Includes 1 American Indian married to a black American.

²Includes 1 American Indian married to an Hispanic.

NOTE: Chi square $P = 0.004$. Percentages may not total because of rounding.

Promotion," E.L. Watkins, K. Larson, and C. Harlan, under Health Resources and Services Administration SPRANS grant 3736003).

Migrant farmworkers receive inadequate income, live in substandard housing, and perform arduous physical labor. Regardless of ethnic group, very few complete a high-school education. Insufficient financial resources, uncertain immigration status, lack of a permanent address, and cultural and language differences between health care providers and farmworkers create barriers to care. The high rate of mobility of farmworkers makes it difficult for health services to provide continuous comprehensive care.

As a result, migrant and seasonal farm laborers have a higher rate of respiratory, infectious, and digestive diseases than the general population (1). Studies indicate that migrant farmworker women and children have poor health status and inadequate access to care (3, 4) (and a report, "Migrant Agricultural Workers in Wisconsin, 1989: Social, Economic, and Health Characteristics," by Doris P. Slesinger, Professor, Department of Rural Sociology, University of Wisconsin-Madison, to the Wisconsin Rural Health Research Center, Marshfield Medical Foundation, September 1990).

Migrant children have a higher incidence of hospitalization and chronic illness than those in the general population (3). Migrant women are more likely to enter prenatal care later in pregnancy and receive fewer prenatal visits than is recommended by the Kessner Index of Adequacy of Prenatal Care (5). They are less likely to use family planning methods than other populations utilizing clinic services (2, 6-9). Other studies have found dietary intakes of migrant women and their families to be below Recommended Dietary Allowances (RDA) for calories, protein, and iron (10, 11).

An important resource for health care for migrant and seasonal farmworker families is services provided through the Migrant Health Program authorized under Section 329, Part D, Title III, Public Health Service Act (Public Law 97-35, as amended). The act provides

funds for migrant health centers in areas where 4,000 or more migrants live. In areas without centers, or fewer than 4,000 workers, the act provides for granting funds to public and nonprofit agencies to provide health services to migrant and seasonal workers.

Currently there are 105 migrant health centers located in 34 States and Puerto Rico, serving about half a million migrant and seasonal farmworkers a year (12). The legislation intends for centers to have bilingual staff members and to provide evening or weekend hours, transportation and outreach services, and to undertake health promotion activities and offer primary as well as secondary care (1).

In recent years, limitations in the amount of Federal funding available, and the allocation of funds on the basis of provider-patient encounters, have caused some centers to reduce employment of allied health providers. Priority has been given to secondary level care, rather than to health promotion and disease prevention services. In the area of maternal and child health this has had serious consequences because of the importance of outreach and health education in prenatal and well-child care.

Administrative separations within supporting Federal agencies also have complicated the task of providing health care services. Block grants under Title V, Maternal and Child Health Services, of the Social Security Act (P.L. 101-329, as amended), are given to State agencies administering Maternal and Child Health Services and Services to Children with Special Health Care Needs.

[Title V is administered by the Public Health Service's Health Resources and Services Administration (HRSA) through its Maternal and Child Health Bureau. In 1983, the Title V-supported maternal and child health program in North Carolina was administered by the Maternal and Child Care Section, Division of Health Services, State Department of Human Resources. State health services were reorganized in 1989 and the program is now administered by the Division of Maternal and Child Health, Department of Environment, Health, and Natural Resources.]

Funds for migrant health centers are administered directly by HRSA's Bureau of Health Care Delivery and Assistance. Individual migrant health centers, therefore, must negotiate with State and local maternal and child health programs for services such as development of standards and protocols; consultation services from specialists in maternal and child health; immunization supplies; educational materials; provisions under the Special Supplemental Food Program for Women, Infants, and Children (WIC); and additional direct patient care services.

North Carolina has four migrant health centers. In 1983, the Administrator of one, Tri-County Community

Health Center, requested the Department of Maternal and Child Health, School of Public Health, University of North Carolina at Chapel Hill, to assess the maternity care that the center had provided 171 women in 1982 (2). The subsequent pilot study found only one bilingual staff member and insufficient clinic protocols at that time. Very little communication had taken place between the center and the North Carolina Division of Health Services' Maternal and Child Care Section. Evaluators found limitations in case finding and followup services, resulting in a lack of outcome data regarding patients who delivered infants in other States.

The 63 mothers who delivered infants in North Carolina had 66 liveborns (including 4 sets of twins) and 1 stillbirth. The rate of low birth weight was 7.7 percent. The mean number of recorded prenatal visits, both at the center and other care sources, for the total sample of women was 2.8, which is well below the Kessner Index of 9 or more for 36 weeks gestation. Forty-six of the newborns were brought to the center for a mean number of three visits. Fourteen of the infants suffered persistent diarrhea with dehydration and weight loss, and eight of them were hospitalized. Two of the children died in their first year of life, one from a viral infection and the other with Sudden Infant Death Syndrome.

As a result of the pilot study, in October 1984, with a 3-year grant from HRSA's Maternal and Child Health Bureau, the School of Public Health began a collaborative effort to assist the center in implementing a public health approach to improve the health of migrant mothers and children. The project director formed an advisory committee of faculty from seven departments in the school, health officers of the three counties, and the maternal and child health supervisor from the regional office of the Division of Health Services. A bilingual multidisciplinary staff was employed at the center to assess the health status of the migrant farmworker women and children and to incorporate preventive approaches to delivering primary care services to this population.

This report describes sociodemographic characteristics of the maternal and child population, health status indicators, and trends in service utilization. The experiences reported in this paper may be useful in developing comprehensive maternal and child health programs in other migrant health centers.

Project Organization

In 1984, Tri-County Community Health Center was the only federally funded migrant health center in North Carolina that was open throughout the year. The center serves about 20,000 migrant and seasonal farmworkers in three southeastern counties, Johnston, Harnett, and Sampson. Migrant farmworkers based in Florida during

Table 2. Ethnic characteristics of migrant farmworker patients, ages birth through 5 years, Tri-County Community Health Center, North Carolina (percentages)

Ethnicity	1985 (N = 181)	1986 (N = 246)	1987 (N = 133)	Total (N = 560)
White	12	9	8	10
Black	15	24	26	21
Hispanic	70	67	64	66
Haitian	3	1	2	2
Total	100	100	100	100

NOTE: Chi square $P = 0.04$. Percentages may not total because of rounding.

winter months come to North Carolina to work April through November.

In 1984, the center had a permanent staff of 20 that doubled during the period when the migrant farmworkers were in residence. The center provided minor emergency care; screening and physical examinations; prenatal and postnatal care; well-child care; pharmacy, laboratory, and X-ray services; nutrition and WIC services; dental care; social work; and limited transportation services. A few resources for outreach and translation services were available during the farm labor season.

Methods

Sample. Participants in the School of Public Health project were 359 pregnant farmworker women, and 560 children ages birth through 5 years, all of whom received primary care services at Tri-County Community Health Center between April 1, 1985, and September 30, 1987 (tables 1 and 2).

Intervention. We began the project as part of an effort to improve the center's health promotion services for the maternal and child population and to utilize the educational and consultant services of the State's Title V agency. To address the project's goals, a multidisciplinary staff was employed onsite. The staff included two public health nurses who served as the project coordinator and the health educator; a public health nutritionist; and a social worker. The positions, their degree attainment, foreign language capability, and functions are listed.

Director, MSSA, DSc. Project designer and administrator. Development of interagency relationships.

Project coordinator, BSN, MPH. Spanish speaking. Onsite project administrator. Coordination of health services within the center, in-State, and interstate.

Public health nutritionist, MPH, RD. Spanish speaking. Nutritional assessments, counseling, and education.

Nurse health educator, BSN, MA. Spanish and Hai-

Table 3. Migrant farmworker women's mean gravidity, parity, and age, by ethnic group, Tri-County Community Health Center, North Carolina

Year and ethnicity	Number	Gravidity	Parity	Age
1985:				
White	15	2.5	1.1	23.1
Black	25	3.6	2.2	26.3
Hispanic	60	3.0	1.8	22.7
Haitian	13	5.3	3.8	30.7
All groups	113	3.3	2.0	24.5
1986:				
White	16	2.7	1.1	22.7
Black	32	2.9	1.5	23.3
Hispanic	83	2.9	1.6	22.5
Haitian	3	3.0	2.0	24.7
All groups	134	2.9	1.5	22.7
1987:				
White	12	2.8	1.4	22.7
Black	34	2.5	0.9	22.1
Hispanic	65	2.5	1.3	22.1
Haitian	1	4.0	2.0	29.0
All groups	112	2.6	1.2	22.2
All years:				
White	43	2.6	1.2	22.8
Black	91	3.0	1.5	23.7
Hispanic	208	2.8	1.5	22.4
Haitian	17	4.8	3.4	29.5
All groups	359	2.9	1.6	23.1

Table 4. Migrant farmworker women receiving minimum recommended food servings Tri-County Community Health Center, North Carolina (percentages)¹

Food group	Number of servings per day					Total subjects (N = 180)
	0	1	2	3	4	
Milk-dairy	36	37	19	29	...	100
Bread-cereal	2	6	16	17	259	100
Meat-protein	2	16	33	249	...	100
Fruit-vegetable ...	24	28	24	12	211	100

¹ All ethnic groups combined.

² Recommended minimum number of servings per day for the food group.

NOTE: Percentages may not total because of rounding.

tian-Creole speaking. Coordinator of the Lay Health Advisor Program.

Social worker, MSW. Spanish speaking. Social work case finding, assessment, intervention, and coordination of social services.

We obtained data on sociodemographic, physical, nutritional, and psychosocial characteristics of migrant farmworker women and children from medical records at hospitals, health departments, and migrant and community health centers in other States, as well as in supplementary interviews by the team. The primary interventions conducted by project staff members as a team effort included outreach and early case finding, coordination between the center's programs and other

health and social service agencies, and a health education program conducted to train migrant farmworker women as lay health advisors.

Guidelines were provided for identifying pregnant women and referring them to the center for care. All staff members made home visits to women enrolled in the project and hospital visits to those delivering infants locally. Arrangements were made to make available immunization supplies, protocols, educational materials, and services of consultants from the Maternal and Child Care Section of the North Carolina Division of Health Services. The social worker provided counseling and facilitated access to community resources. Other project staff occasionally provided direct clinic services because of frequent turnover among center staff and insufficient numbers of bilingual personnel.

We began a tracking system to encourage participants to maintain their health care after they left the center's service area. To address the issue of continuity of care, migrant farmworker women and children were given copies of their health records on the first visit, together with stamped postcards to notify center staff of their new location when they moved. Their winter address and probable location of delivery were documented in the center's medical record. Prenatal patients were given a bilingual (Spanish-English) prenatal weight-gain record, which was developed to teach women about appropriate weight gain. Another bilingual record, to be kept by the parents, was developed to provide continuous data on the growth of each child. All records were placed in a plastic pouch to be carried by the patients to the next place of care. Project staff members visited migrant health centers in Florida that had been identified as the home community of the center's migrant population. Such activities facilitated the transfer of health information between States.

More than 90 percent of migrant farmworker women and children participating in the project were enrolled in the center's WIC program. Twenty-four hour dietary recalls were analyzed for protein and calorie levels and compared with the RDA for that person. We designed a nutrient scoring system to provide additional information on the adequacy of the participants' diets.

We also began a program to train migrant farmworker women as lay health advisors. Women with an ability to help others were recruited from the area. They attended a series of classes in English, Spanish, or Haitian-Creole on appropriate health practices and the use of health and social services.

Classes were scheduled at locations convenient to their residence, such as labor camps, church facilities, and the Migrant Head Start center (a national program for children of migratory agricultural workers funded by Head Start discretionary funds). Forty-two women completed the training program, 10 of whom participated

for more than 1 season.

Upon completion of the training, the trainees would demonstrate an understanding of maternal and child health issues and community resources by sharing what they learned with their peers. The lay health advisor program was not intended to create an extension of center staff, but to strengthen existing social networks. The underlying theme of the program was to build self-confidence in the women so they could become aware of themselves as leaders and advocates for their community. A subsequent 3-year project has been funded through 1990 to evaluate the lay health advisors' impact on the migrant population.

Findings Regarding Maternal Health

Data collected as part of the project documented the following characteristics and health status of the 359 pregnant farmworker women who participated in the project between April 1, 1985, and September 30, 1987 (tables 1 and 2).

Sociodemographic characteristics. More than half of the women were Hispanic and almost all the white women in the study were married to Hispanic men. A marked reduction in the number of Haitian women was observed during the second and third years. The total group of women had a mean age of 23.1 years (table 3). There was a decline in mean age during the 3 years, a decline that we associated with the smaller proportion of older Haitian prenatal patients in 1986 and 1987 than was present in 1985. Forty-seven percent of the sample had completed 8 or fewer years of education. A higher percentage of Hispanic (75 percent) and white women (67 percent) were married than black American women (30 percent).

Reproductive history. Although gravidity ranged from 1 to 16, for about half the women the current pregnancy was either the first or second. The average number of pregnancies for the total sample during the 3-year period was 2.9. A significant decline was observed in mean parity, from 2.0 in 1985 to 1.2 in 1987, which is accounted for by the younger prenatal population in 1987. In contrast to other studies, Hispanic women in this sample did not have higher fecundity levels than black or white women (13).

Prenatal risk factors. The health problems reported most frequently for the women during their pregnancy were urinary tract infections (23 percent) and sexually transmitted diseases (7 percent). Forty-three percent of the total sample had a hematocrit of less than 34 percent sometime during their pregnancy. Tobacco use was reported most often by North American women.

'These data are useful in documenting the changing demographics in the east coast migrant farmworker stream from a large number of black Americans to a predominately Hispanic population.'

Dietary assessments. Eighty-four percent of the women had dietary recalls showing caloric intakes at less than 90 percent of their RDA. Protein intakes appeared far more adequate. Fifty-three percent of the women's diets had 90 percent or more of the RDA for protein. Significant differences were not observed for percent of the RDA for calories or protein among any of the age groups. Maternal dietary intakes did not correlate with their hematocrit or their infant's birth weight.

During the last 2 years of the project, dietary recalls of a subsample of 180 women were evaluated, based on the number of recommended servings of the basic four food groups present (table 4). Servings from the bread-cereal group were most often adequate. However, only slightly more than one-third of the women reported any servings from the milk group. Twenty-four percent reported no servings of fruits or vegetables, and only 11 percent of the women had the recommended 4 servings on the day for which their diet was analyzed. Almost half of the subsample reported 3 or more servings from the meat-protein group.

The women's diets did not appear to include excessive servings of high-calorie, nutrient-poor foods. Pica did not appear to be common, and the majority of the women reported no use of alcohol.

Pregnancy outcomes and associated factors. Data on pregnancy outcome were available on 318 patients (89 percent of the sample), of whom 286 had live births (table 5). There was an observed decrease in low birth weight infants born to women in the 1986 and 1987 cohorts. Still, 24 of the 286 live births, or 8.4 percent, were 2,500 grams or less. This proportion was higher than the 1986 rates of 7.9 for North Carolina and 6.8 for the nation. Black American women had the largest proportion of low birth weight infants while Hispanic women had the smallest. There was a significant association between older maternal age and low birth weight.

The majority of the births were normal, spontaneous vaginal deliveries (79 percent) and 18 percent were by cesarean section. All except four of the deliveries occurred in a hospital; two were at home and two were en route to the hospital. More than half of the women in

Table 5. Distribution of 286 low and normal birth weight infants born to migrant farmworker women, by year, Tri-County Community Health Center, North Carolina

Birth weight	1985		1986		1987		Total	
	Percent	Number	Percent	Number	Percent	Number	Percent	Number
2,500 grams or less.....	13	11	7	7	7	6	8	24
More than 2,500 grams.....	87	76	93	100	93	86	92	262
Total.....	100	87	100	107	100	92	100	286

NOTE: Chi square $P = 0.23$. There were 32 fetal losses (3 stillbirths, 6 therapeutic abortions, 22 spontaneous abortions, and 1 ectopic pregnancy). Data was not available for 41 outcomes.

the sample chose the contraceptive pill for their method of family planning following delivery; 26 percent had a tubal ligation and 10 percent used other methods.

Findings Regarding Children's Health

These findings report the characteristics and health status of the 560 children ages birth through 5 years who received care at the center between April 1, 1985, and September 30, 1987.

Sociodemographic characteristics. Two-thirds of the total sample of children were Hispanic; however, there was a significant increase in the number of black American children between 1985 and 1987. The greatest proportion of migrant children in the sample were newborn through 1 year of age (46 percent), followed by 1-year-olds and 2-year-olds. Boys represented 51 percent of the population and girls 49 percent.

Childhood immunizations. Children of migrant farmworkers are frequently overimmunized or underimmunized because current immunization data often are not available at migrant health centers. In 1985, only 41 percent of the children seen at the center were adequately immunized for their ages according to the American Academy of Pediatrics' Standards of Child Health Care (table 6). The numbers of children with complete immunizations rose to more than 60 percent in 1986 and 1987. The greatest increases were among the black American and Hispanic children.

Preventive health services. A screening to determine children's developmental status was conducted at the center for those who attended the well-child clinic. A significant difference was observed during the 3 years in the proportion of children receiving a developmental screen, from 34 percent of the children in 1985 to more than three-fourths of the children in both 1986 and 1987. Questionable or abnormal results were found for only four children during the project period.

Hematocrit levels. Iron deficiency anemia was a com-

mon problem among the children at the center. Twenty-six percent of the total sample of children 1 year and older were at risk for anemia. When children who came to the center only one season were compared to those who returned 2 or more years, a higher proportion of the returning children showed a normal hematocrit level.

Anthropometric assessments. Growth measurements were collected on almost all of the migrant children. Infants and children fell below the 5th percentile for height-for-age at more than twice the rate expected, using the National Center for Health Statistics Growth Curves for Children, Birth—18 Years, Health Examination Survey, Children and Youths. Hispanic and white children in the project had the shortest stature. When weight-for-height was considered, 91 (18 percent) of the infants and children fell at or above the 90th percentile (table 7). Twenty percent of the black American children and 18 percent of the Hispanic children were obese.

Dietary assessments. Only one-third of the infants and children received 90 percent or more of the RDA for calories. Interestingly, more boys than girls had caloric intakes that were at least 90 percent of the recommended levels. Almost all of the infants and children met or exceeded their recommended intake for protein.

We obtained dietary information on the number of servings of the basic four food groups for a subsample of 138 children who received care at the center during the final 2 years of the project and for whom data were available (table 8). Diets appeared most deficient in recommended servings in the fruit and vegetable group. Only one-quarter of the children had the recommended three servings from the milk group.

Results

Improvements in services. The population-based approach utilized by the project staff increased the case finding and followup activities of the center. We developed closer working relationships with other

health and social service agencies, particularly the Title V Maternal and Child Health Services in North Carolina and Florida. In North Carolina, arrangements were made with the Maternal and Child Care Section of the Division of Health Services for providing free immunization supplies. Consultation by the maternal and child health specialists in perinatal care was initiated.

Provision was made for the center's nursing staff to attend staff development courses in maternal and child health conducted by the division. Procedures were developed for referring children with special health care needs to the developmental evaluation clinics and other specialty services administered by the division. Referrals were made to the Florida Maternal and Child Health Program and to the State's Children's Medical Services for followup when families returned for the winter. Educational materials were developed jointly by the project staff with members of the maternal and child health programs in the two States.

The demonstration of the effectiveness of this approach led the center's administrator to establish a position of a maternal and child health nurse coordinator. With additional funding, he employed a bilingual public health nurse for this position, as well as a Spanish-speaking outreach worker.

The ability of the project staff to communicate with patients in their own language enabled them to have a more complete understanding of patients' needs and to provide more complete case management services. Few of the community agencies had Spanish-speaking staff members. We were able to interpret the needs of the migrant population and thereby reduce barriers to service caused by language.

The documentation of patients' needs by project staff members led to increased services offered by the center. We documented the need for year-around translation services because of the number of Spanish-speaking farmworkers who remained in North Carolina in the winter. We also obtained data on the number of patients who were unable to use the services of the center because of lack of transportation. The center was able to expand its transportation services by acquiring an additional vehicle and employing another driver.

The administration of the health center and the Migrant Head Start Center found the lay health advisors to be a valuable asset in increasing consumer participation in their programs. Four lay health advisors were elected to the board of directors of the health center, and three have been employed on the staffs of both agencies. The influence of the lay health advisor training program in developing self-empowerment was demonstrated by two participants testifying at a Federal hearing on farmworker housing. Three others have been motivated to continue their formal education.

Table 6. Practices to promote the health of migrant farmworker children, Tri-County Community Health Center, North Carolina

Practices	1985	1986	1987	Total
Developmental screen:				
Number of subjects	181	246	133	560
Percent screened	34	84	77	66
Percent not screened	66	16	23	34
Immunization status:				
Number of subjects	180	246	133	559
Percent complete	41	63	62	56
Percent incomplete	59	37	38	44

¹Data unavailable for 1 child.
NOTE: Chi square $P = 0.000$.

Table 7. Growth measurements of migrant farmworker children, Tri-County Community Health Center, North Carolina (percentages)

Characteristic	Weight-for-height percentile				Total (N = 513)
	10 or less (N = 47)	11-50 (N = 196)	51-89 (N = 179)	90 or more (N = 91)	
White	18	42	32	8	100
Black	10	32	38	20	100
Hispanic	7	40	35	18	100
Haitian	17	50	0	35	100
Total	9	38	35	18	100

NOTE: Data not available for 47 children.

Impact. As a consequence of these efforts, there was an increase in the number of women initiating care in the first trimester and in the proportion of women making nine or more prenatal care visits (table 9). Only data from the 286 patients with live births were considered in all analyses involving prenatal visits, since early pregnancy termination would affect the number of visits. Prenatal visits increased considerably from the 1986 mean of 7.4 to a mean of 9.7 in 1987. The proportion of women breastfeeding their newborns increased from 31 percent to 52 percent (14).

Migrant children made an average of three visits to the center each year. There was a significant decrease in the mean number of visits to the center among infants and 1-year-old children from 4.5 visits in 1985 to 3.1 visits in 1987. During the same period more children obtained preventive health services and the incidence of diarrhea decreased, which may in part explain the decline in mean number of visits.

Discussion

The data regarding the health status of migrant farmworker women and children collected by this demonstration project contribute to the knowledge of health needs of this population in general. While there have been several studies documenting the health status of

Table 8. Children of migrant farmworkers receiving minimum number of recommended food servings, Tri-County Community Health Center, North Carolina (percentages)¹

Food group	Number of servings per day					Total subjects (N = 138)
	0	1	2	3	4	
Milk-dairy	14	27	33	25	...	100
Bread-cereal	2	11	17	25	245	100
Meat-protein	2	14	284	100
Fruit-vegetable . . .	23	23	32	13	2 9	100

¹All ethnic groups combined.
²Recommended minimum number of servings per day for the food group.
 NOTE: Percentages may not total because of rounding.

Table 9. Health behaviors of migrant farmworker women, Tri-County Community Health Center, North Carolina (percentages)

Care characteristics	1985	1986	1987	Total
Prenatal visits¹:				
Number of women with visits ²	87	107	92	286
Percent with 1–2 visits	17	9	8	11
Percent with 3–5 visits	31	28	17	26
Percent with 6–8 visits	29	25	16	23
Percent with 9 or more	23	38	59	40
Prenatal care³:				
Number of women beginning prenatal care	113	134	112	359
Percent beginning at 0–14 weeks	41	44	51	45
Percent beginning at 15–27 weeks	42	29	37	36
Percent beginning at 28 or more weeks	17	27	12	19

¹Chi square $P = 0.000$.
²Data on women with live births only.
³Chi square $P = 0.021$.

migrant farmworkers in the Southwest, little has been written about migrant women and children in the rural east coast migrant stream. Because of the mobility of this population it is difficult to obtain complete and consistent data. Through extensive networking with other health care providers in the east coast stream, we were able to collect additional data on pregnancy outcomes, but data still could not be located on 11 percent of the sample prenatal population.

The finding that older maternal age was significantly associated with the incidence of low birth weight was consistent with national studies (15). Similar to other studies, self-reported dietary recall appeared to show little correlation with low birth weight. Since most women received iron supplements as well as iron-rich foods through the WIC program, hematocrit levels may have improved prior to delivery. Nonetheless, the high incidence (43 percent) of migrant women at risk for anemia appears to warrant further research.

Results of the analysis of growth percentiles with regard to stature of children were consistent with previous studies of migrant and Mexican American chil-

dren (16–20). The high incidence of obesity and anemia observed in this very young study population represents potential health risks. Despite gains in the number of migrant children whose immunization series was up-to-date during the project period, it was still lower than that of the Mexican American children reported in the Hispanic Health and Nutrition Examination Survey (HHanes) (21).

These data are useful in documenting the changing demographics in the east coast migrant farmworker stream from a large number of black Americans to a predominately Hispanic population. Centers need to examine closely the ethnic characteristics of the group to be served when designing a public health approach to the delivery of primary care services.

In this demonstration project, the center staff was seen as having focused in the past on the older black American single males who had been the major users of clinic services. Project staff members assisted center staff members in understanding the need for different types of services, devising new approaches in the delivery of care, and in creating innovative staffing patterns to serve the dramatically different Hispanic maternal and child population. With the implementation of the 1986 Immigration Reform and Control Act (IRCA) and expanded Medicaid coverage, an increasing number of Hispanics can be expected to use the migrant health centers.

The activities of the project coordinator also demonstrated the contribution that the position of coordinator of maternal and child health services can make to the improvement of quality of services. Because she was bilingual and a public health nurse, she had expertise in assessing the health and social needs of the target population as well as skill in coordinating services both within the center and with other agencies. Prior to the beginning of the project, no center staff member had been designated as responsible for coordinating maternal and child health services and there were no public health nurses on the staff. This project confirms the findings of earlier studies emphasizing the importance of providing appropriate referral and followup in the prevention of perinatal complications (22).

Many accomplishments of the demonstration project, however, were achieved through the multidisciplinary team efforts of project staff working with center staff. The task of employing qualified bilingual staff with public health training may present difficulties in some rural areas. The center's budget must provide adequately for salaries of personnel whose activities may not necessarily be reimbursed on the basis of patient-provider encounters. However, the resulting increase in utilization of care and the reduction in poor health outcomes makes the investment of extra funding cost effective.

Limitations in resources require health agencies to work closely to share knowledge and services so that the complex needs of the migrant population can be met. The project demonstrated how establishment of communication between the two systems of care, the migrant health center and the Title V maternal and child health programs, enriched the services available to migrant farmworker women and children and improved their health status.

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Measuring Tijuana Residents' Choice of Mexican or U.S. Health Care Services

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Synopsis

There is growing concern that the indigent health care burden in the southwestern United States may be caused partly by Mexican residents who cross the border to use U.S. health services. This article describes the first attempt to measure the extent of this use by border residents. It also compares factors associated with their use of health care services in both the United States and Mexico.

Data were obtained from a household survey conducted in Tijuana, Mexico, near the California border, using a random, stratified analytic sample of 660 households that included a total of 2,954 persons. The