

**EVALUATION OF THE TEXAS MIGRANT COUNCIL  
HEAD START YOUNGER SIBLING IMMUNIZATION PROJECT**

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# EVALUATION OF THE TEXAS MIGRANT COUNCIL HEAD START YOUNGER SIBLING IMMUNIZATION PROJECT

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## I. INTRODUCTION

From 1989 through 1991, there were 55,467 cases of measles in the U.S. resulting in 11,251 hospitalizations and 132 deaths.<sup>1</sup> Because measles is the most contagious of the vaccine-preventable diseases,<sup>2</sup> its presence signals a failure in the vaccine delivery system and suggests that substantial numbers of children are susceptible to pertussis, poliomyelitis, mumps and rubella.<sup>3</sup> The principal cause of the measles epidemic was failure to vaccinate vulnerable children on schedule.<sup>3</sup> While almost all children were fully immunized against these four diseases when they enter school, children were not getting immunizations early enough.<sup>4</sup> Further, the system failed to deliver age-appropriate immunizations to those infants in the population who are the most difficult to reach, the poor and otherwise disadvantaged.<sup>1</sup>

The national response to the measles epidemic includes efforts to improve coordination among various federal programs,<sup>5</sup> and a range of innovative strategies such as development of mobile services, provision of immunizations in public housing and hospital emergency rooms,<sup>6</sup> and strengthening of immunization services for students in Head Start projects.<sup>5</sup> This report results from one of these federally supported efforts.

The Texas Migrant Council (TMC) administers more than twenty-eight Head Start centers in the South Texas area, of which twenty-three are in the Lower Rio Grande Valley counties of Starr, Hidalgo, Cameron and Willacy. Other sites are in Laredo, San Antonio, and three rural communities near San Antonio (Dilley, Devine and Pearsall). The centers provide child care and early educational opportunity for children of migrant farm workers.

In October, 1992, the TMC received federal funding to identify and immunize younger siblings of their Head Start pupils in eight South Texas counties over a seventeen month period in collaboration with the Texas Department of Health (TDH) Public Health Region 11 (PHR11) and other providers. TMC staff searched family records at each Head Start center for younger siblings of Head Start students, contacted their parents, reviewed their immunization records, and provided immunizations. Outreach included direct and telephone contact with parents of target children and general advertisement in their neighborhoods.

The project was implemented in two phases over two school years. In the Spring of 1993, the TMC offered immunization clinics at its Head Start centers. Early in the second phase (Oct. 1993 - Feb. 1994), TMC staff became dissatisfied with clinic attendance, and hired a pediatric nurse practitioner to deliver services directly in the homes of the target children.

This evaluation of the project examines its relevance, progress, effectiveness, efficiency and impact.<sup>7</sup> The project's relevance is considered in terms of its appropriateness in light of immunization policies in the U.S. and Mexico; the organization and availability of immunization

services in the community; the predisposing, enabling and need characteristics of the population; and their utilization of immunization services.<sup>8,9</sup> Evaluation of the project's progress considers processes of project development and implementation. Effectiveness and efficiency consider the extent to which the TMC delivered the planned services and the level of effort involved. Project impact is evaluated in terms of immunization coverage achieved among the target children. Study questions are as follow:

**Relevance - Is the project relevant to the immunization problem?**

**Progress - How well did the project progress in its development?**

**Effectiveness - Did the project effectively reach the target population?**

**Efficiency - Was productivity appropriate to level of effort?**

**Impact - Did the project improve immunization coverage among the target children?**

## II. METHODS

Research methods include: (1) assessment of the existing immunization services delivery system, (2) analysis of clinic logs, and (3) development and analysis of a statistical data base on the target children.

In order to learn about the existing system of immunization services, in December, 1993, the evaluator interviewed representatives of the TDH Immunization Division; PHR11 in Harlingen; three local health departments (LHDs) serving Cameron, Hidalgo and Webb (City of Laredo) counties; and five community health centers (CHCs), including migrant and rural centers, serving Cameron, Willacy, Hidalgo, Starr and Webb counties. These counties are adjacent to the Mexican state of *Tamaulipas*, and the neighboring populations mingle. Thus, the evaluator also met with representatives of three *jurisdicciones sanitarias* in *Matamoros*, *Reynosa* and *Nuevo Laredo* serving ten *municipios* along the Texas-*Tamaulipas* border. No private practitioners were contacted.

About two dozen individuals participated in interviews which lasted half an hour to an hour. The interviewees were administrators, medical or nursing directors, or some combination. Some nursing staff and a community service aide participated. No interviews were refused. All were conducted in person, except the interview with the TDH Immunization Division. A translator assisted in Mexico.

The respondents were asked open-ended questions intended to stimulate discussion of policies which guide the immunization service system; service availability, organization and utilization; and characteristics and needs of target populations and populations served. Analysis of the relevance of the TMC project begins with summary of comments of the interviewees, and then reviews TMC project strategy and its target population in light of their comments.

The primary information source, however, was an immunization data base with records describing each target child identified during the project. TMC staff reviewed family records of enrollees at each Head Start center. For each younger sibling identified, data were collected on the child's date of birth, family size, education and income of householder, Medicaid status, and

main language spoken within the family. Then TMC staff contacted parents and collected data from the child's immunization card on dates and types of each dose, and these records were updated as immunizations were delivered to the children. Also, TMC staff maintained records of clinics and home visits provided, including dates of service, doses administered and individuals served.

In this evaluation, family information is reviewed to verify the relevance of the target population to the immunization problem in the region. Records from clinics and home visits are examined to evaluate the progress of the project and its effectiveness in delivering vaccines. Then, the dates of birth and dates of the respective immunizations of the children are analyzed in order to evaluate project impact in terms of immunization status of the children.

Service delivery programs are often difficult to evaluate because there is no reasonable control group for comparison. However, the two-phased implementation of the TMC project, while not random in allocation of subjects across groups, offers the opportunity for comparison of immunization coverage among children from the initial phase with histories of children from the second phase.

During the project, TMC staff identified 1,241 younger siblings of Head Start students. Of these, 725 were identified during the first school year, and an additional 516 were identified in the second. Of the target children identified in the first year, 227 returned in the second. Of those, 192 continued to meet criteria for inclusion. The other 35 which returned entered the Head Start program and were no longer eligible for study.

Assessment and subsequent tracking were hampered by the mobility of the target population. In the first school year, the families of 198 target children moved away from the area during project implementation. These children were included in analysis of demographic data, but were excluded from analysis of immunization histories. Also, parents of fifty target children simply did not cooperate with the staff, and these children also were excluded from analysis of immunization histories. The immunization histories of 477 first-year children remained as eligible for study.

In the second year, services were initiated earlier in the school year, and less children moved away. Staff conducted 414 initial assessments in the second year. This figure includes 379 children from new families in the second year, and 35 newly identified younger siblings from returning first year families. The TMC also conducted 163 second year assessments of children who returned from the first year and who still met the target group definition. In total, immunization histories of 891 individual children were available for study, including both first and second year children.

Data analysis considers immunization status with comparisons across three study groups: (1) the children from first-year families who did not return in the second year, (2) children from first-year families who returned in the second year, and (3) children new in the second year. Immunization status on each child's second birthday is examined with the study groups each divided into four sub-groups: children who turned age two (a) prior to first-year implementation, (b) during first year implementation, (c) between the first and second year, and (4) during second year implementation. Additional analysis examines immunization status within age ranges for each of the groups on the respective start and stop dates for the two project service delivery phases - 1/1/93, 6/1/93, 10/1/93 and 3/1/94.

### III. THE IMMUNIZATION SYSTEM

#### A. Immunization Policy

In the United States, health insurance is generally acquired by virtue of employment. Workers and their employers typically share the cost of insurance purchased from the private sector. Health care is provided by a mix of proprietary, voluntary and public providers. The system is supplemented by federal Medicare for the elderly and federal/state Medicaid for the indigent. Vaccinations are not usually covered by private health insurance. Texas Medicaid reimburses for immunizations when provided as part of an Early and Periodic Screening, Diagnosis and Treatment (EPSDT) visit.

In the border counties studied, five federally funded and locally administered CHCs offer family outpatient services for both insured and uninsured persons. The CHCs and three LHDs also offer services funded by categorical federal, state and local programs. These include the Women, Infants and Children (WIC) nutrition program; family planning services; well child programs such as EPSDT; and prenatal care such as that funded under the Texas Maternal and Infant Health Improvement Act (MIHIA). Immunizations are provided in the private sector and by CHCs, but the LHDs and PHR11, by the nature of their mandates, provide the foundation for the immunization service system. PHR11 distributes vaccines to public and non-profit providers in the region and compiles data on service delivery submitted by participating agencies.

In Mexico, health insurance programs are administered by federal social security agencies which cover workers and their families in the private, public, energy and military sectors. The government, employers and employees contribute toward insurance premiums. These agencies also provide inpatient and outpatient medical care. Health care for the indigent and public health services are provided by the cabinet-level *Secretaría de Salud* which, in collaboration with state units and local, multi-municipio *jurisdicciones sanitarias*, sponsors an extensive network of small clinics often staffed by newly graduated health care professionals as part of their national public service. Mexico's largest social security agency, for private sector workers, also administers an indigent care program. All of these agencies provide immunizations to their respective target populations. Since 1986, immunization campaigns have been held each February and April. In October, 1992, the *Secretaría de Salud* completed a national, sixteen month, door-to-door immunization campaign.

In Texas, at the time of TMC project initiation, the recommended immunization schedule called for a series of vaccinations beginning at age two months to protect against diphtheria, tetanus, pertussis (DPT), polio and bacterial meningitis (*haemophilus influenzae* type b - Hib). These were repeated at four months; all but polio at six months; and all at fifteen months in addition to vaccination against measles, mumps and rubella (MMR). All of these, except Hib, were given between ages four and six. In early 1994, the third polio was moved from fifteen to six months, the fourth DPT and the MMR moved from fifteen to twelve months, and Hepatitis B was added at birth, two months and six months.

The recommended vaccination schedule in Mexico differs from the one that we use. B.C.G. is given soon after birth to protect against tuberculosis. Infants are immunized against diphtheria, pertussis, tetanus and polio at ages two, four and six months; and measles at nine months. Vaccination for diphtheria, pertussis and tetanus is given at two and four years; measles at six years; and B.C.G. when children enter school.

Immunization programs in South Texas employ federal, state and local funds. TDH purchases the vaccines. Small fees or donations are asked of consumers, but frequently are waived. The recent immunization campaign in Mexico, like most Mexican public health programs, was federally financed and coordinated, although civic groups assisted with vaccines. The Mexican public health clinics charge \$2 for visits, but there is no charge for family planning, chronic disease, medications or immunizations.

## B. The Service Delivery System

All five counties have immunization services available. In addition to services offered in the private sector and by a few school districts, intensive activity is sponsored by PHR11 and the LHDs. All of the CHCs provide vaccinations except the one in Starr county. At the time of the interview, that agency had no medical director for two years. Their EPSDT and other patients were referred to a clinic offered by PHR11 at another location.

The three LHDs operate fifteen clinics in the region. At the time of interview, each offered immunization services at least two days per week. The Brownsville and Laredo clinics and those in the more populous cities in Hidalgo county offered immunizations daily. Two of the Hidalgo clinics had evening hours. The Laredo clinic also offered immunizations three evenings per week. These clinics operate on a first-come first-served basis. The clinic waiting times for the patient vary -- sometimes ten to fifteen minutes, often 45 to 90 minutes, and as much as three hours when school starts. All of the LHDs offer immunizations at remote locations, often in the *colonias* or schools. Hidalgo has a van for minor primary care which provides immunizations; and five immunization aides which survey in the colonias and recruit for evening clinics. Remote clinics often entail collaboration with other entities such as schools, day care providers, churches or PHR11. All of the LHDs incorporate immunizations into their other activities such as well-child care and adult health.

Organized to provide family outpatient care, the CHCs offer immunizations within the context of routine, scheduled pediatric care. The CHCs operate thirteen clinics in the five county area. The clinics are open daily. Su Clínica in Cameron and Willacy counties and Gateway in Laredo offer evening hours one day per week. At the time of interview, the Hidalgo facilities offered immunization clinics on alternate Friday afternoons. The Brownsville CHC offered student immunization clinics once or twice per semester, and pediatric immunization clinics twice a year. The Laredo CHC had formerly offered a regular immunization clinic, but no longer did so. The CHCs are EPSDT providers and, except in Starr County, provided immunizations during EPSDT visits. Gateway, in Laredo, sometimes offered immunizations along with WIC. Education regarding immunizations is a component of WIC and family planning services. The CHCs also participate in various outreach efforts. For example, the Brownsville CHC works with schools, and both the Brownsville and Laredo CHCs have offered immunizations to Head Start students and at health fairs.

PHR11 serves not only as a regional extension for the state health department, but also to fill service gaps in areas with no local health department. As an arm of the state health department, they try to assure that the system successfully protects the population, and they collaborate with other agencies to reinforce participation in the immunization service system. As a provider of services, they tend to emphasize under-served areas, especially the rural counties located between San Antonio and the border area.



The LHDs and PHR11 often collaborate in organizing remote immunization clinics. In many cases, target sites for remote immunization clinics are identified by PHR11. Then, PHR11 arranges the clinic and the LHD provides staff. Remote clinics are preceded by public service announcements in English and Spanish media. Fliers may be distributed to parents through the schools -- this works better in elementary schools than upper grades -- and posters are displayed at stores and other locations in the target area. In the *colonias*, public information may include door-to-door outreach. Remote clinics may be accompanied by neighborhood surveys, but these are limited by summer and winter weather, and, during outbreaks, the need to devote staff to investigations. The Hidalgo LHD said that such special clinics always attract more than 100 people. The PHR11 outreach staff said that the best time for remote clinics is after school into the early evening. In summer, they can go later.

Almost all persons interviewed were dissatisfied with availability of health care personnel. Some expressed their concern in terms of their agency's budget limitations. Others noted that the region in general has a shortage of health care professionals, and this hampers efforts to fill budgeted positions.

Public health nursing staff tend to be *comprehensive nurses*, and are not usually distinguished by program or activity. Thus, it is difficult to determine the extent of staffing resources devoted to immunizations. At the time of the interview, the Laredo LHD had one full-time immunization nurse. TDH had recently increased funding of immunization services offered by the Cameron and Hidalgo health departments; Hidalgo added two LVNs to provide immunizations during WIC clinics, and Cameron hoped to add two nurses. All LHD representatives indicated that they were short on staff, and one described the PHR11 immunization office as chronically understaffed. Because of the recent measles epidemic, TDH added three staff to PHR11 for a Border Measles Initiative.

The CHCs differed greatly in their resources. Brownsville had five pediatric nurses, and had hired an individual just for immunization screening and administration, although that person's time became spread across various activities. At the time of interview, the Starr CHC had an LVN, but no medical director or registered nurse. Three of the CHC representatives commented on frequent turnover among medical staff. The Hidalgo CHC has had difficulty finding a pediatrician. The agency lost eight physicians and only recently recovered some of those staff. Gateway suspended well-baby services because of staff shortages.

The PHR and LHDs use a color-coded card system to track immunization needs. The cards are reviewed monthly to identify those who are behind. The parent is then called and/or sent a reminder card. Follow-up sometimes entails a home visit, but normally, after two reminders, there is no more follow-up. The Hidalgo LHD also audits day care and school records.

In the CHCs, routine pediatric appointments usually are scheduled to coincide with immunization target dates. Thus, tracking of immunization status is incorporated into the appointment system. When the customer comes to the clinic, records are screened and immunizations updated. If a child misses an appointment, the tickler system flags the individual for follow-up. The parent usually is called or, if not reached by phone, a reminder card is sent.

The agency staff named a variety of obstacles to provision of immunization services in the region. These include informed consent requirements, decreased participation by schools, and

limits by providers to services on certain days, at certain hours, or so many clients per day. Staff shortages, particularly in Laredo, were mentioned. Over the years, the immunization workload has increased. Among the causes are population growth, expanded informed consent requirements, and perhaps expansion of the recommended vaccination schedule. In addition, certain peculiarities of the border region occupy the time of immunization providers. Among these are:

- (1) Relatively large number of children,
- (2) Increased risk of public exposure to some diseases;
- (3) Added handling of medical records of immigrants and commuters;
- (4) Increased need for translation;
- (5) Added activity immunizing against mumps and rubella among Mexican immigrants and commuters (mumps and rubella immunizations are not given in Mexico);
- (6) Added follow-up on ambiguous or positive P.P.D. readings (results from B.C.G. administration in Mexico);
- (7) Heightened need for outreach among a decidedly high-risk population; and
- (8) Rapid population growth.

Documentation of histories and consent may be complicated if the child is not living with the legal guardian. Sometimes the accompanying adult is not familiar with the child's health history; or, if the family recently entered the country, there may be no health history. Often, the consenting adult cannot read. Children from Mexico may have no records, or their records may be poorly maintained. One school district reportedly does not accept immunization records from Mexico without official (local health department) translation.

Some interviewees expressed concern about coordination of immunization services with WIC. The U.S. Department of Agriculture does not fund WIC staff to provide immunizations, and local agencies try to assign additional staff to WIC clinics to provide that service. At the time of interview, the Laredo health department offered immunizations during MCH and WIC clinics at its main facility, but not at WIC satellite clinics. The Hidalgo LHD referred WIC customers to another office in the same building. Since the time of the interview, the respective federal agencies for agriculture and health have improved collaboration and the Texas Department of Health launched an aggressive effort to immunize WIC children.

The public health authorities in Mexico operate health centers located in the principal cities and a large number of smaller, satellite clinics. The eight *municipios* from *Río Bravo* to *Nuevo Laredo*, for example, have two large health centers and 23 neighborhood clinics. The clinics are staffed with a doctor, a nurse, and a health *promotor*. Their services are generalized to provide geographic, not functional, division. They are open daily until 3:30 p.m. and operate on a walk-in basis.

For the recent immunization campaign, lower income areas in each *municipio* were divided into neighborhoods. The clinic staff, typically a nurse, *promotor* and auxiliary (often a volunteer), went door-to-door within each neighborhood. Almost all public health staff participated. The process included computer tracking of individuals and follow-up. Interviewees from Mexico considered the campaign highly successful and recommended its replication in the U.S.

There is some interaction across the river. For example, when Mexican health authorities encounter a U.S. resident with a reportable disease, they notify their U.S. counterparts.

### C. The Population at Risk

Researchers have identified a variety of characteristics which correlate with inadequate immunization histories among children. These include low income and low educational attainment of parents,<sup>1,10-15</sup> large family size,<sup>1,10-11,14</sup> ethnic minority status<sup>1</sup> particularly Hispanic<sup>16</sup> children of migrant farmworkers,<sup>13</sup> inadequate insurance coverage,<sup>1,13</sup> and having an older sibling.<sup>12</sup>

Most of the project activity took place in three counties on the southern tip of Texas. While no single city in the region is particularly large, the counties and neighboring *municipios* together constitute a major metropolitan area with almost 1.5 million people. About two-thirds of a million people live in the U.S. counties. The region is characterized by rapid population growth, low incomes, lack of formal education, large families and a predominately Hispanic population.

Table 1. Selected Border Area Population Data

	Main Target Counties <sup>a</sup>	Neighboring Municipios <sup>b</sup>
Total Population, 1990	684,183	785,345
Population Increase Since 1980	31 %	24 %
Percent of Population with Income Below Poverty Level, 1989	42 %	
Percent of Housing Unit Occupants without Drainage to Public Sewer or Septic Tank, 1990		44 %
Percent of Persons Ages 25+ with High School Completion, 1990	47 %	
Percent of Persons Ages 15+ with Primary School Completion, 1990		69 %
Average Persons per Household, 1990	3.6	4.5
Hispanic Origin as Percent of Population, 1990	85 %	
Estimated Percent of Lower Income Women with Health Insurance, 1990	52 % <sup>c</sup>	
Estimated Percent of Women with Health Insurance, 1990		50 % <sup>d</sup>

<sup>a</sup> Cameron, Hidalgo and Starr counties - Counties with multiple Head Start sites.

<sup>b</sup> *Municipios* of Matamoros, Valle Hermoso, Río Bravo, Reynosa, Díaz Ordaz, Camargo and Miguel Alemán.

<sup>c</sup> Estimate based on cluster sample in lower income neighborhoods of Cameron County.

<sup>d</sup> Estimate based on community survey in Nogales, Sonora.

Sources: 17-21

The immunization providers interviewed in the U.S. counties were unable to provide definitive data on the immunization status of children in the area. Estimates of immunization coverage were based on experience, sometimes substantial, with neighborhood surveys that accompany immunization outreach. Estimates of preschool coverage ranged from 20% to 60%. An historical study of kindergarten children in El Paso in 1991-92 found that 45% were adequately covered by their second birthday with 4 DPT, 3 polio, and 1 MMR vaccination.<sup>22</sup>

The Mexican health agencies provided statistics from their 16-month intensive campaign in lower income neighborhoods in six *municipios* from Matamoros to Camargo. They administered more than 300,000 doses and, with tracking software provided from Mexico City, assured that

95% of children ages 1-4 encountered by the campaign were fully immunized for age as of October, 1992. The 36,300 children ages 1-4 who were counted as up-to-date constituted about half of the 1990 census count of children of those ages. These figures do not include routine immunizations provided by Mexico's social security agencies. Mexico's federal health agency estimated that 90% of children under age five in the state of *Tamaulipas*, who were targeted by their Universal Vaccination Campaign, were up to date as of July, 1992.<sup>23</sup>

The immunization providers interviewed presented a range of reasons why people do not immunize their children. Almost all of the respondents on the U.S. side and one from Mexico said that their target populations have problems with transportation to services. Six respondents also cited a lack of a sense of urgency, particularly among young adult parents who have little direct experience with vaccine preventable diseases. Two said that, when the presence of measles became known, parents actively sought immunizations for their children. Another said that, even if the parents don't see the importance, the grandparents, with their longer memories, will bring them in. Two said that immunizations can be inconvenient for busy people. Two U.S. respondents, and two from Mexico, cited fear of reactions to the vaccines, but another two respondents pointed out that such resistance is more common among educated professionals, and there is little resistance from the poor; and two said that there is little concern or fear regarding the vaccines. Two respondents said that many people view immunizations as a school related activity. Three cited a general lack of education and awareness. Three respondents, and one from Mexico, said that illegal aliens might tend to avoid U.S. public health authorities. While several people commented on the extensive poverty in the area, they were more concerned about associated conditions such as lack of awareness, misinformation and lack of transportation than with lack of income. Two respondents were concerned about broad changes in societal values and structure.

The measles outbreak in the region in recent years seems to have subsided. In 1992, Hidalgo county was hard hit, but Cameron and Webb had few cases, although these counties may have been partly protected by outbreaks in earlier years. The ten neighboring municipios participated in the 1988-91 epidemic, but saw less than a dozen cases in 1992.

The Mexican border states report large numbers of rubella cases each year. Immunization providers report that a couple of cases of rubella surface in the U.S. border counties annually.

**Table 2. Vaccine Preventable Diseases Reported in Texas and Tamaulipas, 1990**

	Texas		Tamaulipas	
	Cases	Rate/100,000	Cases	Rate/100,000
Diphtheria	0	--	0	--
Poliomyelitis <sup>a</sup>	2	< 0.1	0	--
Measles <sup>b</sup>	4339	25.5	2057	91.4
Tetanus	7	< 0.1	19	0.8
Pertussis	158	0.9	33	1.5
Mumps	470	2.8	4096	182.1
Rubella	99	0.6	3241	144.1

<sup>a</sup> In U.S., paralytic polio.  
<sup>b</sup> In U.S., indigenous measles.

Sources: 17-18,24-25

## **IV. THE YOUNGER SIBLING PROJECT**

### **A. Relevance**

The design of the TMC immunization project incorporates the preferred public health approach of multi-sectoral collaboration and participation. The project strategy includes case-finding, outreach, education, tracking and follow-up. Further, the project's neighborhood based clinics and home visits offer services which are physically close to the target population and in a familiar environment.

The TMC verified that their target population is at high risk of failure to immunize. Retrospective evaluation of immunization records of Head Start students in the 1991-92 school year found that 40% were fully covered by their second birthday with four DTP, three polio and one MMR vaccination.

The Head Start Younger Sibling project identified 1,241 target children living in 1,056 households. Average family income was \$7,746 and median family income was \$7,097 (based on 933 families). The average education attained by the highest educated persons in the respective families was 9.6 years (based on 934 households). Average household size was 5.2 persons -- greater than the average of the border counties and greater than the average in neighboring Mexico. Only three of the children lived in households with a non-Hispanic householder. Mainly Spanish was spoken in 56% of the children's households, mainly English in 8%, and both languages in 36% (based on 1065 children). Seventy-four percent of the children were enrolled in Medicaid (857/1132).

TMC staff contacted parents or guardians of 1,004 of the target children. For 74% of the children, the parent identified the health department as the usual source of immunization, 20% private physician, and 6% other (based on 756 children). Among those who responded, parents of 93% of the children expressed interest in TMC immunization clinics (721/778). Parents of 71% of the children favored clinic hours during school, 26% preferred clinic hours after school, and 3% favored both (based on 476 children). When asked if transportation is a problem, parents of 21% of the children said yes (126/604).

During the project, TMC staff assessed immunization status of 891 children, and found that 55% (491) were behind recommended schedules at the time of initial assessment.

### **B. Progress**

In total, the TMC sponsored 45 immunization clinics and an additional 32 home visit outings. Twenty-six of the clinics were offered in the first school year, of which 23 were at TMC Head Start facilities. Nineteen clinics and all of the home visit outings took place in the second year. On four occasions, the pediatric nurse practitioner provided services to TMC children and others at the centers on the same day as a home visit outing. Table 3 shows monthly progress of the project according to the number of clinics and home visit outings, and the number of immunization contacts with target children.

The immunization project was funded in October, 1992. In the final months of 1992, TMC staff developed coordination with PHR11 nursing staff, received training by PHR11, and reviewed Head Start enrollment records to identify target children and compile demographic data on their

families. Immunization services were initiated in January. In mid-1993, the Head Start centers closed for summer vacation. During this period, follow-up letters were mailed to public health authorities at known destinations of the migrant families. When the students returned in the Fall, only a month was needed for updating of family records and the project began service delivery in October. The project ended in February, 1994.

Early in the Fall of 1993, the TMC moved from what had been a clinic based strategy for service delivery to a home visit strategy. In the first school year, the average clinic had produced more than five immunization contacts with target children. However, in October, 1993, the average clinic produced only 2.5 target contacts. Subsequently, the average home visit outing produced 3.3 immunization contacts with target children, and initiation of home visits in the second year enabled the project to exceed the previous year's level of production. TMC staff were not certain about the reasons for poor clinic showing in the second year.

In the first year, only one clinic was offered after 5:00 p.m. However, five of the clinics lasted until 5:00 p.m., and nine clinics lasted until 4:00 p.m., suggesting that the preference of 26% of the parents for after-school hours was accommodated. Another four clinics lasted until 3:00 p.m., and two lasted until 2:00 p.m. The remaining five clinics ended by noon.

In October of the second year, almost all of the clinics were offered in the morning. Thus, the change from afternoon to morning services may account for decreased clinic participation in the second year. Indeed, on follow-up with 160 parents who were invited to bring children to first-year clinics, but did not attend, 26% (42) indicated that they *had other business*, and 19% (31) said that they could not attend because the *parent was working*. An alternative explanation for the decline in clinic attendance might be that need for services had decreased.

Data from initial contacts with parents indicate that transportation is a problem for one in five parents. However, in the first year, only 35 individuals, including children and families, accepted TMC offers of transportation assistance. On follow-up, of 160 parents who gave reasons for non-attendance, less than 9% (14) cited *lack of transportation*.

**Table 3. Monthly Progress in Delivery of TMC Immunization Project Services**

Month	Clinics		Home Visit Outings		Total Target Contacts
	Number Offered	Target Immunization Contacts	Number Offered	Target Immunization Contacts	
Jan 93	1	2			2
Feb 93	5	57			57
Mar 93	2	10			10
Apr 93	5	14			14
May 93	13	58			58
Year 1	26	141			141
Oct 93	11	27			27
Nov 93	2	3	10	32	35
Dec 93	1	1	7	25	26
Jan 94			3	13	13
Feb 94	5	16	11	35	51
Mar 94			1	1	1
Year 2	19	47	32	106	153
Total	45	188	32	106	294

### C. Effectiveness

The TMC project proposal states that just over 800 target children would be identified by the project. Over the two year project, 1,241 target children were identified. The proposal indicates that parents of 80% of the target children would be exposed to educational materials and activities emphasizing the importance of immunizations. During the project, TMC staff made contact with parents of 81% of the children (1004/1241). Over the two year period, the TMC assessed immunization histories of 891 unduplicated target children. Forty-five percent (400) were current at the time of initial assessment. The project produced 294 immunization contacts with target children and delivered 794 doses to those children.

**Table 4. Immunization Contacts - Includes PPD Administration**

	First Year Clinics	Second Year Clinics	Second Year Home	Total
Target Children	141	47	106	294
Non-Target Children under Age 4	72	55	20	147
Non-Target Children Ages 4 and 5	147	146	45	338
Non-Target Children Ages 6-17	55	3	4	62
Adults	444	98	28	570
<b>Total</b>	<b>859</b>	<b>349</b>	<b>203</b>	<b>1411</b>

In the first year, there were 141 immunization contacts (including PPD administration) with 127 target children. Among the 127 target children served were 91 children who had been identified at the onset of the project, and 36 children with older siblings who entered the Head Start program during the school year. Attendance by family members and neighbors was substantial, and included 274 immunization contacts with non-target children and 444 contacts with adults (see Table 4).

In the second year, as emphasis shifted from clinic to home based services, the volume of services to adults diminished. However, volume of service contacts with non-target children under age six did not appreciably change. In total, the project produced 1,411 service contacts.

**Table 5. Doses Administered**

	Target Children	Others	Total
Diphtheria-Pertussis-Tetanus (DPT)	225	196	421
Polio	192	197	389
<i>Haemophilus influenzae</i> type b (Hib)	184	49	233
Measles-Mumps-Rubella (MMR)	97	370	467
Singles Measles	36		36
Hepatitis B	51		51
Tetanus	1	362	363
Other	8	230	238
<b>Total</b>	<b>794</b>	<b>1404</b>	<b>2198</b>

The project delivered a total of 2,198 doses of vaccine, including 794 doses given to target children and 1,404 to others. Among target children, the most common vaccine given was DPT (diphtheria-pertussis-tetanus), followed by polio and Hib. Among other participants, the most common vaccine was MMR (measles-mumps-rubella), followed by tetanus (see Table 5).

In addition, the project administered 718 PPD tests for tuberculosis exposure. Of 572 readings, fifteen were positive.

**Table 6. PPD Administration**

	Target Children	Others	Total
Administered	25	693	718
Negative	5	552	557
Positive	0	15	15
Not read	20	126	146

#### D. Efficiency

There is some evidence that productivity in the second year exceeded that in the first year (see Table 7). The staff were able to contact about the same proportion of target parents in each year (80% and 82% respectively). However, while in the first year 66% of identified target children were assessed, by the second year 80% of identified children were assessed. Children assessed in the second year were twice as likely to be up-to-date as those assessed in the first year. In the first year, the project produced about four target immunization contacts for every ten children assessed as behind schedule. By the second year, the project produced almost six target contacts per assessed child in need.

**Table 7. Selected Measures of Change in Project Efficiency Over Time**

	Year 1	Year 2	Total
Initial Contacts with Parents As Percent of Identified Target Children	80% (580/725)	82% (424/516)	81% (1004/1241)
Children Assessed as Percent of Identified Target Children	66% (477/725)	80% (414/516)	70% (891/1241)
Children Current as Percent of Target Children Assessed	29% (138/477)	63% (262/414)	45% (400/891)
Ratio of Target Immunization Contacts to Target Children Behind Schedule	.42 (141/339)	.58 (152/261)*	.60 (293/491)

\* Denominator includes 152 new second year children and 109 returnees.



## E. Impact

The immunization schedule at the time of project inception recommended that, by age fifteen months, children should received four vaccinations against diphtheria-pertussis-tetanus (DPT), three for polio, and one for measles-mumps-rubella (MMR), known as the 4-3-1 schedule. Also recommended are four shots against *haemophilus influenzae* type b (Hib), the 4-3-1-4 schedule. Table 8 compares three groups of target children for completion as of their second birthday for each of these schedules. Underlined numbers identify those children with second birthdays during periods of exposure to the project.

Among the first year target children who did not return in the second year, of 107 children who had their second birthday prior to project implementation, 38% (41) had completed the 4-3-1 schedule by their second birthday. Of the 60 study children who had their second birthday during the project period, 42% (25) had completed the 4-3-1 schedule by their second birthday. The percentage increase in coverage is relatively greater when Hib is added to the requirement.

The first year target children who returned in the second year were exposed to the intervention over two periods. This group includes returning children who continued to meet eligibility criteria for the target group, and it includes newly identified younger siblings from returning families. Within this group, those with their second birthday during implementation were more likely to be up-to-date than children with second birthday in the period before implementation. Further, those with second birthday in the second phase of the project fared better than those with second birthday during the first phase, suggesting either secular trend in the community or year-over-year project effects. The return group appears substantially advantaged with respect to those from the first year who did not return.

Among the children who were new in the second year, those with second birthday during the period of exposure to the project were more likely to be up-to-date than children with second birthday before exposure to the project. Further, coverage among those with birthday just before second year implementation was similar to coverage among those in the first-year group with birthday just before their first year participation. This suggests that any secular changes in the community are minor in relation to the effects of the immunization project.

**Table 8. Percent Up-to-Date on Second Birthday: First Year Non-Return Group, First Year Return Group, and Second Year New Group by Time Period of Second Birthday**  
 --- Underlined Figures Indicate Second Birthday During Period of Exposure to Project ---

		First Year Non-Return	First Year Return	New Second Year
<b>4 DPT, 3 Polio and 1 MMR by Second Birthday</b>				
Second Birthday:	Before 1-1-93	38% 41/107	58% 7/12	44% 4/9
	1-1-93 to 5-31-93	<u>42%</u> 25/60	<u>75%</u> 12/16	23% 4/17
	6-1-93 to 9-30-93		65% 22/34	31% 13/42
	10-1-93 to 2-28-94		<u>80%</u> 37/46	<u>59%</u> 33/56
<b>4 DPT, 3 Polio, 1 MMR and 4 Hib by Second Birthday</b>				
Second Birthday:	Before 1-1-93	10% 11/107	17% 2/12	11% 1/9
	1-1-93 to 5-31-93	<u>25%</u> 15/60	<u>56%</u> 9/16	17% 3/17
	6-1-93 to 9-30-93		44% 15/34	21% 9/42
	10-1-93 to 2-28-94		<u>65%</u> 30/45	<u>55%</u> 31/56

**Table 9. Percent Up-to-Date for 4 DPT, 3 Polio, 1 MMR and 4 Hib by Age Groups:  
First Year Non-Return, First Year Return, and Second Year New Groups by Status on Selected Dates  
--- Underlined Figures Indicate End of Period of Exposure to Project ---**

Age Range	Percent Current on	First Year Non-Return Group	First Year Return Group	New Second Year Group	
<b>2 through 3 months:</b>	1-1-93	40%	6/15	60% 6/10	35% 12/34
	6-1-93	---	---	<u>46%</u> 6/13	48% 15/31
	10-1-93			40% 2/5	58% 14/24
	3-1-94			<u>33%</u> 1/3	<u>50%</u> 3/6
<b>4 through 5 months:</b>	1-1-93	47%	8/17	21% 3/14	17% 4/24
	6-1-93	<u>0%</u>	0/5	<u>33%</u> 1/3	48% 10/21
	10-1-93			12% 1/8	44% 17/39
	3-1-94			<u>0%</u> 0/5	<u>67%</u> 6/9
<b>6 through 14 months:</b>	1-1-93	33%	24/72	47% 34/72	37% 37/99
	6-1-93	<u>25%</u>	16/64	<u>51%</u> 25/49	36% 39/109
	10-1-93			41% 17/41	49% 58/119
	3-1-94			<u>52%</u> 15/29	<u>52%</u> 61/117
<b>15 through 23 months:</b>	1-1-93	13%	13/100	15% 8/52	7% 4/61
	6-1-93	<u>27%</u>	22/83	<u>32%</u> 27/84	21% 21/101
	10-1-93			41% 30/74	36% 36/100
	3-1-94			<u>40%</u> 17/43	<u>35%</u> 37/106
<b>24 through 35 months:</b>	1-1-93	16%	16/99	25% 3/12	11% 1/9
	6-1-93	<u>29%</u>	40/137	<u>44%</u> 11/25	23% 6/26
	10-1-93			53% 30/57	29% 20/68
	3-1-94			<u>63%</u> 55/87	<u>59%</u> 63/106
<b>36 through 47 months:</b>	1-1-93	0%	0/7	---	---
	6-1-93	<u>4%</u>	1/27	<u>33%</u> 1/3	50% 1/2
	10-1-93			20% 1/5	0% 0/1
	3-1-94			<u>31%</u> 4/13	<u>25%</u> 3/12
<b>Total: 2 through 47 months:</b>					
	1-1-93	22%	67/310	34% 54/160	26% 58/227
	6-1-93	<u>25%</u>	79/316	<u>40%</u> 71/177	32% 92/290
	10-1-93			43% 81/190	41% 145/351
	3-1-94			<u>51%</u> 92/180	<u>49%</u> 173/356

Table 9 looks at immunization status on four selected dates for the three study groups with disaggregation of the data by age groups. The immunization criteria increase with age. The age 2-3 month groups should have 1 DPT, 1 polio and 1 Hib; those ages 4-5 months should have two of each; those ages 6-14 months should also have a third DPT and Hib; and those ages 15 months and older should have 4 DPT, 3 polio, 4 Hib and 1 MMR.

The numbers of children in the age 2-3, 4-5 and 36-47 months ranges are too few for meaningful analysis. Among the age 6-14 and 15-23 months children, there are no clear program effects, a finding which is complicated by the increasing criteria for success as the children age.

Among the two-year-olds, however, program effects are substantial. Children who were in that age range at the end of a period of exposure to the project were more likely to be fully immunized than children in that age range at the beginning of the period of exposure.

## V. DISCUSSION

On the whole, the project employs a strategy which appears useful as a method for reaching high-risk children at an early age, and public health professionals elsewhere in the nation should consider whether their communities might benefit from its replication. The strategy targets a population having characteristics which are recognized as being associated with high risk of failure to immunize -- low family income, low education of parent, large family size, Hispanic household, and children of migrant farmworkers.

Two issues emerged during project implementation. First, services in the initial project year were not deployed as rapidly as expected. This partly resulted from time required to establish cooperation with PHR11 nurses and to train TMC staff, and partly from the need for collection of family information from Head Start enrollment records. In future years, if the TMC continues the project, the evaluator recommends substantial abbreviation of the data collection effort. In particular, family information on income, education, ethnicity, language, and Medicaid eligibility need not be collected. Also, survey questions such as those regarding usual immunization provider can be dropped from the tracking instrument. This reduction in paperwork may simplify start-up. The evaluator further suggests that, at much as possible, younger sibling immunization assessment be incorporated into the fall Head Start enrollment process.

The second implementation issue was that, in the second project year, attendance by target children at clinics was low. While the reasons are not entirely clear, one possibility is that the TMC changed from mostly afternoon clinics to mostly morning clinics. An alternative explanation is that there was less need for services among the second year children.

The clinics in the first year and the home visits in the second year appear equally effective at reaching target children. The clinic approach offered the advantage of providing contact with large numbers of non-target children and adults. On the other hand, the second year approach offered a higher ratio of target child immunization contacts to the number of target children behind schedule. Thus, while the clinic approach offers larger overall numbers of people for services, the home visit approach provides better focus on the target population of younger siblings.

Two methods were employed to evaluate project impact. When viewed in terms of immunization status on the child's second birthday, the project clearly has been effective at increasing immunization coverage. Further, the effects may be cumulative in that children served in the first year continue to benefit from participation in the second.

When impact is evaluated in terms of status of respective age groups on specific dates, project effects are also clear, particularly among two-year-olds. Impacts on other age groups are less clear, partly because some age groups had too few children for meaningful analysis, and perhaps also because the immunization requirements increase as the children age.

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