Health Services Use By Children of Migratory Agricultural Workers: Exploring the Role of Need for Care

SECTION: ARTICLES

LENGTH: 5799 words

TITLE: Health Services Use by Children of Migratory Agricultural Workers: Exploring the Role of Need for Care

AUTHOR: Andrea Weathers, MD, DrPH[1]; Cynthia Minkovitz, MD, MPP[2]; Patricia O'Campo, PhD[2]; and Marie Diener-West, PhD[3]

ABSTRACT: Objective. For migrant children: 1) to assess the determinants of health services use among users and nonusers of health services; 2) to evaluate the association between health status and health services use, while controlling for potential confounders.

Design. A cross-sectional household survey using multistage, partially random sampling to identify migrant families in eastern North Carolina.

Participants. Adult caretakers of 1 randomly selected child under 13 years old.

Results. Forty-four percent of children (N = 300) visited a doctor in the preceding 3 months. Those visiting a doctor disproportionately reported having less than very good health (29% vs 10%), insurance (46% vs 11%), interpreters (45% vs 27%), a family member receiving Special Supplemental Nutrition Program for Women, Infants, and Children (50% vs 16%), and a legal caretaker (30% vs 18%). Compared with those without a doctor visit, a larger proportion of children visiting a doctor were 6 years or younger in age (71% vs 35%), born in the United States (51% vs 15%), female (64% vs 45%), and had not moved in 6 or more months (19% vs 10%). Controlling for enabling resource and sociodemographic confounders, children with less than very good health were 2.4 times more likely than those in very good health to have visited a doctor (95% confidence interval [1.1-5.2]).

Conclusions. Migrant children using health services are distinct from nonusers with regards to sociodemographic factors, enabling resources, and need for care. Health services use is associated with less than very good perceived health, despite resource barriers and sociodemographic disadvantages. More efforts are needed to improve access to health care for

migrant children.

[child; Hispanic Americans; transients and migrants; health services accessibility; health services needs and demand; health status; residential mobility; emigration and immigration.]

TEXT:
ABBREVIATIONS. MFW, migrant farm worker; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children; CI, confidence interval; OR, odds ratio.

Numerous studies have documented a positive association between need for medical care and health services use. [n1-n13] Repeated use of the Behavioral Model of Health Services Use [n14,n15] has shown that, of the explained variability in utilization (4%-25%), need for care accounts for the majority--almost all of the variability in usage of hospital services, and approximately two thirds of the variability in use of physician services. [n16-n18] There are gaps, however, in our knowledge of the association of need for care with health services use for certain vulnerable populations of children. Vulnerable populations "are at risk of poor physical, psychological, and/or social health." [n19] One such vulnerable population in the United States is the children of migratory agricultural workers. In particular, it is not known if the unique health services access barriers faced by migratory families inhibit receipt of health care when needed.

Migratory workers immigrate to the United States to harvest the nation's agricultural crops. Despite changes, over time, in their ethnic and cultural compositions, [n20,n21] successive generations of migratory agricultural workers have experienced the constants of poverty, social isolation, cyclical mobility, and limited availability of health services. Excluded from many federal and state protections, farm worker families face low earnings; unstable seasonal employment; lax child labor laws; limited economic mobility; and exclusion from pension plans, unemployment insurance, and worker's compensation benefits. [n22,n23]

In addition to economic constraints, reports of poor health status among migratory agricultural workers and their families are widely recognized. [n24-n28] Despite this, there is little health services usage research directed to this population. [n27,n29] Moreover, most research of migratory agricultural workers has been directed to adults; very little is documented about the health status or the health services usage patterns of their children.

The health status of children of migratory agricultural workers has not been investigated uniformly. Many researchers have documented the compromised states of migrant children's dental [n30-n44] and nutritional health. [n31,n32,n45-n49] Few investigations document specific health morbidities. A few published reports do document unfavorable health status trends among migrant children and for migrant children as compared with national and regional populations. These reports identify migrant children as having 1) high proportions of existing acute and chronic health problems; [n26,n32,n50-n53] 2) poorer responses to global and functional measures of health status than their nonmigrant ethnic counterparts; [n52] and 3) high childhood and infant mortality rates. [n53] These reports underscore the need to better understand the factors that influence migrant children's health services usage patterns.

Migrant children encounter traditional and non-traditional barriers to the receipt of health care. Examples of nontraditional barriers include language differences, high geographic mobility, non-US child and parental citizenship status, and housing isolation. The published literature documenting the associations between these barriers and the health services usage patterns of migrant children contains many gaps. Routine health screens of infants and children accounted for the second highest proportion of all outpatient visits by migrant workers in the Midwest migratory stream. [n26] Other investigators report low immunization rates and low rates of health maintenance visits by migrant children. [n31,n49,n53] Still others document fewer physician contacts for migrant children than for nonmigrant children, even after controlling for health status. [n52] Dental health services usage among migrant children has been documented to be low overall, and as compared with national data on non-Hispanic and Hispanic, nonmigrant children. [n31,n44,n53,n54] Reports of hospitalization rates for migrant children (7%) were similar to contemporary national data for nonmigrant children. [n45,n53]

This investigation of migrant children: 1) provides initial documentation of the distribution of sociodemographic factors, enabling resources, and need for health care among users and nonusers of health services, and 2) investigates the association of health status with health services usage, after controlling for enabling resources and sociodemographic factors. The Behavioral Model of Health Services Use [n14,n15] guided variable selection. This model explains how need for care, enabling resources, and predisposing factors influence whether individuals receive health care services. We expect that the unique socioeconomic and political contexts of migrant children's lives will alter the traditional association of these determinants with health services use. The key determinant of health services use, for migrant children, is anticipated to be the possession of enabling resources, rather than need for care. The hypotheses tested are: 1) children in the 2 groups (users in the past 3 months versus nonusers in the past 3 months) will differ only in the distribution of enabling resources, and 2) health services use is independently associated only with the possession of enabling resources, after controlling for sociodemographic factors and indicators of need for care.

METHODS

Setting and Participants

Study participants were selected from 4 counties, in eastern North Carolina, with high levels of agricultural activity. A migratory agricultural worker is defined as "an individual whose principal employment is in agriculture on a seasonal basis, who has been so employed within the past twenty-four months, and who establishes for the purpose of such employment a temporary abode." [n55] The terms migratory agricultural worker or migrant farm worker (MFW) are used interchangeably with migrant worker. Adult caretakers of migrant children <13 years old were interviewed.

Design and Sampling Procedure

A cross-sectional study design was used. A 5-part, multistage sampling procedure was used to identify respondents. In stage I, 4 counties with high migrant activity were purposively selected. Stage II consisted of the generation of a random sample of 100 addresses, per county, from the August 1998 through July 1999 county-based lists of children in the North Carolina Migrant Education Program. Population mobility dictated that addresses (and not names) of migrant families were sampled. For 1 county, where no list was available, the interviewer sampled families from various parts of the county. Eligible households were identified (Stage III) by the presence of: 1) a respondent who spoke either English or Spanish, 2) an adult caretaker identified as a migratory agricultural worker, 3) at least 1 child <13 years old, and 4) a knowledgeable adult caretaker available for interview. After household selection, any resident child under 13 years old was eligible for inclusion. The "last birth date" [n56] method was used to randomly select 1 child per family for analysis (Stage IV). Stage V involved the identification of the respondent--the adult caretaker who knew the most about the child. In cases of a refusal to participate, the interviewer obtained the US length of stay of the adult refusing. An initial sample size of 333 participants was desired to detect a 20% effect size, with 90% power, for characteristics distinguishing users from nonusers.

Instrument Development

A 40-item questionnaire--available for completion in English or Spanish, per respondent request--was developed for face-to-face interviews. Survey translation to Spanish and back-translation to English were independently performed by professionals experienced in translation for migrant workers. A focus group and a pretest informed the content and phrasing of questions.

Ethical Considerations

The Johns Hopkins University Committee on Human Research approved the study and the informed consent process (Committee on Human Research No. H.32.99.04.07.A).

Data Collection and Management

Data collection occurred over 2 and one half weeks (August 9, 1999 through August 26, 1999), coinciding with peak harvest and planting seasons for tobacco and sweet potatoes. On interview completion, respondents were remunerated with their choice of either a phone card to Mexico or a grocery voucher, both of $ 10 value. Data were entered into Microsoft Excel 2000 for cleaning and coding (Microsoft, Redmond, WA). Cold-deck imputation of central tendency values [n56] was performed for responses of "Don't Know" to interview questions. Data were analyzed using inter-cooled Stata 6.0 (Stata Corporation, College Station, TX). [n57]

Measurements and Coding

The dependent variable is use of health services over the last 3 months. Use of health services was based on parental report, and was operationalized by the question: "During the last three

months, how many times has this child been examined by a physician?" The dependent variable was dichotomized before analysis as use (any report of examinations by a physician over the last 3 months) versus nonuse (no reports of examinations by a physician over the last 3 months), and may include both acute and routine health care visits. Overnight hospital stays were excluded. Focus group testing revealed that migrant workers did not distinguish physicians from physician assistants or nurse practitioners.

The 6 enabling independent variables included the child's possession of insurance (yes vs no), the child's country of birth (United States vs other), interpreter availability for medical appointments (yes vs no), availability of transportation (own or borrowed for child's medical visits vs other and none), family receipt of benefits from the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) program (yes vs no), and income from all family members at the last paycheck received within the last 2 weeks (greater than $ 500 vs </=$ 500). The sociodemographic variables included the child's age, gender (female vs male), and length of stay at the current address (>24 weeks vs 24 weeks or less), as well as the caretaker's self-reported immigration status (legal vs not legal) and pressure to work (low vs high). The 24-week cutoff for length of stay was selected to coincide with the onset of the planting and harvesting seasons in North Carolina, and thus to capture the annual in-migration of agricultural workers to North Carolina. The variable pressure to work was constructed after inquiry into the ease or difficulty in taking leave from work for the child's medical visits. Based on a 4-level Likert type [n58] response scale, the responses of "very easy and easy" were coded as low pressure to work. The child's age was recoded into categories: 3 years or less, >3 years through 6 years, and >6 years through 12 years of age (reference category).

The 4 need variables included the child's general health over the past 3 months, unmet need for health care in the past year, the last well child examination, and ever receiving dental care. Perceived general health status was assessed by the question: "In the past three months, would you say that this child's health has been excellent, very good, good, fair, or poor?" Health status was dichotomized as: excellent/very good health versus less than very good health (good, fair, poor). The question on unmet need for care followed the National Health Interview Survey (1994) format and inquired about any time over the past year that the child was unable to receive medical care when the caretaker thought that the child needed medical care. Preventive care was assessed by inquiry, in 2 separate questions, about the length of time since the child had received a well child examination by a doctor or an examination by a dentist.

Statistical Procedures

[chi]<2> analyses tested the associations of dependent and independent categorical variables. Two sample t tests were used to analyze the bivariate associations of the dependent variable with normally distributed interval covariates: for nonnormal interval covariates, nonparametric testing was used. Pearson or Spearman rank correlation coefficients were used to assess multicollinearity (r >/= .8) among all variables. For all analyses, a significance level of .05 was used.

Multiple logistic regression was used to model the odds of using health services in the past 3 months. All covariates were entered stepwise, as groups (need variables, then enabling resource variables, then sociodemographic variables), into the multiple logistic regression models. If a covariate was not statistically associated with the outcome at bivariate analysis, and provided no contribution to the multivariable estimates or overall model fit, its retention in the model was based only on its policy relevance. To better understand the potentially policy amenable variables of health insurance and interpreter use, 2 interaction terms--the products of health status with insurance and health status with interpreter availability--were also included and tested in the model. The Hosmer-Lemeshow [chi]<2> statistic [n59] was used to test the goodness-of-fit of the data to the final model.

RESULTS

Caretakers of 300 children (96%) among 313 interviewed agreed to participate in the study. Of the thirteen persons refusing survey participation, all had lived in the United States <1 year (mean: 16 weeks): all were identified as of Latino ethnicity by the interviewer. "Don't know" responses occurred in 3% of records (9 records). Analyses with and without imputed values did not alter the results.

Caretakers were largely immigrants who spent most of the year working in agriculture; nearly one half had not completed high school [n48] (Table 1). Most were first generation immigrants from Mexico. Twenty-three percent reported a legal US immigration category. Few reported excellent or very good spoken English ability, less than half reported transportation independence, and most reported high pressure to work. Less than half of the children had used health services in the past 3 months (Table 2). Most children had moved within the last 4 months, and were first generation immigrants who were born in Mexico. Despite US birth, the caretakers classified the majority of children as of Mexican nationality. The majority of children were uninsured (73%) over the previous 3 months, and were reported to never or rarely have an interpreter available for medical appointments (65%). Table 2 also shows that: 1) approximately four fifths of children (81%) were reported to be in excellent/very good health over the previous 3 months; 2) just over one half (53%) had an unmet need for health care over the past year; 3) approximately one third (34%) had never had a well child examination; and 4) almost four fifths (79%) had never been evaluated by a dentist.

TABLE 1. Caretaker Characteristics n1

Variable	No. (%)	Mean (SD)
Maternal caretaker	236 (79%)	
Family size		5.6 (1.4)
Caretaker education (y) completed high school	154 (51%)	9.5 (3.7)
US length of stay (y)		3.6 (3.5)
Country of birth		
Mexico	269 (90%)	
United States	2 (<1%)	
Other	29 (10%)	

Home base
```
  United States              111 (37%)
    Mexico                   159 (53%)
    Other                     30 (10%)
Legal immigration status      69 (23%)
Agricultural work last year n2                    7.4 (2.6)
Nonagricultural work n3       63 (21%)
Income (last paycheck)                        $ 468 (146)
Excellent/very good English   69 (23%)
Transportation available     132 (44%)
Low pressure to work          81 (27%)
```

SD indicates standard deviation.

n1 $N = 300$.

n2 Months spent performing agricultural work over the past year.

n3 Performance of any nonagricultural work over the past year.

TABLE 2. Child Health Services Utilization
Determinants n1

Variable	No. (%)	Mean (SD)
Used health services n2	132 (44%)	
Need for care indicators		
Health status n2		
Excellent	91 (30%)	
Very good	154 (51%)	
Good	47 (16%)	
Fair	8 (3%)	
Poor	0 (0%)	
Unmet need (past year)	160 (53%)	
Last well check		
1 y or less	78 (26%)	
Never	102 (34%)	
No previous dental exam	236 (79%)	
Enabling resources		
Insured n2	80 (27%)	
Child's country of birth		
United States	93 (31%)	
Mexico	186 (62%)	
Interpreter available		

Never/rarely	196 (65%)	
Family member with WIC	93 (31%)	
Sociodemographic factors		
Female gender	160 (53%)	
Age (y)		6 (3.6)
3 or less	69 (23%)	
>3-6	82 (27%)	
>6	149 (50%)	
Child's nationality		
Mexican	271 (90%)	
Guatemalan	21 (7%)	
Stay at current address n3		16 (13.5)
>24 wk	42 (14%)	

SD indicates standard deviation.

n1 N = 300.

n2 Last 3 months.

n3 Weeks (range: 1-104).

Except for the receipt of dental care, health services users were more likely to be categorized as having less than very good health status (odds ratio [OR] = 3.6, 95% confidence interval [CI]: [1.9, 6.7]), to have had an unmet need for medical care in the past year, and to have had a well child care visit in the past year (Table 3). Health services users were also more likely to have insurance coverage, an interpreter available for medical visits, and a family member currently receiving WIC. In terms of sociodemographic factors, children using health services were more likely than those who did not to: 1) be female, 2) be United States born, 3) have lived at the current location for >24 weeks, and 4) have a caretaker reporting a legal immigration status (Table 3).

TABLE 3. Bivariate Analysis of the Determinants of Health Services Use in the Past 3 Months n1

Variable	Users N = 132 (%)	Nonusers N = 168 (%)	OR	95% CI
Need				
Less than very good health n5	29	10	3.59	1.92-6.72
Unmet need n2	61	47	1.79	1.12-2.84
Well check past year n5	44	11	6.15	3.41-11.10
Well check 3+ y ago n5	30	67	.21	.12-0.34
Never had well check n5	16	48	4.92	2.82-8.58

Ever evaluated by dentist	21	20	1.06 .60-1.86
Enabling resources			
Child born in United States n5	51	15	5.63 3.28-9.66
Last paycheck >$ 500	37	35	1.12 .69-1.80
Insured n5	46	11	6.74 3.74-12.12
Interpreter available n4	45	27	2.21 1.36-3.58
Transportation available	48	40	1.38 .87-2.19
Family member with WIC n5	50	16	5.22 3.06-8.91
Sociodemographic factors			
24+ wk current address n2	19	10	2.07 1.07-4.03
Low caretaker work pressure	30	24	1.35 .80-2.24
Legal caretaker n2	30	18	2.00 1.16-3.44
Female child n5	64	45	2.24 1.40-3.58
Child's age (y) n5			
3 or less	39	11	7.99 4.17-15.30
>3-6 or less	32	24	2.96 1.68-5.21
>6-12 or less n6	29	65	1.00 ‖ 1.00

n1 $N = 300$.

n2 $P < .05$.

n3 $P < .01$.

n4 $P < .001$.

n5 $P < .0001$

n6 Reference group.

Less than very good health status remained associated with health services use (OR 2.4, 95% CI: [1.1, 5.2]), even after controlling for enabling resource and sociodemographic differences (Table 4). Family use of WIC, female gender, and young age exhibited independent associations with use. The 2 interaction terms, the products of health status with insurance and interpreter availability, were not statistically significant (respectively, $P = .88$ and $P = .61$), indicating that the association of use of health services with either insurance possession or having an interpreter available for medical appointments was not altered by the child's health status. The child's country of birth was highly correlated with insurance status ($r = .8$), and was excluded from the model. Income was not significant at bivariate analysis, was not contributory to the final model or to the estimates, and was not retained. A separate analysis comparing excellent health versus less than excellent health resulted in an unstable regression estimate, as evidenced by a very wide

CI.

TABLE 4. Logistic Regression Model for Utilization of Health Services in the Past Months n1

Variable	OR	95% CI
Need		
Less than very good health	3.59	1.92-6.72
Need + enabling resources		
Less than very good health	2.38	1.15-4.89
Insured	4.52	2.27-8.98
Interpreter available	.89	.46-1.48
Transportation	.83	.46-1.47
Family member with WIC	2.55	1.34-4.85
Need + enabling resources + sociodemographic factors		
Less than very good health	2.43	.13-5.24
Insured	2.06	.93-4.56
Interpreter available	1.08	.51-2.29
Transportation	.89	.47-1.69
Family member with WIC	2.16	.09-4.30
24+ wk at address	1.36	.57-5.26
Low work pressure	.61	.30-1.22
Legal caretaker	1.50	.68-3.30
Female	2.26	.28-3.98
Age (y)		
3 or less	3.93	1.70-9.07
>3-6	2.08	1.10-3.95
>6-12 or less n2	1.00	1.00

n1 $N = 300$.

n2 Reference group.

DISCUSSION

The report of the Committee on the Health and Adjustment of Immigrant Children and Families (The National Research Council of the Institute of Medicine) noted "a glaring and significant gap in the scientific literature" for research on undocumented children. [n60] In its recommendations on health care coverage and access to care, the committee noted that "little is known about the medical and health needs of undocumented children or children with undocumented parents, or

their use of services, compared with legal immigrant and US-born citizen children. Little more is known about citizen children in families with undocumented immigrant parents." [n60] For the largely immigrant children of migratory agricultural workers, the American Academy of Pediatrics has outlined specific health-related concerns. [n61,n62] This study addresses the concerns of both of these organizations, and provides particular information on the associations of child and parent immigration status, mobility, and health status with child health services use. These concerns are salient, as children in MFW families often become permanent US residents. [n20]

These results fill an important gap in our knowledge about this difficult to reach, linguistically isolated, and mobile population of often undocumented immigrant workers and their children. Moreover, this study's application of rigorous and innovative methodology to investigate this elusive population provides a framework for future investigations of this population. Most important among these methods are: 1) the use of outreach workers as interviewers; 2) the survey translation procedures used; 3) the use of qualitative input from farm workers into the development of the survey; 4) the use of random sampling; 5) lack of reliance on health centers for population access; 6) introduction of a unique sampling methodology to locate the children of farm workers; and 7) use of the protections of anonymity and indirect questioning to increase the accuracy of information obtained about the respondent's immigration status.

The univariate results support assertions of migrant children as a vulnerable population. The sampled children were largely early school-aged, mobile, first generation immigrants from Mexico who live in immigrant families, have few health-related resources, and who, despite being reported as healthy, often have never had preventive medical or dental care. The sample finding that the majority of children were first generation immigrants is in contrast to a contemporary report (of migrant children in Head Start) identifying migrant children as mostly second generation. [n60] The large proportion (81%) of children in this study with health status of excellent/very good, as reported by their caretakers, parallels that found for US children overall ([approximately] 82%). [n63] The caretaker-reported health status of the sampled migrant children is somewhat less favorable than the distribution among non-Hispanic white children (87% excellent/very good health), but more favorable than the distributions among 1) non-Hispanic black children (75%); 2) Hispanic children overall (73%); and 3) Mexican American children (70%). [n63] The study proportion of uninsured children (73%) is 5.5 times higher than the rates for US children overall ([approximately] 13%) and non-Hispanic black children (13%), and [approximately] 2.5 times higher than that of Hispanic children overall ([approximately] 28%) and Mexican American children ([approximately] 30%). [n63] With regards to reports of unmet need, migrant children are particularly vulnerable. The study finding that 53% of caretakers reported an unmet need for the child's medical care is 1) 24 times higher than that reported for US children overall (2.2%); 2) 29 times higher than that for non-Hispanic white children (1.8%); 3) 20 times that of non-Hispanic black children (2.7%); and 4) 15 to 16 times higher than reports for both Mexican American (3.5%) and Hispanic (3.4%) children. [n63]

The observed association between health services use and less than very good health status

persists, even after controlling for enabling resources and sociodemographic characteristics. These results suggest that when migrant caretakers perceive their child's health to be poor, they overcome resource and sociodemographic barriers (such as mobility and undocumented immigration status) to obtain needed health care. The independent associations found with use suggest that selected resources (eg, young age, family receipt of WIC benefits, and female gender) may confer an advantage in health services use. Thus, although the traditionally targeted younger age group is well-represented in the health care system, school age, preadolescent children, and boys are less often users of health services. Potential explanations for these findings include 1) the operational definition of migratory agricultural worker used; 2) differential quality of migratory patterns; 3) the effect of immigration and social policies on care seeking; 4) differential group acculturation; and 5) an illness-driven motivation to seek care.

The 2-year time limit, for mobility-related agricultural work, in the definition of MFW used by the Migrant Health Program may allow inclusion, as migrants, of families who intend to transition from migratory to seasonal agricultural labor. These families would most likely have longer lengths of stay locally or have fewer annual moves. This relative stability may allow time for the attainment of resources, such as insurance or WIC, and for health services use. To ensure that seasonal families are not "crowding out" more migratory families from using migrant health services, efforts should be made to assess the mobility of those served.

Independent of migratory categorization, differences observed in health services use may reflect qualitative differences in migration. Usage differences may reflect intra-national and international migration patterns, and thereby differences in temporal and physical contacts with the US health system. Under this scenario, users may more likely be intra-national migrants (and more acculturated), whereas nonusers may more likely be international migrants. Some support for this explanation is lent by the finding that users were significantly more likely to have a caretaker with a cumulative US length of stay of 3 or more years (50% users vs 35% nonusers), and that users were significantly more likely to have a caretaker reported as legally present in the United States (30% vs 18%). The finding of no significant difference, by use, in caretaker "home base"-users (42%) and nonusers (33%) limits the clarity of this association. Future migrant health research should include a measure of migration quality.

The passage of the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 [n64] linked the receipt of certain categories of health care to immigration status in a manner that could potentially construct harmful scenarios for immigrant migratory children. The study findings that higher proportions of children using health services were born in the United States and had a legally present caretaker raises questions about the extent to which immigration status linked restrictions on health services use may negatively influence access to health care for migrant children. Of note, multivariable analysis reveals that when the child is perceived to have less than very good health, the caretaker's immigration status does not retain a significant association with use of health care. One possible conclusion is that migrant caretakers may access health care for their ill children despite the threat of discovery of their own immigration status. It may also be concluded that the health services system available to migrant children in poorer health allows access and use independent of caretaker immigration status. This analysis

does not allow inference of the degree to which caretaker immigration status is related to a delay in care seeking.

The finding that less than very good health status has an independent association with use may suggest that migrant children's health services use is illness-driven. This finding does not support the hypothesized importance to health services use of enabling resource possession, despite need for care. This finding also does not support the largely anecdotal assertions of a large reservoir of unmet need for illness care among migrant children. With regards to health services use for children perceived to be in less than very good health, and despite the many nontraditional access barriers encountered, migrant families appear similar to nonmigrant US families. This illness-driven use of health services may derive from population or health system characteristics. The combinations of economic impoverishment and mobility may lead families to focus on survival goals, such as obtaining food and shelter, over the receipt of health care. This survival orientation may lead to care seeking only in cases of illness. A caretaker who is fearful of discovery of his or her own or their child's immigration status may manifest this same orientation. Alternatively, the health services system, and the social policies that guide it, may facilitate the receipt of care in illness, rather than in health. Investigation of the distribution of access barriers encountered by migrant children in the receipt of preventive care or for care for mild illnesses may be informative.

Several limitations of the current study should be noted. First, the cross-sectional design of the study prevents antecedent-consequence determination. Despite this limitation, a cross-sectional study is optimal for an exploratory investigation of a linguistically isolated, mobile population for whom little is known about factors that influence receipt of health care. Second, selection bias may have limited participation of geographically isolated families or families that were highly mobile, early moving, or early returnees south. Two steps were taken to reduce selection bias: 1) the use of a sample frame from an organization (the Migrant Education Program) with extensive and longstanding outreach to agencies and individuals (growers included) that provide services to migrant children and their families, and 2) the execution of sampling during "peak harvest season," when the highest numbers of migrant workers are present. Neither of these measures addresses potential bias attributed to qualitative variations in mobility. Future studies of this population may be able to address qualitative mobility dynamics by the inclusion of early and late harvest interview cycles. Despite these limitations, the study's strengths are the inclusion of nonusers of health services, the sampling methodology developed for migrant populations, and multivariable analysis to control for potential confounders.

CONCLUSIONS

This analysis reveals migrant children to be a vulnerable population of largely first and second generation immigrants. Those children using health services appear to be distinct from those who do not, with regards to sociodemographic characteristics, enabling resources, and indicators of need for care. Health services use is associated with a caretaker's perception of the child's health as less than very good, despite resource barriers and sociodemographic disadvantages (lack of insurance, short length of stay locally, and having an illegal caretaker). Moreover, certain

resources (WIC) and population characteristics (young age and female gender) are independently associated with use, even when health status is taken into account. These findings suggest that, although migrant families overcome traditional and nontraditional barriers to obtain needed health care for their children, further efforts may be needed to improve access to care for migrant children who lack contact with WIC, older migrant children, boys, and those with relatively high geographic mobility.

Future research of migrant children's access to and use of health care should focus on:
1. Characterization of the qualitative and quantitative associations of mobility with health services use.
2. Evaluation of reasons for the low level of health services use by boys, compared with girls, and by school-aged children, compared with younger children.
3. The development and evaluation of programs designed to improve the dental health of migrant children.
4. Evaluation of the association between differential program outreach structure and intrapopulation variability in health services access and use.

ACKNOWLEDGMENTS

SUPPLEMENTARY INFORMATION: From the <1>Department of Maternal and Child Health, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina; and Departments of <2>Population and Family Health Sciences, and <3>Biostatistics, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland.

Address correspondence to Andrea Weathers, MD, DrPH, Assistant Professor, University of North Carolina School of Public Health, 402A Rosenau Hall, CB # 7445, Chapel Hill, NC 27599-7445. E-mail: andrea_weathers@unc.edu

REFERENCES:

[n1.] Berki SE, Ashcraft ML. On the analysis of ambulatory utilization: an investigation of the roles of need, access and price as predictors of illness and preventive visits. Med Care. 1979;17:1163-1181

[n2.] Starfield B, Hankin J, Steinwachs D, et al. Utilization and morbidity: random or tandem? Pediatrics. 1985;75:241-247

[n3.] Diaz C, Starfield B, Holtzman N, et al. Ill health and use of medical care. Community-based assessment of morbidity in children. Med Care. 1986;24:848-856

[n4.] Leaf PJ, Bruce ML, Tischler GL, Freeman DH, Weissman MM, Myers JK. Factors affecting the utilization of specialty and general medical mental health services. Med Care. 1988;23:9-26

[n5.] Newacheck PW. Improving access to health services for adolescents from economically disadvantaged families. Pediatrics. 1989;84:1056-1063

[n6.] Crozier DA. Health status and medical care utilization. Health Aff (Millwood). 1985;4:114-128

[n7.] Connelly JE, Philbrick JT. Smith GR, Kaiser DL, Wymer A. Health perceptions of primary care patients and the influence on health care utilization. Med Care. 1989;27(suppl 3);99-109

[n8.] Woodward CA, Boyle MH, Offord DR, et al. Ontario Child Health Study: pattern of ambulatory medical care utilization and their correlates. Pediatrics. 1988;82(suppl):425-434

[n9.] Riley AW, Finney JW, Mellits ED, et al. Determinants of children's health care use: an investigation of psychosocial factors. Med Care. 1993;31:767-783

[n10.] Newacheck PW, Stoddard JJ. Prevalence and impact of multiple childhood chronic illnesses. J Pediatr. 1994;124:40-48

[n11.] Cooper H, Smaje C, Arber S. Use of health services by children and young people according to ethnicity and social class: secondary analysis of a national survey. Br Med J. 1998;317:1047-1051

[n12.] Weinreb L, Goldberg R, Bassuck E, Perloff J. Determinants of health and services use patterns in homeless and low-income housed children. Pediatrics. 1998;102:554-562

[n13.] Ryan S, Riley A, Myungsa K, Starfield B. The effects of regular source of care and health need on medical care use among rural adolescents. Arch Pediatr Adolesc Med. 2001;155:184-190

[n14.] Andersen RM. A Behavioral Model of Families' Use of Health Services. Center for Health Administration Studies. University of Chicago. Research Series 25; 1968

[n15.] Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? J Health Soc Behav. 1995;36:1-10

[n16.] Aday L, Awe WC. Determinants of health behavior: personal and social. In: Gochman DS, ed. Handbook of Health Behavior Research I: Personal and Social Determinants. New York, NY: Plenum Press; 1997:153-172

[n17.] Mechanic D. Correlates of physician utilization: why do multivariate studies of physician utilization find trivial psychosocial and organizational effects? J Health Soc Behav. 1979;20:387-396

[n18.] Wolinsky FD. Assessing the effects of predisposing, enabling, and illness-morbidity characteristics on health services utilization. J Health Soc Behav. 1978;19:384-396

[n19.] Aday LA, Begley C, Lairson D, Slater C. Evaluating the Medical Care System: Effectiveness, Efficiency, and Equity. Ann Arbor, MI: Health Administration Press; 1993

[n20.] Mines R. Children in immigrant and nonimmigrant farm worker families: findings from the National Agricultural Workers Survey. In: Hernandez DJ, ed. Children of Immigrants: Health, Adjustment, and Public Assistance. Institute of Medicine. Washington, DC: National Academy Press; 1999:620-658

[n21.] McWilliams C. Factories In the Field. Santa Barbara, CA: Peregrine Press; 1935

[n22.] Taylor EJ, Martin PL, Fix M. Poverty Amid Prosperity: Immigration and the Changing Face of Rural California. Washington, DC: The Urban Institute Press; 1997

[n23.] Linder M. Migrant workers and minimum wages: regulating the exploitation of agricultural labor in the United States. Boulder, CO: Westview Press; 1992

[n24.] Leone LP, Johnston HL. Agricultural Migrants and Public Health. Public Health Reports, January 1954. As reported in the Briefings of the Commission on Security and Cooperation in Europe. Washington, DC; 1953:330-337

[n25.] Goldsmith MF. As farm workers help keep America healthy, illness may be their harvest. JAMA. 1989;261:3207-3213

[n26.] Dever GEA. Migrant Health Status: Profile of a Population With Complex Health Problems. Monograph Series, Migrant Clinicians Network. Austin, TX: National Center for **Farmworker** Health, Inc; 1991

[n27.] National Migrant Resource Program. Recommendations of the National Advisory Council on Migrant Health, 1993. Austin, TX: National Center for **Farmworker** Health, Inc; 1993

[n28.] Implementation of the Helsinki Accords: migrant farm workers in the United States. Briefings of the Commission on Security and Cooperation in Europe; May 1993. Washington,

DC: US Government Printing Office

[n29.] Rust GS. Health status of migrant farm workers: a literature review and commentary. Am J Public Health. 1990;80:1213-1217

[n30.] Bachand RG, Gangarosa LP, Bagassa C. A study for dental needs, DMF, deaf, and tooth eruption in migrant Negro children. J Dent Child. 1971;38:399-403

[n31.] Chase HP, Kumar V, Dodds JM, et al. Nutritional status of preschool Mexican-American migrant farm children. Am J Dis Child. 1971;122:316-324

[n32.] Larson LB, Dodds JM, Massoth DM, Chase HP. Nutritional status of children of Mexican-American migrant families. J Am Diet Assoc. 1974;64:29-35

[n33.] Avery KT. Dental health for migrant agricultural workers. J Occup Med. 1974;16:606-607

[n34.] Avery KT. The dental health of children of migrant and seasonal agricultural workers. J Sch Health. 1975;45:24-26

[n35.] Cipes M, Castaldi CR. Dental health of children of migrant workers in Hartford, Connecticut. J Conn State Dent Assoc. 1982;56:59-62

[n36.] Ragno J, Castaldi CR. Dental health in a group of migrant children in Connecticut. J Conn State Dent Assoc. 1982;56:15-21

[n37.] Woolfolk M, Hamard M, Bagramian R, Sgan-Cohen H. Oral health of children of migrant farm workers in northwest Michigan. J Pub Health Dent. 1984;44:101-105

[n38.] Woolfolk MP, Sgan-Cohen HD, Bagramian RA, Gunn SM. Self-reported health behavior and dental knowledge of a migrant worker population. Community Dent Oral Epidemiol. 1985;13:140-142

[n39.] Call RL, Entwisle B, Swanson T. Dental caries in permanent teeth in children of migrant farm workers. Am J Pub Health. 1987;77:1002-1003

[n40.] Ismail AL, Burt BA, Brunelle JA. Prevalence of dental caries and periodontal disease in Mexican American children aged 5-17 years: results from the southwestern HHANES, 1982-83 National Nutrition and Health Examination Survey. Am J Public Health. 1987;77:967-970

[n41.] Koday M, Rosentein DI, Lopez GMN. Dental decay rates among children of migrant workers in Yakima, WA. Public Health Rep. 1990;105:530-533

[n42.] Weinstein P, Domoto P, Wohlers K, Koday M. Mexican-American parents with children at risk for baby bottle tooth decay: pilot study at a migrant farm workers clinic. ASDC J Dent

Child. 1992;59:376-383

[n43.] Waldman HB. Invisible children: the children of migrant farm workers. J Dent Child. 1994;61:218-221

[n44.] Nurko C, Aponte-Merced L, Bradley EL, Fox L. Dental caries prevalence and dental health care of Mexican-American workers' children. J Dent Child. 1998;65:65-72

[n45.] Chase HP, Larson LB, Massoth DM, Martin DL, Niernberg MM. Effectiveness of nutrition aides in a migrant population. Am J Clin Nutr. 1973;26:849-857

[n46.] Acosta PB, Aranda RG, Lewis JS, Read M. Nutritional status of Mexican-American preschool children in a border town. Am J Clin Nutr. 1974;27:1359-1368

[n47.] Yanochik-Owen A, White M. Nutritional Surveillance in Arizona: selected anthropometric and laboratory observations among Mexican-American children. Am J Public Health. 1977;67:151-154

[n48.] Dewey KG, Chavez MN, Gauthier CL, Jones LB, Ramirez RE. Anthropometry of Mexican-American migrant children in northern California. Am J Clin Nutr. 1983;3795:828-833

[n49.] Watkins E, Larson K, Harlan C, Young S. A model program for providing health services for migrant **farmworker** mothers and children. Public Health Rep. 1990;105:567-575

[n50.] Smith G, De Angelis C, Hanser J. The health status of a subgroup of migrant American children: the role of a medical center as a service and educational institution in the community. Clin Pediatr. 1978;17:900-903

[n51.] Michael RJ, Salend SJ. Health problems of migrant children. J Sch Health. 1985;55:411-412

[n52.] Ruducha J. Migrant Child Health: The Role of Social, Cultural, and Economic Factors. Austin, TX: National Migrant Resource Program, Inc; 1994

[n53.] Slesinger DP, Christenson BA, Cautley E. Health and mortality of migrant farm children. Soc Sci Med. 1986;23:65-74

[n54.] Kurtzman C, Feed J, Goldstein C. Evaluation of treatment provided through two universities, mobile dental project. J Public Health Dent. 1974;34:74-79

[n55.] US Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Bureau of Health Care Delivery and Assistance, Migrant Health Program. An Atlas of State Profiles Which Estimate Number of Migrant and Seasonal Farm Workers and Members of Their Families. Rockville, MD; 1990

[n56.] Aday L. Designing and Conducting Health Surveys: A Comprehensive Guide. 1st ed. San Francisco, CA: Jossey-Bass; 1989:110

[n57.] StataCorp. Stata Statistical Software: Release 6.0. College Station, TX: Stata Corporation; 1999

[n58.] Edwards AL. Techniques of Attitude Scale Construction. East Norwalk, CN: Appleton-Century-Crofts; 1957

[n59.] Hosmer D, Lemeshow S. Applied Logistic Regression. New York, NY: John Wiley & Sons; 1989

[n60.] Hernandez D, Charney E, eds. From Generation to Generation: the Health and Well-being of Children in Immigrant Families. Institute of Medicine. Washington, DC: National Academy Press; 1998

[n61.] American Academy of Pediatirics. Guidelines for the Care of Migrant **Farmworkers'** Children. Elk Grove, IL: American Academy of Pediatrics; 2000

[n62.] American Academy of Pediatrics, Committee on Community Health Services. Health care for children of **farmworker** families. Pediatrics. 1995;95:952-953

[n63.] Bloom B, Tonthat L. Summary Health Statistics for US Children: National Health Interview Survey, 1997. 2002 Vital Health Stat 10(203).

[n64.] US Congress. The Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (P. L. 104-193) August 22, 1996