

Informal work group meeting on health and research  
opportunities for the migrant and seasonal farmworker

Migrant Clinicians Network

**INFORMAL WORK GROUP MEETING  
ON  
HEALTH AND RESEARCH OPPORTUNITIES  
FOR THE MIGRANT AND SEASONAL  
FARMWORKER POPULATION**

**Resource ID#: 3789**

**Informal work group meeting on health and  
research opportunities for the migrant and seasonal  
farmworker population**

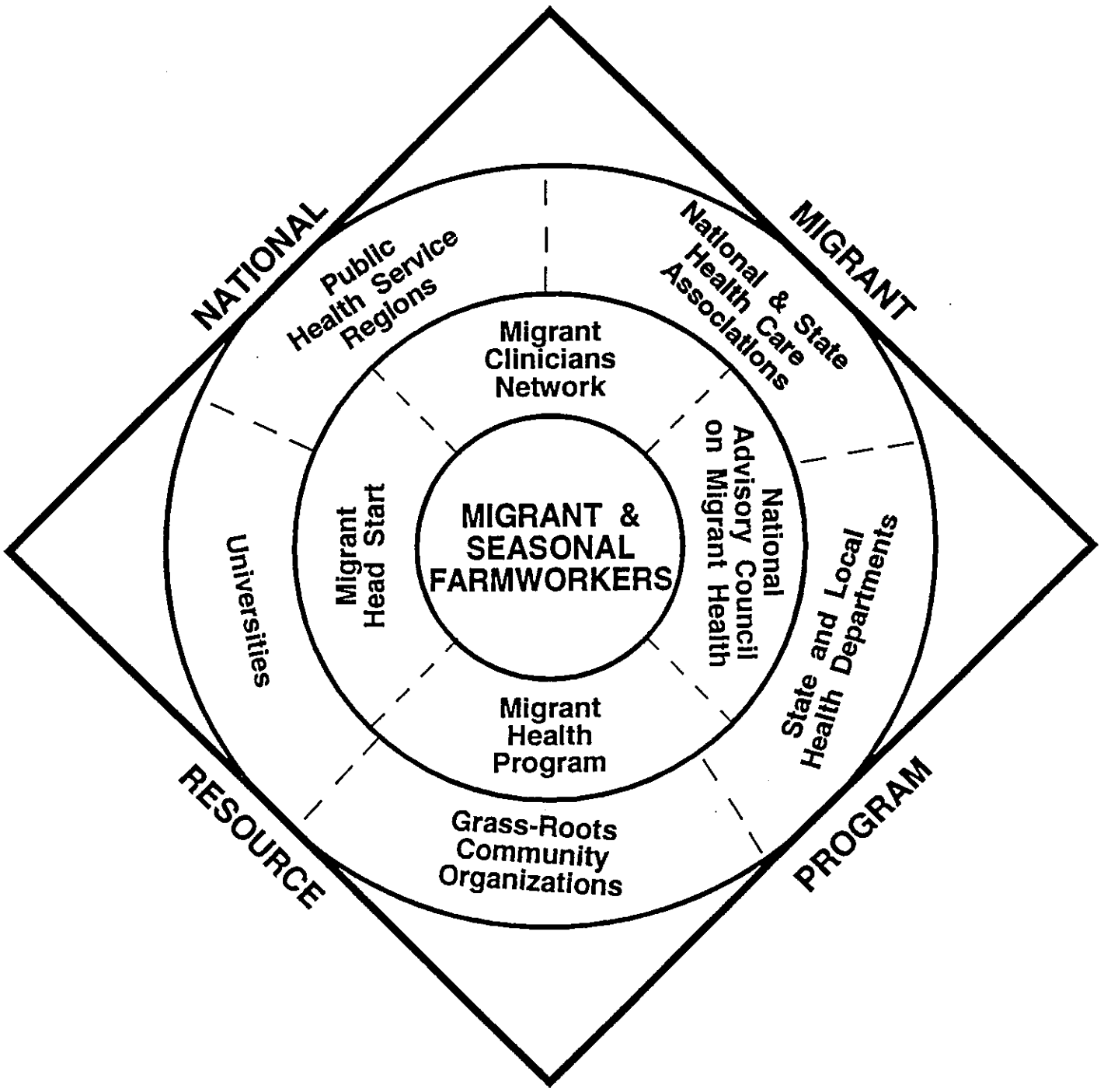


M I G R A N T C L I N I C I A N S N E T W O R K

INFORMAL WORK GROUP MEETING  
ON  
HEALTH AND RESEARCH OPPORTUNITIES  
FOR THE MIGRANT AND SEASONAL  
FARMWORKER POPULATION

DECEMBER 7, 1992  
2512 SOUTH I-H35, STE. 220  
AUSTIN, TEXAS

HOSTED BY THE  
NATIONAL MIGRANT RESOURCE PROGRAM  
AND THE  
MIGRANT CLINICIANS NETWORK





**APPENDIX I**



# monograph series

MIGRANT CLINICIANS NETWORK

## *Migrant Health Status:*

# Profile of a Population With Complex Health Problems

By G. E. Alan Dever, PhD, Mercer University School of Medicine

## Executive Summary

The results from this study are significant, shocking, and convincing. The findings are based upon a sample of migrant and seasonal farmworkers living and working in the U.S., yet their demographic patterns, socioeconomic conditions, life-style characteristics, and disease categories reflect agrarian third world conditions rather than those of the most powerful and affluent nation in the world. Factors such as poverty, malnutrition, infectious and parasitic diseases, poor education, a young population, and poor housing equate to a highly vulnerable population in need of resources. Clearly, the migrant population is at greater risk and suffers more problems than the general population of the U.S. The results of this research demonstrate the need for more services, care, and treatment. The need for developing a health policy and research agenda for migrant farmworkers in this decade is evident.

Since the Migrant Health Act was passed in 1962, migrant health centers have struggled to serve the migrant and seasonal farmworkers and their families who make up the backbone of this country's agricultural work force. The on-going battle to improve the health status of farmworkers has not been easy, and is being lost. Current estimates show that migrant clinics are able to serve less than twenty percent of this nation's migrant farmworkers.

Health centers have been handicapped in their efforts to focus attention on this gap in service by the lack of reliable data on the health status of the farmworkers they serve. While some data is available for individual clinics or regions, this information does not give a clear national picture of the health problems experienced by these workers and their families.

Now, thanks to the Migrant Clinicians Network in partnership with the National Migrant Resource Program, the

first national study of morbidity in the farmworker population gives us solid evidence that their health status is far below that of the general population. In addition, the findings indicate that migrant farmworkers experience *different* problems from those of other populations.

With technical support from the National Migrant Resource Program, the Migrant Clinicians Network sampled utilization data for this study from four migrant health centers in the states of Texas (a homebase area for migrant and seasonal farmworkers), Michigan, and Indiana (non-homebase areas). The program health analysis examined data from a total of 6,969 medical encounters during the study period. In addition, community health data was collected on two control group counties in addition to the study area in order to test the hypothesis that Hispanic migrant and seasonal farmworker populations differ from the Hispanic population *per se*.

This study focused on farmworkers in the midwestern migratory stream. Although the data was not cross-tabulated to track individual workers, data was collected for workers both in their homebase area in Texas and in the upstream areas where they work. Access to health care services tends to be more limited in migrant homebase areas than in non-homebase areas due to the concentration in homebase areas of other potential clinic users who compete with farmworkers for access to services. Because the data indicate that the differences between farmworker health status and that of the general U.S. population is more pronounced for workers in their home areas than for those working upstream, this monograph concentrates scrutiny on data from the homebase study area counties. However, the final study report presents data from all of the study area counties, including both homebase and non-homebase areas.

### **Comparison with General Population**

- Migrant farmworkers have different and more complex health problems from those of the general population.
- Migrant farmworkers suffer more frequently from infectious diseases than the general population.
- Farmworkers have more clinic visits for diabetes, medical supervision of infants and children, otitis media, pregnancy, hypertension, and contact dermatitis and eczema.
- Clinic visits for general medical exams account for only 1.4 percent of all visits to migrant health clinics, 39 percent below the U.S. average.
- Demographic analysis of the study area counties indicates that the farmworker population has more young people and fewer older people than the general U.S. population.

### **Multiple Health Problems**

- Multiple and complex health problems exist among over 40 percent of all farmworkers who visit migrant health clinics.
- Patients under one year and over 64 years old had the highest occurrence of multiple health problems.
- The diagnostic category "Factors Influencing Health," which covers preventive services, produced the most clinic visits for all migrant workers. This suggests that migrant health clinics are actively providing health promotion and disease prevention services. In addition, this may indicate that coordination of complementary service resources such as WIC may significantly increase access to health care.

### **Community Health Status**

- As many as 58 percent of all households in migrant "homebase" areas are below nationally defined poverty levels, compared with only 1.4 percent nationally.
- Homebase areas have a higher-than-average proportion of households with low median income, low median home value, and low percent of college graduates.
- The overall health of farmworkers in homebase areas is significantly worse than that of either the general U.S.

population or farmworkers in non-homebase migrant areas.

### **Health Status by Age**

- Clinic visits for ages 1-4 are mostly for infectious and nutritional health problems. Health problems for ages 5-9 are also primarily infectious, but dental problems also appear for the first time in this group.
- Dental disease is the number one health problem for patients aged 10-14.
- Pregnancy is the most frequent presenting health condition for females aged 15-19; dental disease is number one for males.
- Females age 20-29 visit clinics primarily for pregnancy, diabetes, common cold, and reproductive problems. Males visit primarily for contact dermatitis and eczema, strep throat and scarlet fever, and dental problems.
- In the 30-44 age group, two of the top three problems for both males and females are diabetes and hypertension.
- Nearly half of all clinic visits for men and women in the 45-64 age group are for diabetes, hypertension, or arthropathies.
- Among the elderly, over 60 percent of clinic visits by males and 80 percent by females are for diabetes and hypertension.

### **Geography and Demography**

- The non-homebase study counties have an overall higher median age than the country as a whole.
- The homebase counties have more children under 15 and fewer elderly over 65 than either the U.S. in general or non-homebase migrant areas.
- Per capita income in all study counties except one is below the U.S. average. Migrant homebase areas show a 1989 per capita income 50 percent less than the U.S. level of \$13,218.
- Over 20 percent of the households in the homebase study area have incomes of under \$7,500; households with incomes under \$7,500 in non-homebase areas range from 7 percent to 14 percent.

## **Introduction**

Our knowledge of the overall health status of the farmworkers who use migrant health clinic services is quite limited. Some health status information is available for individual clinics; however, such information does not give a national picture of the problems encountered by farmworkers. A number of studies to date have filled in pieces of the migrant health status puzzle.

## **Literature Review**

There are approximately 4.2 million migrant and seasonal farmworkers in the United States. This is comparable in size to the population of Minnesota. But the health status of the residents of Minnesota is well documented and understood. On the other hand, we know very little about the health status of migrant and seasonal farmworkers. These workers represent a highly mobile group. Thus, in order to under-

stand their health status we must rely on a variety of reporting systems which do not uniformly collect this information on migrant farmworkers. Much of what we do know of the health status of this population has been collected independently by individual clinics throughout the country, and has never been aggregated across migratory streams or across the farmworker population as a whole.

A review of the current literature yields a wide range of opinions regarding the health problems of migrant and seasonal farmworkers. These opinions were often elicited from health professionals who one or more areas of expertise and, in some cases, knowledge about a specific geographical area. In addition, the perception by migrant workers themselves that they suffer from non-specific ailments including backaches, headaches, colds, and "strong anger" is shared by many health professionals who serve them. Data from existing studies would support this contention. Further, the literature review found other important health problems which have been noted by health professionals. For example, added to the above list of concerns, the following were identified as significant health problems: anemia, high blood pressure, diabetes, accidents, exposure to pesticides, general dental problems, heart attack, infectious diseases.

A review of the literature made it possible to estimate the leading causes of farmworker death and the principle reasons given by farmworkers for visiting migrant health centers. In many instances these problems could also be categorized by age group. In comparing these random mortality and morbidity studies from the literature with the results of the actual clinical data as presented in this and other professional reports, the morbidity patterns are frequently similar.

## Study Area

Four migrant health centers in three states were studied for this report. The four health centers are: Migrant and Rural Community Health Association (MARCHA) in Bangor, Michigan; Indiana Health Centers (IHC) in Indianapolis, Indiana; Hidalgo County Health Care Corporation (HCHCC) in Pharr, Texas; and Su Clínica Familiar (SCF) in Harlingen, Texas. Each center has unique social, economic, and demographic characteristics. In addition, two control group counties were selected to facilitate comparison to the study areas.

The centers to be sampled were selected by the Migrant Clinicians Net-

work (MCN) and represent two "homebase" and two "non-homebase" sites in the Midwestern migratory stream. All migrant clinic utilization (encounter) data for the months of June through August 1986 for the Michigan centers, July through September 1986 for the Indiana center, and November 1986 through January 1987 for the Texas centers were collected. A total of 6,969 patient encounters were included in the final data analysis. With assistance from The MITRE Corporation, MCN performed an extensive data analysis to produce a set of tables illustrating Diagnostic Related Groups (DRGs) by site, age, and sex. These data were further evaluated by looking at the top 20 morbidities by life-cycle and site location (i.e., homebase vs. non-homebase). Additionally, co-morbidities were determined for each age group for all centers. The results were used to identify appropriate clinical indicators for evaluation.

This document presents information on migrant health status from several perspectives. First, the demographic characteristics of the study population are discussed. Second, data relevant to community-based health status (i.e., homebase vs. non-homebase population) are presented. Next are program health status findings based on comparisons of clinic-specific data with findings from the National Ambulatory Medical Care Survey. Fourth, co-morbidity patterns in migrant health clinics are examined. Finally, the development of clinical indicators is discussed.

## Geography

The migrant and seasonal farmworker population is distributed across almost every state in the U.S. California has the most farmworkers, while Rhode Island has the least. The states of Michigan, Indiana, and Texas, which comprise the study area for this report, are estimated to have a combined farmworker population of about 575,000 workers, about 13.7 percent of all farmworkers in the country. These three states are in the Midwestern migratory stream, with Indiana and Michigan located "upstream" (non-homebase areas) and Texas "down-

stream" (a homebase area). The service areas of the four major migrant health centers used in this study encompass a total of eighteen counties.

The agricultural working season varies between the three study areas. Texas has a year-round growing season, while the season in Indiana and Michigan is approximately seven months. Over 50 percent of Hidalgo county's population is comprised of farmworkers; for Cameron and Willacy counties the percentages are 17.8 and 39.3, respectively. The analysis of much of the data in this report is predicated on the assumption that the Texas sites are homebase areas for migrant and seasonal farmworkers. Subsequent references in this report to "homebase" and "non-homebase" migrant populations refer to the Texas and Indiana/Michigan sites respectively.

## Demography

Demographic data are almost always prerequisites for basic community health analysis, since demographic trends directly influence health and disease patterns. Accompanying any demographic trend is a public and health policy implication reflective of a healthy public policy. Thus, a basic analysis of demographic trends is critical to understanding the problems encountered by migrant and seasonal farm workers. Moreover, we know very little about the demographic characteristics of these workers.

This demographic analysis related to migrant and seasonal farmworkers was conducted from two perspectives: an ecological analysis of migrant homebase and non-homebase areas served by migrant health centers, and a program analysis of patient data from the four migrant health centers.

### Population Characteristics

In the study area counties, the percentage of migrant and seasonal farmworkers as a percentage of total county population differs dramatically among counties, ranging from .23% in Grant County, Indiana to 51.7% in Hidalgo County, Texas. In fact, for all the Indiana and Michigan study area



counties farmworkers make up less than 9.0%. In contrast, in the homebase study area (Texas) counties the percentages are high—ranging from 17.8% to 51.7%.

Furthermore, the Hispanic population in these study areas has similar distributional characteristics. Approximately 2% of the Michigan and Indiana population is Hispanic, whereas for Texas the corresponding number is 27.7%. County-specific data for these sites are similar to their respective states, except in the case of Texas. The study area counties in Texas have more than 90% Hispanic population. With the high proportion of migrant workers and the high percentage Hispanic population in the Texas study area counties, a contingency analysis indicates that the demographic characteristics described in this study may be considered as representative of the homebase Hispanic migrant and seasonal farmworker.

#### **Age Distribution**

The median age of the U.S. population in 1989 was 32.7 years. In contrast, the median ages for the homebase study counties were 28.1, 27.8, and 27.4 for Cameron, Hidalgo, and Willacy counties respectively. The median ages for the Indiana counties were on the average *above* that of the U.S., and the Michigan counties range from 0.2 years above to 2.1 years *below* the U.S. median.

The proportion of the population less than 15 years old and the proportion over 65 in a geographical area are significantly related to disease patterns. The percentage of population in the U.S. under age 15 is 21.7%. The homebase counties range from 8.8% to 9.4% above the U.S. proportion. On the other hand, non-homebase counties range from 1.4% below to only 2.9% above the U.S. The percentage of population over age 65 in the U.S. for 1989 was 12.5%. The non-homebase areas have greater percentages of older citizens while the homebase counties have a lower percentage than the U.S.

This demographic pattern of a high proportion of younger people and a low proportion of older people is typically associated with infectious disease

cycles. Thus, not knowing the disease patterns of the homebase study area counties, we could expect nutritional problems, infectious diseases, and parasitic diseases to dominate and to be concentrated in the younger age groups. Additionally, since the proportion of elderly persons is less in the homebase counties than in the U.S. as a whole, we could expect less chronic disease. Specifically, the magnitude of representative diseases (such as heart disease, cancer, and diabetes) would be lower compared to other areas where the population is significantly older than the U.S., and certainly older than the migrant population. This clearly suggests that migrant farmworkers would be dominated by an infectious disease cycle typical of third world countries, with an emerging secondary chronic disease pattern typical of a population getting older and more urbanized. This paradox of many young/few old produces mostly infectious disease for the rural farmworker and chronic disease for the urban migrant worker. A transition is taking place.

The population distribution of patients who attended migrant health clinics for the three homebase study area counties is compared to the state and U.S. distributions. The program-specific data (obtained from farmworker clients who visited the migrant clinics) are contrasted with community-based data which were obtained for the entire population in an area where migrant centers are located. Thus, the first data set is program-specific information, whereas the second data set is community-based information. The pattern in the two data sets is very similar. However, the age distribution of patients who visit migrant clinics is quite different when compared to the U.S. age distribution. The age groups under age 15 make up 30% of the patient population in the migrant clinics, whereas the corresponding percentage in the U.S. is 20%. Further, the group over age 65 is under-represented in the clinic data compared to U.S. population data.

#### **Population Growth**

The population growth of an area is also a key variable in understanding the health and disease patterns of a population. Projected percent change in population 1989 to 1994 for the study area sites indicates that most of the Indiana counties will lose population by 1994, while the Michigan and Texas counties gain population. The growth rates for these two latter areas range from 0.3 percent to 11.8 percent. High growth rates in an area may be due to a high birth rate and/or a high immigration level. In addition, high birth rates reflect a wide-based population pyramid and are typical of a population in a high infectious disease cycle. The homebase areas in the current study fit this pattern.

#### **Economic Characteristics**

The relationship between population variables and economic characteristics can further add to our understanding of the disease patterns for a community. In this study, the homebase areas were clearly economically disadvantaged when compared to the U.S. and the non-homebase migrant areas. The per capita income for the homebase migrant areas is one-half that of the U.S. and most of the non-homebase areas. For example, the U.S. per capita income in 1989 was \$13,218, compared to only \$6,087 for Willacy County, Texas. In the U.S. as a whole 11.9% of all households earned less than \$7,500; this percentage is also typical of the non-homebase study area counties. On the other hand, the homebase counties have nearly twice as many households earning under \$7,500 as the U.S. as a whole. Obviously, the homebase migrant areas are significantly below the U.S. economic standard. Low per capita incomes and high percentages of households earning less than \$7,500 characterize the homebase migrant population in the study areas as an economically vulnerable population.

A demographic and economic profile emerges which characterizes homebase migrant farmworkers. The profile is typical of a society or culture in an infectious disease cycle. Further, the profile suggests that a secondary

chronic disease pattern will emerge as additional demographic characteristics are examined. The overall profile may be characterized in the following manner:

- High proportion of migrant and seasonal farmworkers as a percent of total population.
- Extremely high percent Hispanic population.
- Low median age (younger population).
- Very high percent of population under age 15.
- Percent of population age 65 and over low but showing minor increases.
- Fast population growth expected.
- Very low per capita income.
- High percent households earning under \$7,500.
- Low educational level.
- An economically disadvantaged population.

These characteristics define a profile of a population which is vulnerable and needs major improvement in the quality of life. The profile is quite typical of an infectious disease cycle. In the next section the community health status of migrant areas will be examined.

## Community Health Status

This aspect of the analysis provides information about the health status of the population in the communities where migrant and seasonal farmworkers live. The results are aggregated to describe groups, and it cannot be inferred that any one individual within the group would have the com-

ination of problems or characteristics identified for the entire group. An ecological analysis offers a description of the community and generates potential hypotheses as to the reasons for the problems identified.

### Quality of Life

Disease patterns in a population are linked to quality of life. The homebase migrant study areas represent a quality-of-life profile of a population which faces difficult and complex problems. Each of the three counties (Cameron, Hidalgo, and Willacy) is dominated by household groups which are among the poorest rural areas in the country. For example, the percentage of households designated through cluster analysis as "Hard Scrabble" \* is 58.14%, 28.5%, and 11.0% for Willacy, Hidalgo, and Cameron counties respectively. Based on a rank order of forty different neighborhood designations, Hard Scrabble ranks 39th—only public assistance neighborhoods rank lower.

In addition, the migrant homebase study areas are characterized by low median income, low median home value, low percent college graduates, and an overall low quality of life rating. Generally, their income is half to one-third that of the U.S. as a whole. For example, the median income for Hard Scrabble neighborhoods in Cameron county is \$12,874, compared to the U.S. value of \$24,269. Median home values for these counties compared to the general U.S. show the same pattern. The percent of college graduates falls well below the U.S. level. In Cameron

county, for instance, only 6.5% of the population are college graduates, while the U.S. percentage is 16.2% (1989).

### Major Diagnostic Groups

There are major differences between the homebase migrant areas and the non-homebase areas for the major disease categories. In Indiana (ten counties) only two disease categories out of a possible 230 are significantly above the U.S. index. Michigan (five counties) has two disease categories significantly different from the U.S. For instance, Van Buren, Ottawa, and Berrien counties (Michigan) are higher for "Newborn and Other Neonates with Conditions Originating in the Perinatal Period" by 8%, 4% and 2% when indexed to the U.S. average. For Kalamazoo county, Michigan, the other disease category ("Pregnancy, Childbirth, and the Puerperium") is 3% above the U.S. (Figure 1).

Figure 1 demonstrates some very basic differences in terms of which disease patterns dominate. The diseases which predominate in Willacy county (a homebase area) are typical of a young population, and thus reflect an infectious disease cycle. On the other hand, Jay county (a non-homebase area) is dominated by a disease pattern typical of an aging population and a chronic disease cycle. These differences are notable since throughout this analysis these patterns persist. Results of this nature allow planners and policy makers to develop appropriate pro-

\* The term "Hard Scrabble" is an old phrase meaning to scratch a hard living from hard soil. Hard Scrabble neighborhoods represent our poorest rural areas, from Appalachia to the Ozarks, Mexican border country, and the Dakota Bad Lands. Hard Scrabble leads all other clusters in concentration of adults with less than eight years of education, and trails all other clusters in concentration of working women.

The other dominant cluster groups identified in this study are defined as follows: 1) "Agri-Business" is geo-centered in the Great Plains and mountain states. These are, in good part, prosperous ranching, farming, timber, and mining areas. However, the picture is marred by rural poverty—from the Dakotas to Colorado—where weather-worn old men and a continuing youth exodus testify to hard living; 2) "Heavy Industry" is much like "Rank & File," nine rungs down on the socioeconomic scales and hard-hit by unemployment. It is chiefly concentrated in the older industrial markets of the northeastern U.S. quadrant and is very Catholic, with an above-average incidence of Hispanics. These neighborhoods have aged and deteriorated rapidly during the past decade. There are fewer children and many broken homes; 3) "Hispanic Mix" describes the nation's Hispanic barrios and is therefore, chiefly concentrated in the major markets of the Mid-Atlantic and West. These neighborhoods feature dense, row-house areas containing large families with small children, many headed by single parents. They rank second in percent foreign-born and first in short-term immigrant residents, and are essentially bilingual neighborhoods.

Neighborhood clusters are the end result of complex statistical techniques which employ U.S. census data plus many additional types of consumer data to uncover the latent structure of these natural social groups. This method enables us to define and locate all similar communities wherever they may occur in the U.S., and to assign them to homogeneous clusters. These clusters exhibit vivid, predictable behavior patterns toward products, services, media, and promotions. Moreover, because all these data can be correlated by cluster and then projected back into local market configurations, the marketer can target the neighborhood level and thereby increase leverage, efficiency, or both. Every neighborhood in the nation has been computer-assigned to one of forty clusters at the county, zip code, tract, and block group levels. These "prizm" clusters are produced and copyrighted by Claritas Corporation.

DIAGNOSTIC GROUPS: A MIGRANT HOME BASED AREA VS. A MIGRANT NON-HOME BASED AREA.

MAJOR DIAGNOSTIC GROUPS

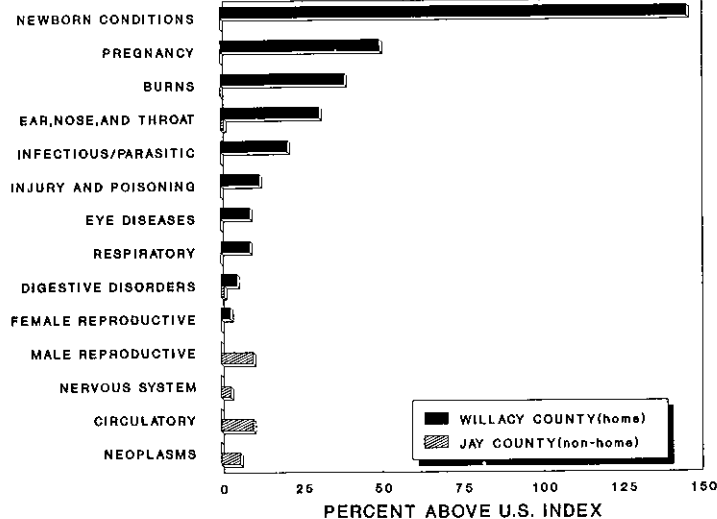


Figure 1

grams which will improve the health status of the migrant population.

The migrant homebase study areas present a disease profile which is significantly different from the non-homebase areas and the United States as a whole. For the state of Texas (the location of the three homebase study area counties) there are four disease categories above the U.S. average. They are 1) "Newborn and Other Neonates with Conditions;" 2) "Pregnancy, Childbirth and Puerperium;" 3) "Burns;" and 4) "Disorders and Diseases of the Ear, Nose and Throat." In contrast to the non-homebase study areas, the homebase areas have significantly more problems and problems of greater magnitude.

All three study area counties have the following problems which are significantly above the U.S.: 1) "Newborn and Other Neonates with Conditions;" 2) "Pregnancy, Childbirth and Puerperium;" and 3) "Disorders and Diseases of the Ear, Nose and Throat." Additionally, "Burns;" "Infectious and Parasitic Diseases;" and "Disorders and Diseases of the Respiratory System" are well above the U.S. average for one or more of the study area counties.

To determine if the patterns displayed in the homebase areas are representative of the migrant population

specifically or just of the Hispanic south Texas population, a control group of counties was identified. The purpose of identifying the control group was to compare the health status of the study area to a control group area. The control group concept was introduced to test the hypothesis that the Hispanic migrant and seasonal farmworker population differs from the Hispanic population *per se*. The control group was matched on several social and economic characteristics, except that the control group had no migrant population. The control group counties were selected by matching as closely as possible the following criteria: 1) >50% Hispanic, 2) >20% of households with income <\$7,500, 3) >25% of population <15 years of age, 4) median age range +/-. 4 years, and 5) similar socioeconomic status. Using the National Planning Data Corporation on-line data system, we selected two counties (San Miguel county, New Mexico and Culberson county, Texas) which met the criteria but which did not have a migrant farmworker population.

A comparison of two study area counties (Cameron and Willacy) to the two control group counties for the most common diagnostic disease categories reveals major differences. None

of the disease categories for the control group counties are significantly above U.S. rates. On the other hand, five disease categories for Cameron county and three categories for Willacy county are significantly above the U.S. average (Figure 2). Thus, it can be stated that the identified problems are specific to the migrant population.

Community Health Summary

This study focused on farmworkers in the midwestern migratory stream. Although the data was not cross-tabulated to track individual workers, data was collected for workers both in their homebase area in Texas and in the upstream areas where they work. Access to health care services tends to be more limited in migrant homebase areas than in non-homebase areas due to the concentration in homebase areas of other potential clinic users who compete with farmworkers for access to services. Because the data indicate that the differences between farmworker health status and that of the general U.S. population is more pronounced for workers in their home areas than for those working upstream, this monograph concentrates scrutiny on data from the homebase study area counties. However, the final study report presents data from all of the study area counties, including both homebase and non-homebase areas.

The quality of life in these homebase areas is characterized by low socioeconomic status—some of the poorest rural areas in the nation, low median income, low median home value, and low percent college graduates. The disease problems in these areas are mostly infectious and specific to the migrant population. The major diseases suffered by the migrant population are conditions in newborns and neonates; infectious and parasitic diseases; burns; disorders of the ear, nose and throat; and injury and poisoning. These problems are typical of the infectious disease cycle. In addition, the exhibited demographic pattern and the poor socioeconomic status also underscore the fact that the migrant population is victimized by an infectious disease cycle. However, as noted earlier, a chronic disease cycle is also

emerging. Chronic disease problems are also prevalent in the migrant population. Subsequent analysis of the migrant-specific program data will reveal the emergence of this chronic disease cycle.

### Program Health Status

For the purpose of this study, community health status analysis of migrant and seasonal farmworkers is specific to migrant homebase communities. In contrast, program health status analysis is specific to the migrant workers who visited the surveyed migrant health centers during the study period.

The program data was compiled from 6,969 patient counters, and is specific by diagnosis, age and sex for the four surveyed migrant health centers.

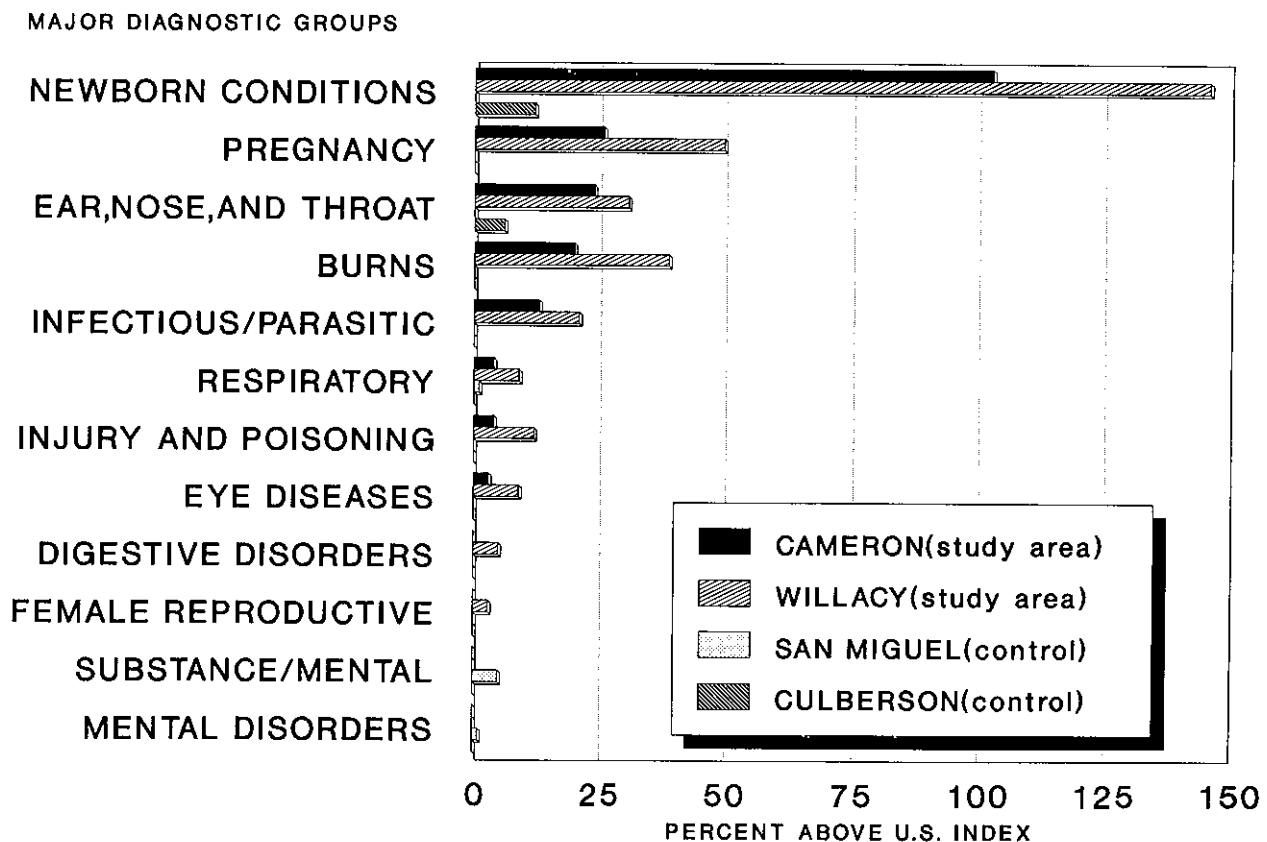
The twenty most common principal diagnoses are detailed for nine age groups by sex. All diagnoses were coded according to ICD-9-CM categories.

One objective of the program health analysis was to identify potential clinical indicators which would be appropriate for migrant farmworkers in each age group. However, the identification of clinical indicators for some age groups is more difficult since accumulating a majority of clinic visits will require the inclusion of more than the top ten most common reasons for visiting migrant health centers. A large percentages of visits which are categorized as "Other" would indicate that significant variation in health problems is encountered for that age group.

### All Ages

Table 1 presents data on all age groups for males and females. Although this data may have limited use for the development of clinical indicators, it does demonstrate the overall major reasons for visiting migrant health centers. The top three male conditions are: 1) health supervision of infant/child, 2) otitis media, and 3) diabetes. The top three female conditions are: 1) diabetes, 2) pregnancy, and 3) health supervision of infant/child. Perusing the list of the top twenty problems gives no surprises. Typically, the principal common diagnoses are dominated by infectious and chronic disease problems. Additionally, environmental conditions are represented by such disorders as dermatitis and respiratory problems.

## DIAGNOSTIC GROUPS: STUDY GROUP COUNTIES VS. CONTROL GROUP COUNTIES. 1989.



CAMERON/WILLACY CO. TEXAS (MIGRANT HOME BASED STUDY AREAS) AND SAN MIGUEL N.M. / CULBERSON TX. (NON-MIGRANT CONTROL AREAS)

Figure 2

**Most Common Principal Diagnoses in Migrant Health Clinics,<sup>1</sup>  
Number and Percent, By Sex, All Ages, 1986-87**

Rank <sup>2</sup>	Diagnosis <sup>3</sup>	Code	Male		Female		Total	
			#	%	#	%	#	%
1	Diabetes Mellitus	250.	172	6.6	408	9.3	580	8.3
2	Health Supervision of Infant or Child	V20.	227	8.7	245	5.6	472	6.7
3	Otitis Media, Suppurative and Unspecified	382.	214	8.2	200	4.6	414	5.9
4	Normal Pregnancy	V22.	0	0.0	396	9.0	396	5.6
5	Upper Respiratory Infection, Acute	465.	151	5.8	164	3.8	315	4.5
6	Essential Hypertension	401.	121	4.7	177	4.1	298	4.2
7	Consultation Without Complaint or Sickness	V65.	69	2.7	126	2.9	195	2.8
8	Hard Tissues of Teeth Disease	521.	78	3.0	106	2.4	184	2.6
9	Contact Dermatitis and Other Eczema	692.	77	2.9	80	1.8	157	2.2
10	Common Cold	460.	0	0.0	142	3.3	147	2.1
11	Conjunctivitis, Acute	372.	61	2.4	81	1.9	142	2.0
12	Strep Throat and Scarlet Fever	034.	61	2.4	64	1.5	125	1.7
13	Inflammatory Disease of Cervix, Vagina, or Vulva	616.	0	0.0	117	2.6	117	1.6
14	Anemia, Unspecified	285.	46	1.8	69	1.5	115	1.6
15	Viral Infection, Unspecified Site	079.	43	1.7	66	1.5	109	1.5
16	Pharyngitis, Acute	462.	47	2.8	59	1.3	106	1.5
17	Urethra and Urinary Tract Disease	599.	0	0.0	84	1.9	105	1.5
18	Gastroenteritis and Colitis, Non-Infectious	558.	48	1.9	0	0.0	99	1.4
19	General Medical Examination	V70.	40	1.5	59	1.3	99	1.4
20	External Ear Disorders	380.	45	1.7	0	0.0	92	1.3
21	Other		956	36.8	1622	37.0	2702	38.7
	TOTAL		2596	100.0	4373	100.0	6969	100.0

1 The migrant health clinics included in this study area are: Migrant and Rural Community Health Association (Michigan), Indiana Health Centers (Indiana), Hidalgo County Health Care Corporation (Texas), and Su Clinica Familiar (Texas).

2 Rank is based on total patients (6,969), all ages. A value of 0.0 indicates the item was not ranked in the top 20.

3 Diagnostic classifications are based on the ICD-9-CM categories.

**Table 1**

Figure 3 displays the top ten diagnoses for all ages (male and female) visiting migrant health clinics.

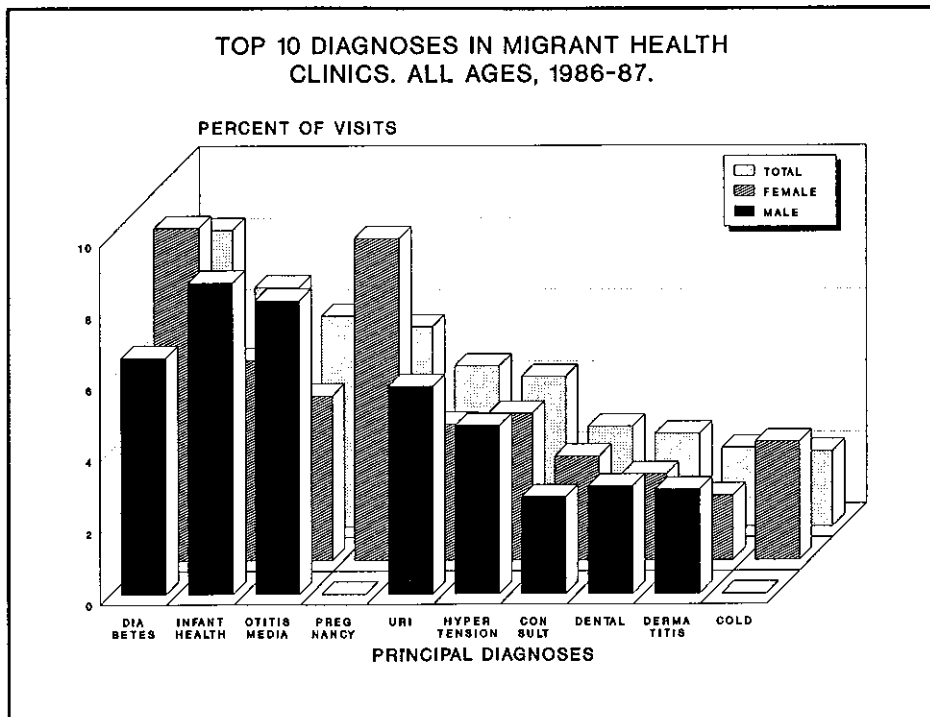
**Age Group <1 (Infant)**

Six of the top twenty diagnoses for this age group are "V" codes, or health maintenance visits. This suggests that prevention is a major component in the migrant health centers for this age group. In fact, almost 50% of all visits for this age group are for health maintenance. "Health Supervision of the Infant" (Code V20) accounts for 29.3% of all visits. Visits related to an infectious disease process account for 27.4% of all visits. Other principal reasons for clinic visits are nutritional (4.5%) and digestive and respiratory problems; the

"Other" category accounts for 9.3% of all visits. The top five diagnoses account for approximately 65% of all visits to migrant health centers for males, females and total population under age one. The top five reasons for visiting migrant health centers for age <1 (male, female, total) are: 1) health maintenance, 2) active upper respiratory infection, 3) consultation without complaint or sickness, 4) otitis media, and 5) single birth (newborn visit). The development of clinical indicators for this infant migrant population should focus on these conditions (representing 65% of all visits) as potential for measuring outcomes.

**Age Group 1-4 (Pediatric)**

The pattern of visits for this age group is similar to that of the <1 age group. Specifically, the dominant reason for a visit is health supervision (20.7%). The second most common reason for a visit is otitis media (17.0%). This age group had about a 5% increase in otitis media compared to the age group <1. As with the age group <1, the dominant disease pattern is infectious and nutritional. For instance, reviewing the top ten reasons for visiting migrant health clinics, four are infectious, two are nutritional, and two are preventive visits. This pattern is typical of the infectious disease cycle. The "Other" category accounted for 18.6% of clinic visits. Since the top five



**Figure 3**

visits dominate (57.1% of all visits) for this age group, they should become the major diagnoses to measure and thus, develop clinical indicators for the migrant health data system.

#### **Age Group 5-9 (Pediatric)**

This age group also has health supervision and otitis media as the top two reasons for visiting the migrant health clinics. However, for this group otitis media ranks first. The distribution of the top ten diagnoses is not dominated by any one category as was seen in the previous age groups. For example, only 36.7% of all visits are accounted for in the top five conditions, about half the value of the previous two age groups. The addition of the top ten visits results in 52.4% of all clinic visits. At this age group we begin to see the appearance of dermatological and parasitic problems. However, as with the two previous age groups, the infectious disease cycle still dominates. For this age group, 26.2% of all visits are categorized as "Other."

#### **Age Group 10-14 (Pediatric)**

The distribution of the twenty most common principal diagnoses for this age group represents a rather diffuse situation. The range from the most common problem to the least common

problem is only 4.6%. Further, the range for the top five problems is only 1.1%. This narrow range presents some difficulty in selecting pertinent clinical indicators. The fact that four or five conditions do not dominate this age group further exacerbates the issue of selecting appropriate clinical indicators. Of all age groups studied in this report, this age group is by far the most difficult for which to choose outcome measures.

Of the 6,969 visits (all age groups), this age group represents only 6.1%. The "Other" category represents 39.0% of all diagnoses. The number one condition for this age group is dental problems, with a percentage almost twice as high in the male population. This is the first time dental disease appears and it is the number one problem for males. For females the number one problem is acute conjunctivitis. This age group visits clinics very seldom for health maintenance visits—only 4.6% of all visits. Contact dermatitis is the second most common problem for both males and females. The top twenty problems may be readily grouped into the following conditions: 1) infectious diseases, 2) respiratory problems, and 3) work-related conditions (such as contact dermatitis, parasitic disease, sprains and strains, and injury). This is

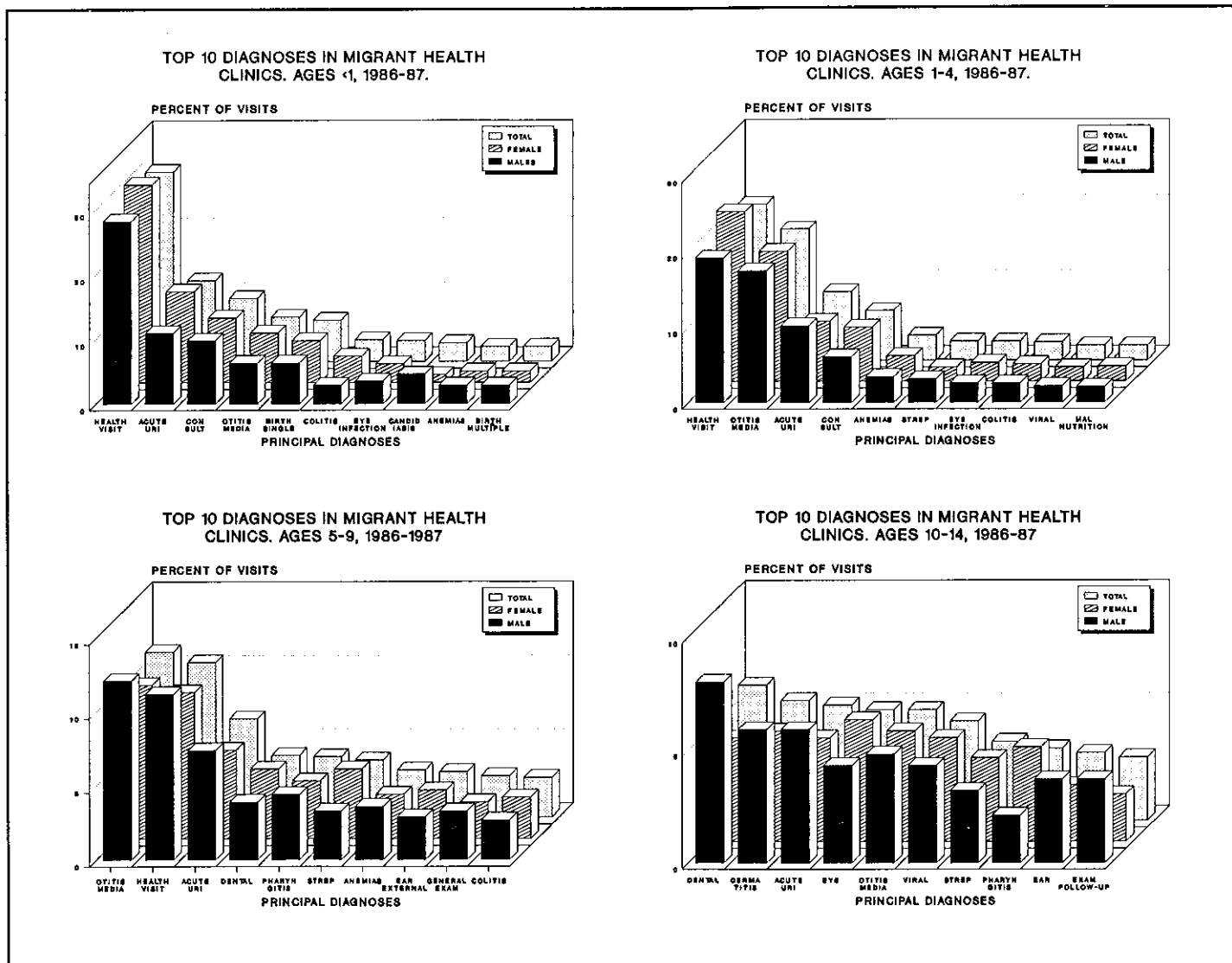
the first age group where we begin to see an abundance of conditions which could be associated with typical migrant working conditions. The problems encountered by this pediatric group are very typical of the infectious disease cycle.

The comparison of the top ten diagnoses for the four age groups that have been discussed thus far is depicted in Figure 4. Clearly, the latter group (age 10-14) does not exhibit a pattern, which suggests the clinical indicators would be defined based on the magnitude of visits for the first three or four conditions. Possibly the groups 1-4, 5-9, and 10-14, which represent the pediatric population, could be considered as a single group for purposes of defining clinical indicators. This will be discussed later.

#### **Age Group 15-19 (Adolescent)**

Some significant changes begin to occur for this age group in the distribution of the most common principal diagnoses. Normal pregnancy becomes the number one reason for visiting a migrant health clinic, representing 16.5% of all visits for females. Dental disease begins to increase in importance as a reason for visiting migrant health centers for both males and females, and represents 6.3% of all visits. A troubling trend begins to emerge for females at this age group: diabetes is the third most common reason for visiting the clinics (4.6%). Males in this age group did not have any visits for diabetes. Another interesting and important trend is that six diagnostic codes are of the "V" type, indicating health maintenance visits. This suggests that at this age group prevention and/or health maintenance is very much a part of the protocol at migrant clinics. Common to other age groups and representing the infectious disease cycle, there are seven diagnostic codes which are indicative of an infectious etiology.

This age group (15-19) represents 8.6% of all visits in the surveyed migrant health centers. The top twenty problems represent 53% of all visits, which means approximately 47% are categorized as "Other." This is the largest "Other" group of any of the age



**Figure 4**

groups investigated. This suggests that significant variation in health problems is encountered. The top five problems—normal pregnancy, dental disease, cold, diabetes, and dermatitis—represent 28.5% of all clinic visits for this age group. Certainly for females, clinical indicators must be reflective of pregnancy, diabetes, and infectious disease. On the other hand, for males, dental disease, dermatitis, and infectious disease problems must be considered as the major indicators for this age group. The first two diagnoses, dental disease and dermatitis, represent 16.5% of the visits. Additionally, these and other diagnoses experienced by the males in this age group are quite typical of a poor working environment. Examples of these problems include dermatitis, respiratory in-

fections, and other respiratory problems.

**Age Group 20-29 (Adult)**

This age group (both males and females) is the second most frequent user of migrant health clinics (18.0%); for females only it is the most frequent user (14.0%). For females the major diagnoses are 1) pregnancy, 2) diabetes, 3) cold, 4) cervix, vagina and vulva inflammatory disease, and 5) special exams. These five problems represent 48.6% of all problems. The five most common principal diagnoses for males are 1) dermatitis, 2) strep throat/scarlet fever, 3) dental disease, 4) dermatophytosis, and 5) urethra and urinary tract disease. These five problems account for 23.4% of all clinic visits. Based on the analysis of this data,

the development of clinical indicators for females should be straightforward; for males clinical indicator definitions seem to be less clear.

A shift in disease patterns occurs at this age. The infectious disease cycle typical for the ages under 20 is now being replaced by chronic and environmentally related problems. The male visits are quite typical of environmental problems and the females experience problems related to the chronic disease cycle. The concentration of problems occurs among the top five for women, but for males the concentration is much less. Further, very few males in this age group visit clinics. They represent only 4.0% of total visits.

### Age Group 30-44 (Adult)

At this age group chronic diseases dominate the top five problems. Specifically, diabetes, hypertension, and back problems are chronic problems exhibited by males and females. Respectively for males and females, these chronic problems represent 16.9% and 18.8% of all visits for this age group. Also, for the first time arthropathies appear as a problem in the top twenty diagnoses. The other major set of problems which dominate this age group are environmental (for instance, back problems, contact dermatitis and other eczema, respiratory problems, and external ear disorders). Interestingly, infectious diseases still represent a significant problem (common cold, upper respiratory infection, and viral infections). Thus, although this age group is dominated by chronic disease

problems, infectious and environmental problems are still significant. The focus of development for clinical indicators for this age group should be directed toward two major areas: 1) chronic disease problems, which are represented in both sexes, and 2) for females, pregnancy (perinatal conditions). As noted in the 10-14 age group and as well for this age group, the distributional patterns of the top twenty diagnoses are quite diffuse. Therefore, defining outcome measurements in terms of clinical indicators becomes somewhat more difficult.

### Age Group 45-64 (Adult)

The conditions or problems experienced by this age group are clearly chronic and related to the aging of the population. The top five problems represent 50% of all visits and are domi-

nated by diabetes, hypertension, arthropathies, and soft tissue disease. This pattern is very typical for females, while some minor variances exist for males. For instance, back problems and dermatitis are among the top five diagnoses; these are environmental or work-related problems. The second top five problems are, however, dominated by environmentally-related conditions for both males and females. The proportion of visits is significantly less, but nevertheless a shift occurs from the top five chronic disease diagnoses. The bottom ten problems are dominated by infectious codes and a few typical lifestyle categories (i.e., obesity, dental, and mental disorders). This age group represents approximately 15% of all visits to migrant health clinics.

Two problems dominate the top ten principal diagnoses for this age group;

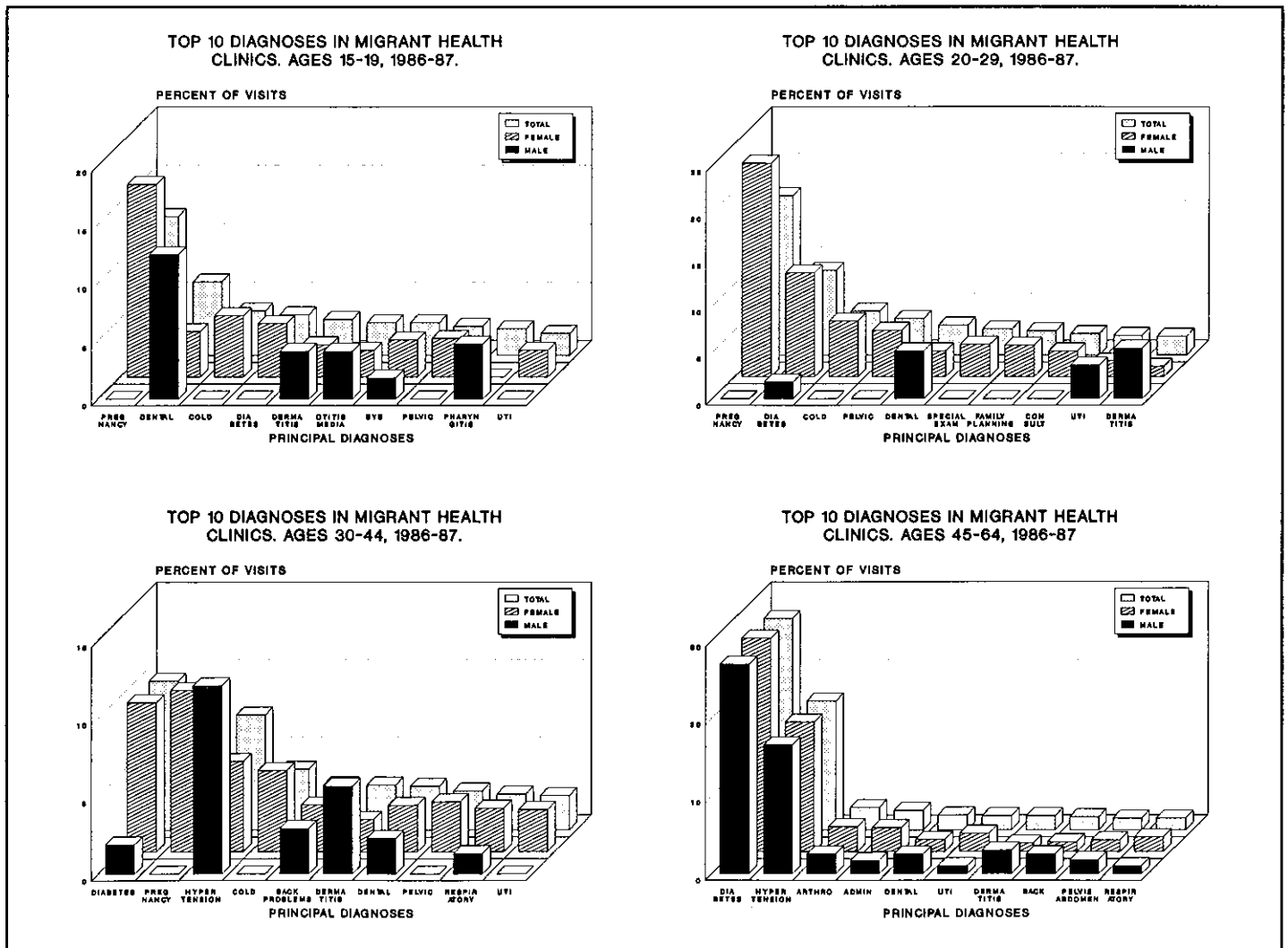


Figure 5



thus, outcome measurement would be most appropriate for the principal diagnoses of diabetes and hypertension. Although other problems are presented, their magnitude does not dictate the development of a comprehensive set of clinical indicators. However, indicators representing broad categories such as infectious or environmental might be appropriate to develop. Figure 5 compares the last four age groups analyzed. The dominance of problems in the top five categories is best portrayed by the age group 45-64.

### **Age Group >64 (Geriatric)**

This age group represents only 1.5% of all visits to migrant health centers. Of the 6,969 visits were made to four migrant health centers during the study period, only 107 visits were made by individuals age 65 and over. Overwhelmingly, diabetes and hypertension accounted for the major problems (70%). Since the numbers are so small for problems represented by the 18 other categories, the discussion of such would be of little statistical value due to significant variation. However, the development of outcome measures should pose very little difficulty because the two major problems represent 70% of all problems. Therefore, this age group presents the most clear direction for outcome measurement.

### **Program Health Summary**

Program health status data must serve as our major source for the development of clinical indicators by life cycle. The analysis of the data by the nine age groups has revealed significant variations in disease patterns (i.e., reasons for visiting migrant health clinics) which can be used as a major input to the identification of appropriate areas for measuring outcome. For those age groups where the problems concentrate in the top five categories, the development of clinical indicators to measure outcome should be relatively straightforward. Thus, in this analysis the age groups <1, 1-4, 5-9, 15-19, 20-29, 45-64, and over 64 are typical of this pattern (i.e., where the top five diagnoses make up a major portion of all visits). The two potentially

most difficult groups for which to develop clinical indicators, based on this analysis, would be the 5-9 and 30-44 age groups. In any event, the development of clinical indicators in migrant health centers must incorporate the results of the program health status analysis.

### **Migrant Clinics and the National Ambulatory Medical Care Survey**

Another perspective to evaluate in order to understand the health status of migrants is the relationship of migrant-specific data (obtained from 1986-87 survey of four migrant centers) to the National Ambulatory Medical Care Survey data (NAMCS, 1985), which is sample survey data representing ambulatory care in the U.S.

The age distribution of the populations visiting these settings is quite different. For males and females under age 15 there is a 2-to-1 ratio of visits for migrant workers compared to the NAMCS population. Thus, migrant clinics see twice as many children under age 15 than do ambulatory care settings in the U.S. as a whole. The only other group where migrant clinics see more patients than the ambulatory care setting is females aged 15-44. Probably the most significant difference occurs at the 65 and over age group. Only 0.8% (males) and 0.7% (females) of total visits are represented by this age group in the migrant clinics, whereas the respective percentages for the national ambulatory care setting are 8.0% and 12.5%.

These age distribution characteristics agree with the previous community health status analysis, where migrant health clinic visits are dominated by younger age groups and the elderly are sparsely represented. Further, the typical demographic profile of the homebase migrant worker is one of a much younger population and one in which the elderly population is under-represented compared to the U.S. population. The predominance of visits to migrant clinics by younger ages and to U.S. ambulatory care settings by older ages is striking.

The male/female ratio of visits for migrant farmworkers visiting migrant

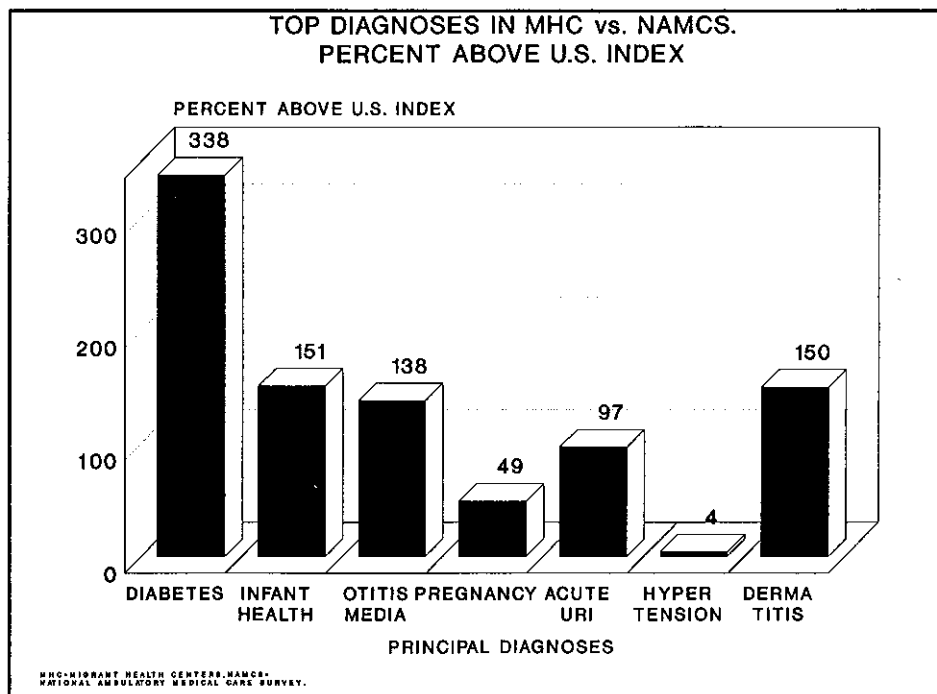
health clinics for the age groups <1, 1-4, 5-9 and >64 are almost equal to one. Females in the age groups 15-19, 20-29, and 30-44 outnumber males dramatically in their use of services. Also, females in the 45-64 age group visit 1.5 times more frequently than males. The highest use of services by age group for males is the 1-4 and 45-64; for females the highest use is in the 20-29 and 30-44 age groups. This use pattern is similar to that found in the NAMCS data. The age groups with the lowest use of health services are >64 and <1 for males, and >64, <1, and 10-14 for females.

### **Principal Diagnoses—Migrant Health Clinics vs. NAMCS**

The top twenty most common principal diagnoses in migrant health clinics were compared with the NAMCS data. Of the top twenty diagnoses in migrant health clinics, only eight were represented in NAMCS data. Thus, visits related to twelve diagnoses in migrant health clinics did not appear as visits in the NAMCS data. Typical diagnoses not appearing in the NAMCS data were infectious (cold, acute conjunctivitis, strep throat/scarlet fever, and viral infections), nutritional (anemias, gastroenteritis, and non-infectious colitis), and occupational (contact dermatitis and eczema).

The eight diagnoses which did appear as visits in both clinical settings were substantially different. Seven of the eight principal diagnoses for visiting health centers were dramatically higher in the migrant health clinics. Thus, diabetes (the number one reason for visiting a migrant center) was 338% above the U.S. average (where the U.S. was set to equal 0). Other principal diagnoses which were significantly above the U.S. were health supervision of infant or child (151% above), otitis media (138% above), normal pregnancy (49% above), acute upper respiratory infection (97% above), and dermatitis (150%). Additionally, visits related to hypertension were 4% above the U.S. average (Figure 6).

Analyzing the principal reasons for visiting health clinics does not provide a measure of the prevalence or incidence of a disease. Clearly, the denom-



**Figure 6**

inator is not the population at risk, but is the total number of visits made by the population during the specified period. Thus, for any one principal diagnosis there is a proportional morbidity ratio (i.e., what percent of total clinic visits is made for each specific diagnosis or morbidity to the clinic?). Such a ratio does not give true risk, since the population at risk for each event is unknown. However, the ratio does tell us the relative ranking of each type of visit based on total visits, and can be compared to similar ratios in other settings.

The utilization differences between clinics could be confounded by the underlying characteristics of the population, and may not be indicative of significant differences between the two groups. The analysis in the community section of this report underscored the major demographic differences between the migrant population and the general U.S. population. Understanding these differences allows us to make some general statements about this comparison of migrant-specific data and the NAMCS data.

In summary, utilization rates by principal diagnosis show significant variations between migrant farmworkers and the general population. Farmworkers do visit clinics more

frequently (well above the U.S. population) for eight conditions, and they visit for infectious, nutritional and occupational reasons which do not even rank in the top twenty conditions for the general U.S. population. Farmworkers do have different problems; farmworker visits exceed the visits by the general population for many common principal diagnoses. Therefore, these results are important to the overall understanding and interpretation of migrant-specific problems.

### Co-Morbidity Patterns

This report has for the first time documented the prevalence of co-morbidities among farmworkers who visit migrant health clinics. The prevalence of co-morbidity at the time of death for the general population has been researched extensively. For example, R. A. Israel reported that more than one cause of death was reported in 35% of deaths in 1917; the percent increased to 60% in 1955 and to 73% in 1979. Using National Health Interview Survey data, Rice and LaPlante about 1.4 chronic conditions reported in 1969-71 and about 1.6 in 1979-81 for each person 65 years of age and older who had limited activity. Recently, an Advance Data report indicated that 48.8% of the

population over 60 years of age had more than one morbidity. In fact, 25.9% of the population had two or more, 14.6% had three or more, and 6.0% had four or more co-morbidities. The nature of co-morbidity problems for age groups under than age 60 is not documented. Therefore, the co-morbidity patterns revealed in the migrant population cannot be compared to national data for ages under 60 years. However, the frequency of co-morbidity patterns for migrant farmworkers above and below 60 years of age will convey information about their degree of illness.

Over forty percent (43.9%) of all farmworkers who visited migrant health clinics had more than one morbidity. The percentage of males with more than one morbidity is 40.6%; for females the percentage is 45.8%. The age groups with the highest percentage of co-morbidities are the <1, 1-4, and >64 groups. The respective co-morbidity averages are 2.3, 2.0, and 1.9. The average number of co-morbidities for all age groups was 1.7. The co-morbidity patterns for males and females are similar to the total pattern. Thus, for males and females the three age groups with the highest percentages of co-morbidities are <1, 1-4, and >64. The respective percentages for males are 63.0, 54.8, and 50.0; for females the respective age group percentages are 61.2, 53.6, and 59.2. The male age group with the fewest co-morbidities is 15-19 and the corresponding female age group is 10-14.

Of the 6,969 migrant patients who visited the clinics, 3,057 had more than one morbidity, producing 5,066 additional morbidities. Generally, the initial morbidity category also produced the largest number of co-morbidities. For example, "Diseases of the Respiratory System" ranked number two for initial morbidity seen at the migrant clinic while the presenting co-morbidity was also coded as "Diseases of the Respiratory System." Apparently, one respiratory problem produced a second one or a third. It would not be unusual to see initial and subsequent morbidities group within a system category. On the other hand, several variations did occur. For instance, infectious and parasitic diseases, the

fifth most common initial morbidity for the total migrant population, produced a rank of ten for infectious and parasitic diseases as the co-morbidity. The number one ranking co-morbidity for farmworkers who had an initial ICD code of "Infectious and Parasitic Disease" was "Diseases of the Respiratory System." Another example would be "Endocrine, Nutritional and Metabolic Disease and Immunity Disorders." This category ranked fourth as the initial morbidity, but the number one ranking co-morbidity for this code was "Diseases of the Circulatory System."

The co-morbidity patterns observed in this migrant population suggest a most vulnerable group, with significant co-morbidities that have the ability to produce substantial disability.

Our only basis for comparison to national data is for those over age 60; for this age group the farmworker population has comparable problems and numbers of co-morbidities. The analysis of the other age groups shows that a significant number have co-morbidities, ranging from approximately 30% to 60% of the population in each age group. Possibly the delay in seeking care, unavailability of care, lack of access to care, potentially appalling working conditions, lack of perceived illness, transitory nature of farm work, and need to work at all costs in order to survive are critical reasons for the poor health status of the migrant population. Whatever the reason for not visiting the health clinics, the outcomes are clear—multiple morbidities representing a population with poor

health status that may need significantly greater care and more treatment due to the delay in receiving initial care. Of course, primary prevention will have the most benefit and, as noted previously, this is practiced when and where feasible.

### Clinical Indicators

Several approaches must be considered in the development of clinical indicators for migrant health centers. In this report, the demographic analysis, community health status information, migrant program-specific data, comparisons of data to national surveys, and patterns of co-morbidity have all enhanced our understanding of migrant health problems and have underscored the need to develop outcome measures specific to migrant

**Clinical Indicator Recommendations for Migrant Health Centers  
by Age Group and Life Cycle**

Target Condition <sup>1</sup>	<1	1-4	5-9	10-14	15-19	20-29	30-44	45-64	>64
Anemia	✓	✓							
Otitis Media	✓	✓	✓	✓					
Gastroenteritis/Colitis	✓	✓							
Well Baby Care (Supervision)	✓	✓	✓						
Immunizations	✓	✓							
Upper Respiratory Infection	✓	✓							
Strep Throat		✓	✓	✓	✓	✓			
Parasitic Disease			✓	✓					
Dermatitis/Eczema				✓	✓	✓	✓	✓	✓
Pregnancy					✓	✓	✓		
Diabetes					✓	✓	✓	✓	✓
Female Reproductive Problems					✓	✓	✓	✓	
Hypertension							✓	✓	✓
Arthropathies								✓	✓
Infections (Conjunctivitis, URI, Strep, Scarlet Fever, Viral, Cold, Otitis Media)	✓	✓	✓	✓	✓	✓	✓	✓	
Respiratory									✓
Digestive									✓
<b>TOTAL BY AGE GROUP (LIFE CYCLE)<sup>2</sup></b>	<b>7</b>	<b>8</b>	<b>5</b>	<b>5</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>5</b>	<b>6</b>

<sup>1</sup> Target conditions which represent approximately 40% to 70% of all diagnoses in migrant health clinics. Additionally, the conditions represent the majority of high risk problems as defined in the community health status assessment.

<sup>2</sup> Number of clinical indicators by life cycle is: Perinatal (7), Pediatric (10), Adolescent (6), Adult (8), Geriatric (6).

**Table 2**

## CLINICAL INDICATOR RECOMMENDATIONS BY AGE GROUP FOR MIGRANT HEALTH CENTERS.

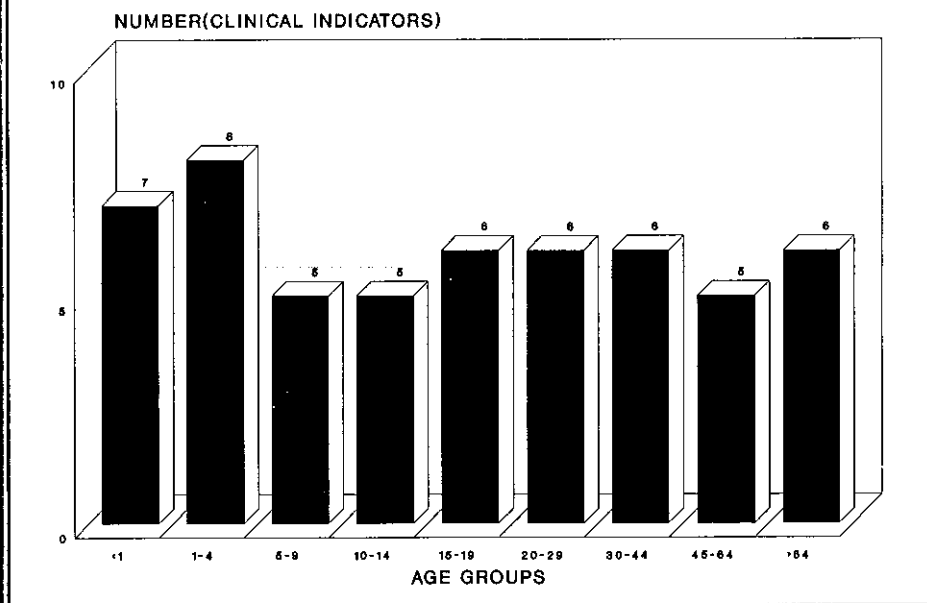


Figure 7

health centers. The measurement of outcome must be defined by a set of clinical indicators which are comprehensive and responsive, and yet do not burden those who must collect the information. Each previous section of this report suggested recommendations. The intent of this section on clinical indicators is to further develop and refine our understanding of the basic clinical problems encountered by migrant farmworkers, and to determine which clinical problems (i.e., most common principal diagnoses) warrant the development of clinical indicators.

A literature review of major medical problems encountered by the migrant population was completed to determine the most frequently occurring diagnoses. Of the four top ranking problems in the literature, three were also among the top problems as determined by this study. In an attempt to group the problems noted in the literature, the health field concept was utilized as a framework. Lifestyle, environment, health care delivery system, and biology became categories into which medical problems were classified.

### Criteria for Selecting Clinical Indicators

The review of the literature on clinical indicators revealed 32 criteria

which may be important to the selection of clinical indicators (see Glossary of Terms). Using all of these criteria (some of which overlapped in meaning), a matrix was designed to illustrate the frequency or number of times the criterion was mentioned in the literature as being important to the selection of a clinical indicator. As a result of this analysis, 32 criteria were grouped into five general categories: I) Epidemiology, II) Intervention, III) Data, IV) Management Criteria, and V) Diagnostic Criteria.

Using the detailed analysis reported in this study, a list of specific outcomes by age groups and life cycles are recommended as candidates for development of clinical indicators (Table 2). The framework outlined above for detailing the criteria for developing clinical indicators and the analysis in this report was used to generate the problem lists exhibited in Table 2. These problem lists of most common principal diagnoses are appropriate for the development of clinical indicators for migrant health clinics. Further evidence of what measurements should be collected is demonstrated by the dominance of problems occurring in the top five, ten or twenty diagnoses by age group. Figure 7 provides the dominance statistics for the nine age groups. Overall, 47% of all problems

occur in the top ten principal diagnoses (i.e., the principal reason for visiting the health center). The age-specific analysis clearly demonstrates that all but three age groups experience the majority of the problems in the top ten principal diagnoses. Three age groups which do not meet this criterion are the 10-14, 15-19, and 30-44 age groups. Two of these three age groups, 10-14 and 15-19, represent about 14% of all visits to migrant health clinics. The third group (30-44) represents a substantial portion of the visits (16.8%). In this latter case, one recommendation would be to consider the problems represented in the top 20 diagnoses since this encompasses 61% of the principal diagnoses for the 30-44 age group.

The overall recommendation is to have the Migrant Clinicians Network evaluate the lists in the accompanying tables, refine the list, and propose specific indicators which would be acceptable to migrant health centers for collection. Many times, it is not the criteria which are so important or the detailed list of problems which is so critical; what may be the most important issue to the development of clinical indicators would be time availability, cost of collection, acceptability of the concept of outcome measurement, availability of computer technology, size of the migrant health clinic, and clinic staffing. Additionally, migratory patterns make it necessary to collect data longitudinally rather than over a single point in time. As can be deduced, there is the potential for myriad problems which must be acknowledged and addressed before beginning the implementation of any such data collection efforts related to outcome measurement and clinical indicators.

Given the facts presented in the analysis of this study and the criteria analysis for the selection of clinical indicators, it is therefore suggested these conditions should be targets for the development of clinical indicators and outcome measurement. However, as noted, the issues concerning statistics may not be as important as the practicality of the implementation. Accordingly, a dovetailing of these two factors must occur. ❖

## Glossary of Terms

*Ability to Report Data at Centers:* Are all migrant health centers able to correctly record the data?

*Acceptable to Clinician:* Is the procedure or intervention easily utilized by the clinician?

*Accuracy:* The degree to which a measurement represents the true value of the condition being measured.

*Benefits:* Does the intervention positively impact the condition?

*Characterizes All Migrant Health Centers:* Is the condition or disease found to exist at all migrant health centers?

*Common Technique:* Is there standard agreement on the intervention or treatment of the condition?

*Consistency in Coding Data:* Will the health centers use the same code for a condition or disease? The ICM-9-CM coding scheme allows different codes for the same condition.

*Cost:* Is the cost of the intervention, performance of the test, and recording of results low or within the health center budget?

*Data Availability:* Will the data collection and extraction be disruptive to the health center?

*Ease of Diagnosis:* Is the disease well defined and easy to diagnose in both field and clinic settings?

*Effectiveness of Intervention:* The extent to which a specific intervention does what it is intended to do for a defined population.

*Efficiency:* Is the effective maneuver being made available to those who could benefit from it with optimal use of resources?

*Epidemiology:* A field of study concerned with the observation and description of the occurrence, distribution, size, and progression of health and causes of disease and death in a population.

*Etiologic Evidence:* Is there proof for the cause or origin of the disease or condition?

*Functional Impact:* Does the disease cause significant impact on the function of patient?

*Impact of Care:* Is the natural history of the disease or condition sensitive to the quantity or quality of care received by the patient?

*Incidence:* Are there a significant number of new cases of the condition or disease each year?

*Lead-Time Bias:* Survival can appear to be lengthened when screening advances the time of diagnosis, lengthening the time

between diagnosis and death without any true prolongation of life.

*Legality/Liability:* Has permission been granted to use patient information from health centers?

*Length-Time Bias:* Screening sometimes produces a disproportionate number of slowly progressing diseases while missing aggressive cases which are present in the population for only a short time... a missed window of opportunity.

*Life Cycles, Consistent With:* Can the disease or condition be sorted according to age, sex, and race?

*Management Criteria:* Medical management of the condition should be well-defined in at least one of the following processes: prevention, diagnosis, treatment, or rehabilitation.

*Number of Encounters Per ICD-9-CM:* Ability to code patient encounters by Diagnostic Related Groups.

*Particular to Upstream Migrant Health Centers:* Is the condition or disease only present in the upstream migrant health centers?

*Predictive Value:* In screening and diagnostic tests, the probability that a person with a positive or negative test is a true positive or true negative. The predictive value is determined by the sensitivity and specificity of the test, and by the prevalence of the condition.

*Prevalence:* Is a large proportion of the population affected by the condition or disease? Rates should be high enough to permit the collection of adequate data from a limited population sample. Prevalence rate refers to the number of people who have a disease at a particular time (a snapshot or cross-section).

*Reliability:* Will the test or intervention obtain the same result when repeated?

*Risks:* Are the hazards to the patient and clinician outweighed by the benefits of a particular intervention?

*Sensitivity:* Does the examination or test pick up the condition every time (i.e., correctly test "positive")?

*Simplicity of Intervention:* Does the intervention or test require simple measures or elaborate, time-consuming ones?

*Specificity:* Does the examination or test correctly identify non-diseased individuals (i.e., correctly test "negative")?

*Validity:* The degree to which a measurement measures what it purports to measure.

Copyright © 1991 by National Migrant Resource Program, Inc., Austin, Texas.

This study of migrant health status was completed by G.E. Alan Dever of Mercer University, serving as a consultant to the National Migrant Resource Program. Funding for the study was provided by the U.S. Department of Health and Human Services, Bureau of Health Care Delivery and Assistance, Migrant Health Program.

Additional copies of this monograph may be requested from the Migrant Clinicians Network, 2512 South IH35, Suite 220, Austin, TX 78704, (512) 447-0770 voice, (512) 447-1666 fax. For information concerning the full report on this research, contact MCN at the number above.

**APPENDIX II**

**HEALTH SURVEY OF MIGRANT AND  
BLACK POPULATIONS IN TATTNALL,  
TOOMBS, AND CANDLER COUNTIES,  
GEORGIA, 1992**

Prepared by

**G.E. ALAN DEVER, PH.D., M.T.**

**Professor, Department of Family and Community Medicine  
Director, Clinical Epidemiology and Biostatistics  
Director, Office of Health Policy  
Grassman Chair of Rural Medicine  
Mercer University School of Medicine**

**BARBARA ADAMS, M.S.A.**

**Program Coordinator, Community Science and  
Community Office Practice Program  
Mercer University School of Medicine**

## I. SURVEY HIGHLIGHTS

### A. Demographic

#### 1. MIGRANT POPULATION

- Dominant age groups are 15-24 (24.5%) and 25-44 (31.7%). Only 0.9% of the population is > 64.
- 83.5% of migrant workers are Hispanic and 11.7% are Black.
- Predominantly male workers (62.9%).
- The majority of migrant workers (55.4%) are single.
- 67.9% of migrant workers have 6 years or less education. This includes 17.1% with no formal education.
- Over ½ of migrants only stay in the area for 3-4 months, 28.6% stay more than 6 months.
- Migrants move usually 2-3 times per year (46.1%). Some move more than 6 times per year, while 17.6% do not move.
- 52.8% of migrants make <\$5,000 per year, while percent making less than \$8,000 is 81.7%.
- Most migrants (60.8%) live in a trailer.
- 31.5% of all migrants live rent free; however, 55.2% do pay rent.

#### 2. BLACK POPULATION

- Dominant age groups are 15-24 (18.0%) and 25-44 (27.5%). Further, age > 64 represents 8.3% - for migrants, this was 0.9%.
- The majority of Blacks in the survey (55.6%) are female. Males dominate the age group 0-4 (16.5% male vs. 10.6% female). Females dominate the age group > 64 (10.3% female vs. only 5.6% male).



- Most Blacks in the survey (48.1%) are single. However, the widowed, divorced, and separated percentages are greater than the migrant population.
- Blacks in the survey show 12.0% with no formal education and 30.9% have 6 years or less education. Further, 39.5% have a high school or more education.
- Only 55.4% of the surveyed population were employed. The remainder were retired (19.6%) and unemployed (18.4%). Notably, 11.7% were unemployed because of health problems and lack of child care.
- 47.8% of the Black population own their own home, and, interestingly, 18.9% have free rent.
- 32.9% of the Black population earns <\$5,000 per year, while those making less than \$8,000 is 50.8%. However, 3.5% make above \$35,000 per year.

## B. Access and Availability of Health Care

### 1. MIGRANT POPULATION

- Migrants obtained health care from a health department or migrant center 42.6% of the time and the Hospital ER 15.1%. They used a doctor's office 28.5% of the time.
- During the past year, 44.3% did not visit a health professional. However, some (5.5%) made >4 visits.
- Only 14.2% of the last visits to a professional were for prevention. Most (56.8%) visited because of an illness.
- 50.9% accessed health care via a friend's car or truck; further, 42.6% used their own car or truck to seek health care.
- A majority of the migrants (53.4%) are >30 minutes away from health care.
- 29.6% and 46.5% of the migrants have never visited a doctor or dentist. Further, 21.8% said it had been >2 years since they went to see a doctor.
- The three main reasons for not seeking health care are: cost (54.2%), unable to speak English (16.7%), and access (14.3%).

- An alarming 65.7% of the migrants do not have insurance. Their main source of coverage is Medicaid and other government assistance.

## 2. BLACK POPULATION

- The majority of Blacks (70.1%) obtain health care at a doctor's office. The health department clinic provides 19.2% of health care for Blacks.
- During the past 12 months, 47.3% did not contact a health professional. However, 16.5% made >4 visits.
- 8.6% of all visits are for prevention. The majority (44.3%) are for illness.
- Transportation to health care was by own car/truck (53.9%) or a friend's car/truck (36.0%). The remainder used a bus, taxi, ambulance, or walked.
- 79.1% are within 15 minutes of health care. Only 12.2% are 30 or more minutes away from a health care facility.
- 15.5% of the Black population have never visited a health professional. Further, 27.2% have not been to a doctor for more than 2 years.
- The major reason for not seeking health care is cost (79.0%).
- Insurance coverage is primarily provided by their place of work (33.3%). However, 11.8% have no insurance and 42.7% have some form of government assistance (Medicare, Medicaid, or other).

## C. Lifestyle and Health Habits

### 1. MIGRANT POPULATION

- 34.7% of the migrant population smoke. Further, 53.0% have never smoked.
- The majority of migrants (55.6%) said they never drank alcohol. However, 21.1% drink more than 2-3 times per week.
- Seat belts are always used 26.0% of the time, while 38.0% said they never use a seat belt.

## 2. BLACK POPULATION

- 20.7% of the Black population surveyed smoke. Further, 66.4% have never smoked.
- The majority of the Blacks surveyed (67.2%) said they never drank alcohol. On the other hand, only 12.1% have more than 2-3 drinks a week.
- Blacks always use seat belts 33.1% of the time, while 22.7% said they never use a seat belt.

## D. Health Education

### 1. MIGRANT POPULATION

- 67.0% were very interested in health education, only 18.9% said they were not interested.
- The top five subjects which migrants were most interested in learning about are: AIDS, Drug and Alcohol Abuse Prevention, Care of Babies, Work Safety, and Sexually Transmitted Diseases. They were least interested in Immunizations, Sanitation, and Juvenile Delinquency.
- The locations most preferred for conducting health education sessions ranged from the Health Department to the Migrant camp. The church was the least preferred.

### 2. BLACK POPULATION

- 76.5% were very interested in health education and only 8.4% were not interested.
- Like the migrants, the Black population were most interested in learning more about AIDS. The other categories in the top five are: Cancer Prevention and Exams, High Blood Pressure, Drug and Alcohol Abuse Prevention, and Sexually Transmitted Diseases. They were least interested in Immunizations, Prenatal Care, and Pesticide Safety.
- Blacks preferred the health department also as the best location for health education meetings.

## E. Medical Conditions

### 1. MIGRANT POPULATION

- Overwhelmingly, Dental Problems ranked as the number one problem for all ages, ages 0-19 and 45-64, and for age group 20-44, it ranked second.
- The top three medical conditions are: dental problems; back, neck, leg, and shoulder problems; and muscle spasms for all ages, ages 20-44, and 45-64. For the 0-19 age group, they ranked rashes as number two and allergy as number three.

### 2. BLACK POPULATION

- The top three medical conditions for all ages were sinus problems, dental problems, and hypertension. Age group 0-19 experienced asthma and allergy as the first and third ranking problems. For age groups 20-44 and 45-64, back, neck, leg, or shoulder pains ranked third. For the age group >64, arthritis ranked number one.

## E. Medical Symptoms/Problems

### 1. MIGRANT POPULATION

- The top three ranking medical symptoms for all age groups and the specific age groups 0-19 and 45-64 were: Headache, Difficulty Seeing, and General Body Pains. However, the number two problem for age group 20-44 was injury.
- The lowest ranking medical symptoms ranged from Diarrhea, Heart Palpitation, Excessive Urination, and Difficulty Hearing and Sleeping.

### 2. BLACK POPULATION

- The top three ranking medical symptoms for all age groups were headache, difficulty seeing, and stiffness in joints. For age group 0-19, Diarrhea ranked second; for age group 20-44, anxiety/nervousness ranked second.
- The fewest medical symptoms recorded were difficulty hearing, excessive urination, and diarrhea for all age groups. Specific age groups recorded injury, poor appetite, and difficulty sleeping as their least common problems.

## G. Female Health

### 1. MIGRANT POPULATION

- 17.1% of the migrant women have never had a pap smear, and for an additional 10.0%, it has been more than five years since their last pap smear.
- 26.1% of the migrant women have never has a breast examination.
- An alarming 48.5% of migrant women have never performed a Breast Self Examination.

### 2. BLACK POPULATION

- Most of the Black women (91.2%) have had a pap smear in the last five years. However, 8.9% never or it has been longer than five years since last pap smear.
- Most of the Black women (92.2%) have had a breast examination.
- Approximately 73.0% have performed a breast self examination in the last 12 months. 19.2% have never performed a breast self examination.

## G. Environment

### 1. MIGRANT POPULATION

- Houses used septic tanks (61.9%).
- Primary water source from well or water.
- 7.0% of homes had no running water or electricity.
- 49.6% of homes had rats, roaches, etc.
- Garbage, refuse, junk observed near homes (27.2%).
- 41.3% of buildings structurally unsound.
- At least 1/3 of buildings needed paint, window repair, screens, and interior repair.

## 2. BLACK POPULATION

- Majority homes (92.1%) used public sewer.
- Primary water source from city or county water system.
- All homes had running water and electricity.
- 53.6% of homes had rats, roaches, etc.
- Garbage, refuse, junk observed near homes (17.2%).
- 19.6% of the homes needed repair.

APPENDIX III

## HIV Infection, Syphilis, and Tuberculosis Screening Among Migrant Farm Workers — Florida, 1992

An estimated 2.7–4.0 million persons in the United States are classified as migrant and seasonal farm workers (1). Despite a high prevalence of tuberculosis (TB) and other conditions among migrant workers (2–4), approximately 13% have access to or receive care at federally funded migrant health clinics (5). During February–March 1992, to assess the prevalence of selected health conditions among migrant farm workers, the Florida Department of Health and Rehabilitative Services (FDHRS) conducted a voluntary screening for human immunodeficiency virus (HIV)-1 infection, syphilis, and TB among workers living in 14 migrant camps in Immokalee, Florida. This report summarizes the results of the screening and describes disease-prevention efforts developed by FDHRS for migrant workers.

The period February 1–March 31 was chosen for screening because Florida's perishable crops are in season and the number of migrant workers peaks. Outreach workers went door-to-door in the camps encouraging workers aged  $\geq 16$  years to enroll, and leaflets encouraging enrollment were posted in the camps several days before the screening began. Screening was conducted during evening hours. Participants received pretest HIV counseling and signed an informed consent form for testing for HIV-1 antibody (enzyme immunoassay with confirmatory Western blot or immunofluorescent assay), syphilis, and TB infection (Mantoux testing with 5 tuberculin units of purified protein derivative). In addition, participants completed an interviewer-administered questionnaire assessing their work, lifestyle, and medical history. Participants were asked to return within 48–72 hours for a skin test reading, serologic test results, and posttest HIV counseling.

Tuberculin skin tests (TSTs) were considered positive if the induration was  $\geq 10$  mm for HIV-1-seronegative persons and  $\geq 5$  mm for HIV-1-seropositive persons. Any positive skin test reading in this screening was attributed to infection with *Mycobacterium tuberculosis* because 1) bacille Calmette-Guérin (BCG) vaccination is usually given as a childhood vaccination in all native countries of migrant farm workers and TST reactivity to BCG wanes over time and 2) vaccinated persons included in this screening were in a group at high risk for TB.

Of an estimated 518 persons  $\geq 16$  years of age residing in the 14 migrant camps, 310 (60%) participated in the screening. Participants were predominantly male (247 [80%]), Hispanic (165 [53%]) or black non-Hispanic (130 [42%]), and foreign-born (Haiti [93 (30%)], Mexico [83 (27%)], and Guatemala [44 (14%)]).

Twenty-six (8%) had reactive serologic tests for syphilis (STS); 15 (5%) were HIV-1-antibody seropositive (four of the 15 had reactive tests for both HIV-1 and syphilis). Persons born in the United States (11%) were more likely than those who were foreign-born (3%) to have positive HIV-1 tests (relative risk [RR]=3.6; 95% confidence interval [CI]=1.4–9.7) and reactive STS (RR=2.0; 95% CI=1.0–4.2). Of the 267 workers whose TSTs were read, 118 (44%) were positive, including four who were also HIV-1-antibody seropositive. TST positivity was similar among U.S.-born and foreign-born workers (RR=0.9; 95% CI=0.6–1.3).

Workers with reactive STS were referred for treatment; of the 26 who had a reactive STS, one person had primary syphilis; six, secondary syphilis; four, early latent syphi-

## Migrant Farm Workers — Continued

lis; and five, late latent syphilis. Five had been previously treated for syphilis, and five were unavailable for examination.

Those with positive test results for TB or HIV-1 infection were referred for further evaluation. Thirteen of the 15 persons who were HIV-1 seropositive had newly diagnosed infections. Of the 118 participants with positive TSTs, 55 (47%) returned for chest radiographs and sputum collection. Isoniazid preventive therapy was initiated for 18 persons with latent tuberculous infection; in addition, active TB was diagnosed in one person and treatment was initiated. When necessary, ongoing care was arranged by referring workers to migrant health centers in other locations.

Analysis of questionnaire data (controlled for birthplace [i.e., U.S.-born versus foreign-born]) indicated that use of crack cocaine was associated with positive STS (RR=4.1; 95% CI=1.3–12.6). Risk factors associated with HIV-1-antibody seropositivity included having more than two sex partners during the last 6 months (RR=3.8; 95% CI=1.3–11.1), a prior history of syphilis (RR=3.8; 95% CI=1.2–11.7), and among men, having ever paid for sex (RR=2.8; CI=0.9–9.0). Injecting-drug use (IDU) and homosexual behavior were rarely reported, regardless of HIV-1-infection status; of those who were HIV-1 positive, none reported IDU, one male reported homosexual behavior, and one female reported bisexual behavior. Forty-seven percent of the participants had never used a condom.

*Reported by: N Frees, J Polkowksi, MD, Collier Public Health Unit; R Farmer, DO, R Akin, Collier Health Svcs; MJ Bankowksi, PhD, M Neuman, PhD, Naples Community Hospital; V Negrón, N Feintuch, MA, R Cremona, J Wroten, J Witte, MD, RS Hopkins, MD, State Epidemiologist, Florida Dept of Health and Rehabilitative Svcs. A Landay, PhD, Rush-Presbyterian-St. Luke's Medical Center, Chicago. Clinical Research Br and Program Operations Br, Div of Sexually Transmitted Diseases and HIV Prevention, and Clinical Research Br, Div of Tuberculosis Elimination, National Center for Prevention Svcs; Epidemiology Br, Div of HIV/AIDS, National Center for Infectious Diseases, CDC.*

**Editorial Note:** When compared with migrant-worker populations in other areas of the United States, workers in the southeastern United States are more likely to live away from their families while doing farm work (64%), to live in poverty (73%), and to lack documentation of legal residence status (25%) (6)—factors that can impede their access to medical care. The findings in this report document high prevalences of syphilis, HIV-1 infection, and TB among migrant workers in this region of Florida. The 8% prevalence of positive STS among persons in this survey was higher than the 0.8% reported in a national serologic survey (7). Moreover, the HIV-1 seroprevalence of 5% was higher than the 3.5% reported in populations of Belle Glade, another Florida agricultural community, and the 2.6% reported for farm workers in North Carolina (4,8).

The high TST reactivity among workers in this survey is consistent with previous reports (9). Because test results were available within 72 hours, most workers in this screening returned to receive their test results; however, many workers relocated and did not return for follow-up with chest radiographs and sputum tests, which were scheduled several weeks later. In addition, some workers who tested positive but who did not have symptoms (e.g., coughing) did not believe a positive TST indicated TB. Workers were given letters with test results to present to health centers in other locations.

The FDHRS survey identified a substantial number of migrant farm workers with unrecognized and untreated preventable diseases. In particular, treatment and counseling of these persons could prevent transmission of STDs to their sex partners and,



for TB, to those with whom they live and travel. Although the precise magnitude of TB among migrant workers is not known, different studies have detected high prevalences of asymptomatic tuberculous infection and clinical TB among these populations; the risk for TB among migrant workers has been estimated as six times greater than in the total U.S. population (10). The Advisory Council for the Elimination of Tuberculosis recently offered recommendations for the prevention and control of TB among migrant workers (10).

The screening to detect HIV-1 infection, syphilis, and TB among migrant workers in Immokalee underscores the need for public health professionals who are trained to respond to health-care needs within the migrant-worker population. The FDHRS used data from this screening to develop crosstraining for public health workers on STDs, including HIV infection, and TB and is conducting other assessments of the prevalence of communicable diseases among migrant farm workers in Florida.

#### *References*

1. Farmworkers Justice Fund. Farmworker demographics. In: *The occupational health of migrant and seasonal farmworkers in the United States*. Washington, DC: Farmworkers Justice Fund, 1986.
2. Ciesielski SD, Seed JR, Esposito DH, Hunter N. The epidemiology of tuberculosis among North Carolina migrant farm workers. *JAMA* 1991;265:1715-9.
3. Jones JL, Rion P, Hollis S, et al. HIV-related characteristics of migrant workers in rural South Carolina. *South Med J* 1991;84:1088-90.
4. Castro KG, Lieb S, Jaffe HW, et al. Transmission of HIV in Belle Glade, Florida: lessons for other communities in the United States. *Science* 1988;239:193-7.
5. de Anda T. Migrant farm workers' substance abuse: issues and concerns. *Texas Journal of Rural Health* 1992;31-8.
6. US Department of Labor. Findings from the national agricultural workers survey, 1990: a demographic and employment profile of perishable crop farm workers. Washington, DC: US Department of Labor, 1990;89:97-8.
7. Hahn RA, Magder LS, Aral SO, et al. Race and prevalence of syphilis seroreactivity in the United States population: a national sero-epidemiologic study. *Am J Public Health* 1989;79:467-70.
8. CDC. HIV seroprevalence in migrant and seasonal farmworkers—North Carolina, 1987. *MMWR* 1988;37:517-9.
9. CDC. Tuberculosis among migrant farm workers—Virginia. *MMWR* 1986;35:467-9.
10. CDC. Prevention and control of tuberculosis in migrant farm workers: recommendations of the Advisory Council for the Elimination of Tuberculosis. *MMWR* 1992;41(no. RR-10).