A Report from The California Endowment

Suffering in Silence: A Report on the Health of California's Agricultural Workers

Photo: Bill Gillette

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Research Conducted by the California Institute for Rural Studies
Sponsored by The California Endowment
November 21, 2000

The California Endowment

Acknowledgements

This project was supported by a grant from The California Endowment to the California Institute for Rural Studies (CIRS). Project Principal Investigator was Don Villarejo from October 1998 through June 1999. David Lighthall assumed that responsibility, effective July 1, 1999. Co-investigators are Bonnie Bade, Steve McCurdy and Richard Mines. Steve Samuels is Project Bio-Statistician. Daniel Williams III was Project Coordinator from October 1998 through July 2000. Bade, Williams and Anne Souter were Site Coordinators for the project. Kathryn Azevedo, Maura Dwyer, Konane Martinez, Rafael Pena and Laura White were key field associates or lead interviewers in several of the field sites. Carol Crabill, CIRS Associate Director, managed the burdensome and complex business aspects associated with operating seven field stations, and interfacing with five medical clinics and two medical laboratories. Data entry for the physical examination and risk behavior questionnaire was performed by staff of the California Department of Health Services while for the main survey instrument it was provided by Research Support Services. Ken Kambara and Lisette Saca assisted with data analysis. The authors are grateful for the helpful advice regarding the interpretation of the medical findings that was provided by Dr. Sherry Baron and Dr. Nelson K. (Kyle) Steenland of the National Institute for Occupational Safety and Health, and Dr. Howard Frumkin, Rollins School of Public Health of Emory University.

More than 100 individuals conducted the field research described in this report. The interviewers, in particular, deserve special recognition for their amazing perseverance under difficult conditions, sometimes nearly impossible conditions, to obtain the first-hand information reported herein.

Finally, the authors would like to especially thank the 971 agricultural workers from all parts of California who generously provided both their time and cooperation. Their willingness to share information, much of it of a very personal nature, and to participate in comprehensive medical examinations reflected a belief-perhaps 'hope' might be a better word — that the results of this survey would lead to significant improvements in the health status of all agricultural workers. The authors share this hope, and are also determined that the collective voice of California's agricultural workers, as reflected in the findings described in this report, contributes to substantial improvements in their lives.

Foreword

It is with great respect for the pioneers in the struggle for the health and dignity of America's farm workers, that The California Endowment announces the publication of Suffering in Silence: A Report on the Health of California's Agricultural Workers. It has been 40 years, since Edward R. Murrow's documentary "Harvest of Shame," and 61 years since John Steinbeck's "Grapes of Wrath." In their respective mediums, they focused the nation's attention on the plight of our farm workers. In each case Americans could not help but be moved by the simple dignity, yet abject poverty of those among us who help put food on our table.

More importantly, César Chávez and Dolores Huerta laid the foundation for the rise of United Farm Workers and the farm worker movement. Through the efforts of these leaders and many others, some important changes occurred, including such legislative landmarks as the federal Migrant Health Program and California's Agricultural Labor Relations Act. Based on the findings of this report, however, a great deal of work remains to be done.

With this report we are asking California and the rest of the nation to once again cast their eyes on the more than 1 million migrant and seasonal agricultural workers of California. It represents the nation's first comprehensive, statewide health survey of hired agricultural workers. As cogently described by principal researcher Don Villarejo in the pages to follow, the report provides a sobering yet authoritative window on the health and well-being of our agricultural workers. In addition to an extensive survey administered in their homes, participants underwent full physical exams and blood chemistry analyses. We find the results disturbing. As a result of their socioeconomic conditions and immigration status, no group of workers in America faces greater barriers in accessing basic health services.

Despite the distressing news contained in the report, there is some evidence of progress at the policymaking level: new leadership and commitment to agricultural worker health and safety issues has been on a steady rise in the legislature, resulting in several important bills signed into law last year by Governor Gray Davis. In addition, Mexico's visionary, President-elect Vincente Fox has called for a binational partnership to address the health and welfare issues of families who migrate between our two countries, or have family members residing in both countries. The rising interest of significant policymakers on both sides of the Mexican border may be a signal that the opportunity for lasting improvements in the lives of agricultural workers is finally at hand.

It is our hope that this report, in conjunction with forthcoming recommendations from a task force of experts on agricultural health, will catalyze needed progress in this area. Programs, strategies, and policies will need to be reexamined, fine-tuned, or overhauled. These findings have triggered a Board of Directors-endorsed re-examination of our organizational commitment as well.

This report represents a collaboration between two organizations committed to helping the underserved — The California Endowment and the California Institute of Rural Studies (CIRS). To Don, David Lighthall, executive director of CIRS, and all of the researchers and others whose vision and hard work made the study possible, we extend our sincere appreciation.

In dedication, however, we turn to California's agricultural workers. They continue to toil in our fields – often unseen and forgotten, but ever present. The irony is inescapable; that the fruits of their labor provide us with such health, yet their health status suffers in ways that most Americans would never tolerate. So as the nation gathers on November 23 to give thanks and celebrate the bountiful fall harvest with family and friends, let us pledge to seize these moments of opportunity to address this issue that has plagued Americans for the last century.

As we enter this new millennium, let us act not out of shame, but from a sense of collective responsibility that is grounded in the dignity and inestimable value of our agricultural workers.

Sincerely,

Robert K. Ross, M.D.
President and CEO
The California Endowment

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Executive Summary

This report summarizes the initial findings of a large-scale, statewide, population-based survey of the health status of California's agricultural workers carried out in 1999. The survey was conducted by the California Institute for Rural Studies (CIRS), a private, non-profit research organization based in Davis. The California Agricultural Worker Health Survey (CAWHS) is the first statewide health survey among agricultural workers that has included a comprehensive physical examination, and provides the first-ever baseline health status data for this labor force. The survey was funded by a major grant from The California Endowment.

The CAWHS is constructed from a rigorously objective random sample of subjects. Participants were randomly selected from a comprehensive, door-to-door household survey conducted in seven communities. Five communities were randomly selected to represent each of five of the state's six agricultural regions: Arbuckle (Sacramento Valley), Calistoga (North Coast), Cutler (San Joaquin Valley), Gonzales (Central Coast) and Vista (South Coast). The community of Mecca represents the sixth region (Desert). Firebaugh was added to represent the west side of the San Joaquin Valley. Half of the state's agriculture workers are employed in the San Joaquin Valley.

Survey interviewers went to both residences within the towns, as well as thoroughly searched labor camps and informal dwellings found in the agricultural fields surrounding these communities. Some 1,174 randomly selected agricultural workers were asked to participate. Of these, 971 agreed, for a response rate of 83%.

Each subject agreed to a one-and-one-half-hour interview at their residence, a comprehensive physical examination at a nearby medical facility, including a full blood chemistry analysis performed by an independent medical laboratory, and a private interview at the clinic that inquired about risk behaviors. Two-thirds of the randomly selected subjects (652) completed all three components of the CAWHS for an overall participation rate of 56%.

The main feature of the CAWHS sample (971 persons) is that it is mostly comprised of young, married, Mexican men who have little formal education and who earn very low annual incomes. Overall, the sample median age is 34, about 92% are foreign-born, 59% are married, 63% have attained six or fewer years of formal education, only half say they can read Spanish well, and the median reported total annual earnings from all sources is between $7,500 and $9,999. About 96% say they are Mexican, Hispanic or Latino, and 8% overall are of indigenous origin (indios).

Physical examination and blood chemistry data have been reviewed and analyzed for the 652 persons who completed all components of the survey, the "PE sample." The main findings are:

- Nearly one in five male subjects (18%) had at least two of three risk factors for chronic disease: high serum cholesterol, high blood pressure or obesity.

- For all three age cohorts (20-34, 35-44, 45-54), a significantly larger fraction of male subjects had high serum cholesterol as compared with the U.S. adult population.
- Both male and female subjects in the CAWHS sample show substantially greater incidence of high blood pressure as compared with the incidence of hypertension among all U.S. adults.
- 81% of male subjects and 76% of female subjects had unhealthful weight, as measured by the Body Mass Index (BMI). Overall, 28% of men and 37% of women were obese. In both aspects, the PE sample compares unfavorably with all U.S. adults and with findings from the Hispanic Health and Nutrition Examination Survey.
- For both male and female subjects, a significantly greater fraction of persons in the PE sample, show evidence that they are likely to suffer from iron deficiency anemia than is the case for U.S. adults. For males, in both age cohorts, it is about four times greater in the PE sample than among comparable groups of U.S. men.
- Clinically determined dental outcomes were startling. More than one-third of male subjects had at least one decayed tooth. And nearly four out of ten of female subjects had at least one broken or missing tooth.

Subjects in the CAWHS sample (971 subjects) were asked to report on utilization of and access to health care services. The findings contrast sharply with comparable data for U.S. adults:

- Nearly 70% of all persons in the sample lacked any form of health insurance, and only 7% were covered by any of the various government-funded programs intended to serve low-income persons.
- Just 16.5% said their employer offered health insurance, but nearly one-third of these same workers did not participate in the insurance plan that was offered, most often because they said they could not afford either the cost of premiums or because they could not afford the co-payments for treatment.
- When asked to describe their most recent visit to a doctor or clinic, a plurality of male subjects (32%) said they had never been to a doctor or clinic in their lives. But a plurality of women had a medical visit within the previous five months.
- Half of all male subjects and two-fifths of female subjects said they had never been to a dentist. The extremely low access to dental health services is reflected in the high proportion of adverse dental health outcomes found in the PE sample.
- More than two-thirds of subjects reported never having had an eye care visit.
- Some 18.5% of CAWHS subjects reported having a workplace injury at some point in their farm work career that was compensated by a payment to them under the California Workers Compensation Insurance System. But just one-third of all CAWHS subjects thought that their employer had such coverage, despite the fact that California law required such coverage.

- Only 57% said they had received pesticide safety training, but more than 82% reported that their employer provided toilets, wash water and clean drinking water.

The report concludes that the risks for chronic disease, such as heart disease, stroke, gall bladder disease and diabetes, are startlingly high for a group that is mostly comprised of young men who would normally be in the peak of physical condition. Hired farm work is often very strenuous, and surely qualifies as regular exercise.

Unhealthful diet is likely to be a major contributor to the conditions noted above. It is a tragedy and more than a little ironic that the labor force that is responsible for producing such a great abundance of healthy food in California should themselves be suffering from the effects of poor nutrition.

California's Agriculture

California's agriculture ranks among the state's most important industries. In 1999, the state's farm businesses received more than $26 billion from their sales of crops, livestock and livestock products. To put that figure in perspective, $26 billion is three times larger than the combined annual box office receipts of the entire U.S. motion picture industry.

Even less well known than its very great size is the fact that California's agricultural industry has experienced remarkable growth in recent decades. For example, the annual volume of the state's fruit and vegetable production, measured in tons harvested, has doubled in the last thirty years. Today, more than 50% of all U.S. major vegetable production, and 40% of major fruit production comes from California's fields and orchards. Another indicator of the pace of this growth is that the state has added more than 800,000 acres of orchards in just the past quarter century, and harvested vegetable acreage has increased by over 40% in the same period.

A principal reason for this impressive record of success is that Americans are eating more fruits and vegetables than ever before. The great nutritional value of California's fruits and vegetables has been increasingly recognized as highly desirable by consumers throughout the U.S., as well as in many other parts of the world. The U.S. Department of Agriculture has adopted a "5-a-day" program, advocating five servings each of day of vegetables and fruit. Healthy lifestyles today rely on the type of diet that California's agricultural industry is uniquely able to provide.

At the heart of this industry are the farmers, unpaid family members and agricultural workers whose labor makes these achievements possible. Today, an estimated 700,000 agricultural workers toil in the state's fields and livestock facilities.

Hired workers have become an even more important component of the state's agricultural system over the period of the past fifty years. The share of all annual farm work in the state performed by farmers and family members sharply declined in the past half century, from about 40% in 1950 to less than 15% today. Ever increasing numbers of agricultural workers have been recruited to fill the gap. Today, more than 85% of all of the labor needed to produce the state's crops and livestock is performed by hired workers.

Agricultural workers are a distinctive group and have experienced the consequences of "agricultural exceptionalism." By deliberate actions of Congress, they were excluded from the protections of the Fair Labor Standards Act (FLSA), and from the National Labor Relations Act, laws that were intended to provide at least minimal standards of employment and collective bargaining rights for all other U.S. workers. Today, although FLSA requires overtime pay for all hours worked in excess of 40, agricultural employers are completely exempted from this provision. Similarly, children under the age of 14 may not be employed in any industry, except in agriculture, where

the minimum age is 12. No age restrictions apply to children working on their family's farm. More recently, Congress has chosen to exclude workers employed on farms with fewer than eleven employees from the protections of the Occupational Health and Safety Administration (OSHA), unless the employer operates a farm labor camp or if an on-the-job fatality occurs. All other industries are subject to OSHA regulation irrespective of the number of employees. Even immigration law has treated agricultural workers differently than all other categories of employees. The 1986 Immigration Reform and Control Act specifically provided that any agricultural worker who entered the U.S. without immigration authorization and who toiled in perishable crop agriculture for at least 90 days between May 1985 and May 1986 was eligible to apply for regularization of their status. In no other industry did unauthorized workers enjoy such an opportunity.

Surprisingly little is known about the health status of U.S. agricultural workers and their families. Despite the plethora of federal and state programs that provide health services for agricultural workers, the supporting government agencies fund little or no fundamental research on this population. Nearly all health status data collected by these agencies is obtained exclusively from the self-selected population seeking to utilize the services they provide. Similarly, the National Center for Health Statistics and the Center for Disease Control are, even today, unable to provide even rudimentary information about the health status of the nation's hired farm labor force. Recent reviews of the medical literature concluded that there exists no baseline data at all regarding the health status of U.S. agricultural workers or their family members (Mobed et al, 1992; Villarejo and Baron, 1999).

One factor that helps to explain the paucity of reliable health status information about this population is that most agricultural workers are foreign-born, do not speak or read English, live in poverty, and many are undocumented. Large numbers, but unknown in absolute magnitude, do not have a usual place of residence in the U.S. because they migrate to find work. Even the decennial Census of Population and Housing, with all of the resources of the federal government at its disposal, has had a great deal of difficulty just attempting to count their number, and has largely failed to do so. Clearly, an accurate determination of the health status of this population requires unconventional research methods.

The California Agricultural Worker Health Survey

The California Endowment awarded a major grant in October 1998 to the California Institute for Rural Studies (CIRS) to conduct a health needs assessment of the agricultural worker population of the state. This award had several goals:

- Develop a health needs assessment based on a representative cross-section of current agricultural workers in California;
- Provide, for the first time, reliable and current baseline data that can serve to objectively identify priorities for interventions funded by The California Endowment; and
- Provide baseline data that can serve as a reference against which to measure the effectiveness of future public and private interventions.

A key feature of the California Agricultural Worker Health Survey (CAWHS) is that it was to include a comprehensive physical examination to be administered by third-party medical personnel, ideally at a local clinic that has experience serving agricultural workers. The physical examination that was contemplated would include a full blood workup at a medical laboratory and possibly other lab work as well.

Finally, the CAWHS was to be large-scale and population-based, involving an approximate total of 1,000 subjects from communities throughout the state. Selection of the communities would be such that each of California's six agricultural regions would be represented, assuring the inclusion of a wide range of farm workplace occupational exposures in the state.

CAWHS: Community Participation

The first step in developing the CAWHS was to obtain significant advice regarding the design of the project directly from current agricultural workers. A Farm Worker Advisory Committee composed of eight individuals (four men, four women) was recruited during October 1998, with the assistance of CIRS staff and local collaborators Esther and Jorge Villalobos. A stipulation imposed by CIRS was that those who were recruited for this purpose should have no formal relationship with farm worker advocacy organizations, labor unions or service providers.

Three meetings with the Farm Worker Advisory Committee were held in the nearby community of Winters, at a Catholic Church facility, during autumn and winter, 1998-99. All committee members were unaware of The California Endowment and requested that CIRS provide basic information about that organization and its motives in sponsoring this project. The committee also requested a direct meeting with the foundation staff.

CIRS staff explained the goals of the CAWHS and responded to questions from committee members about how the information that was gathered was going to be used. CIRS staff asked the committee members for advice about how the CAWHS

should be designed. In particular, questions were raised about how to structure the project to ensure a high level of participation, including whether potential subjects would be willing to undergo a complete physical examination.

The advisory committee was generally supportive of the concept of the CAWHS, and was enthusiastic about the thoroughness of the physical examination that would be provided at no cost to all participants. Also, it was agreed that a $30 honorarium to be paid to CAWHS subjects was appropriate in view of the time commitment and possible inconvenience that would be required of subjects.

In a surprising development, the committee argued that all subjects should be provided with free medical treatment for any and all health problems disclosed by the physical examination, and asked CIRS to present this request to the sponsoring foundation. Several committee members pointed out that few farm workers have any form of health insurance, and that if people learned of adverse health conditions as a result of participation in the CAWHS, they should be entitled to free and complete treatment.

Ultimately, after discussion with foundation staff, it was necessary to report back to the committee that neither request could be met. CIRS and the foundation could not meet the potentially large costs of providing full medical care for all subjects. However, the committee was provided assurance that medical personnel would attempt to meet individually with each subject to review the findings of the physical examination, and that referrals would be provided for treatment of conditions disclosed by the exam. CIRS staff also explained that local clinics would be used to conduct the physical examinations and that these clinics would likely assume responsibility for providing reviews of the exam results and would also likely be able to provide treatment, when it was needed.

CAHWS: Sampling Procedures

The key to obtaining a representative sample of any given population is the development of a rigorously objective, random sampling methodology. While non-random samples can be informative for surveillance purposes, an effort to determine the health status of any population group must be based on randomly selected subjects.

A community-based, household survey method was used for the CAWHS, a decision largely determined by the researchers' intention to include a physical examination at a medical facility near the residences of subjects. The main advantage of a household survey is that a complete enumeration of all dwelling units, both formal and informal, within a given geographic area is functionally equivalent to an enumeration of all persons residing within the same area because everyone who resides there necessarily sleeps in some type of dwelling. As was discovered in the course of this survey, a 'dwelling unit' may be of any type: house, apartment, trailer, motor home, tool shed, garage, tent, vehicle or a temporary shelter. This sampling method seeks to approach potential subjects at their place of residence rather than at

their workplace. The household survey method employed in the CAWHS was developed and utilized in the Parlier survey conducted by CIRS eight years earlier (Sherman et al, 1997).

The criterion for subject eligibility was the following: age 18 years or older, and employment as an agricultural worker for any length of time within the twelve-month period prior to contact by the CAWHS. Persons who met these qualifications, but who were injured and unable to work at the time of the survey, were eligible for inclusion. Also, there were no restrictions imposed on the type of hired farm work the individual may have performed. Dairy, poultry and other types of livestock work were considered to qualify along with any type of crop farm work.

A multi-stage sampling strategy was developed to identify potential subjects for participation in the CAWHS. The underlying philosophy of the sampling strategy was to ensure that all, or very nearly all, persons who would qualify as agricultural workers at the time of the survey have a known chance of being selected for participation in the health needs assessment.

The first stage of the sampling strategy involved adopting the assignment of each of the state's fifty-eight counties to one of six agricultural regions, following the definitions utilized by the California Department of Employment Development. These regions are: Central Coast, Desert, North Coast, Sacramento Valley, San Joaquin Valley and South Coast.

The second stage of sampling involved selecting at least one community to represent each region. Toward this end, several suitable Medical Service Study Areas (MSSA), defined by the California Office of Health Planning and Research, were selected as intermediate "community units." An MSSA is a geographic area within which most residents obtain most or all of their needed health care services. Each MSSA is comprised of a number of Census Tracts, which are defined by the U.S. Census Bureau. The usefulness of MSSA data for examining access to health care services in communities that have a high proportion of agricultural workers has been previously reported (Villarejo, 1999).

Ultimately, as further described in Appendix I of this report, in a random selection procedure, one community was selected in each of five of the state's six agricultural regions. For survey purposes, a "community" consists of a Census Tract, or groups of Census Tracts, or other well-defined geographic area. A sixth site was purposefully selected to represent the Desert Region based on feasibility considerations to serve as the 'pilot' community in which to test the survey methodology and the willingness of subjects to participate in the physical examinations. The community of Mecca was chosen to represent the Desert Region because of the presence of a federally-funded migrant clinic willing to provide the needed physical examinations, and because the community is both relatively small and geographically isolated. A seventh site was purposefully selected to provide a second community to represent the San Joaquin Valley. This was done because a very large share of the state's agricultural worker employment is located in the valley (EDD reports that about 50%

of all California agricultural worker employment is located in the valley), and it was thought that two San Joaquin Valley sites would be more representative of this large and diverse region than just one.

The fourth stage of sampling involved mapping all dwelling units located within each community, including those found in the countryside or farming areas that are part of the selected geographic area. The mapping procedure – "ground truthing" - involved walking or driving through the entire geographic unit and visually locating and mapping every dwelling. In the case of Mecca, for example, this meant precisely identifying the location of every dwelling unit, no matter how unconventional or informal, in a 40 square mile area that included both the town (about 1.5 sq. mi.) and surrounding countryside. Dwelling units were assigned unique identification numbers, and randomly selected dwelling units were listed, in order, for personal visits by interviewers. No substitutes of other dwellings were permitted.

Each of the seven communities was assigned a 'target' number of subjects corresponding to the regional share of 1999 annual average agricultural worker employment reported by the California Department of Employment Development in its 1999 Agricultural Bulletin. In this way, the CAWHS sample proportionally represents each of California's six agricultural regions. Table 1 summarizes the CAWHS community sites, each region's share of 1999 annual average agricultural worker employment, and the corresponding regional share of CAWHS subjects actually obtained in the project.

Table 1. CAWHS Sites, by Region, and Regional Share of Subjects

Region	Ag Employment	Community Site	CAWHS Subjects
Central Coast	14%	Gonzales	15%
Desert	9%	Mecca	12%
North Coast	4%	Calistoga	3%
Sacramento Valley	16%	Arbuckle	13%
San Joaquin Valley	50%	Cutler, Firebaugh	47%
South Coast	7%	Vista	9%

Source: Agricultural Employment data for 1999 are based on 12-month averages for the six regions as reported in Agricultural Bulletin, Employment Development Department, State of California.

Each randomly selected dwelling was contacted 'in-person' by a project interviewer. If at least one individual age 18 or older resided there who had performed hired farm work in the previous twelve months, then all eligible residents of the dwelling were enumerated. A subject was then selected from this participant selection list using a table of random numbers.

One of the concerns of the investigators was to include a large enough sample of women to ensure the validity of findings of gender-specific health outcomes. For this reason, women were deliberately over-sampled in the process described above. However, the dwelling enumeration procedure provides an accurate determination of the ratio of eligible male and female persons within each community site. Thus, the extent of over-sampling of females can be accurately determined.

A full-disclosure Human Subject Permission form was presented to subjects and read aloud to them in their preferred language. If the subject agreed to participate, a signature was requested and the interviewer proceeded with the main interview.

The entire set of survey materials and proposed procedures was submitted for peer review to the Human Subjects Committee of the University of California, Davis. This review was not only required by the two project collaborators who are affiliated with UC, but also was strongly favored by CIRS in order to obtain oversight of the project by leading professionals.

CAWHS: Survey Instruments

The CAWHS had three principal components: main survey instrument, physical examination and risk survey instrument. The first instrument was administered in the subject's residence, usually at the time of first contact by the interviewer. The physical examination and risk survey instrument were administered at the time of the agreed-upon appointment, usually within a clinic or other medical facility. Each required about 20 to 30 minutes to complete.

The main survey instrument borrowed generously from the National Agricultural Workers Survey (NAWS), and included a household grid and work grid that are essentially identical to those found in the NAWS. A significant number of questions were deliberately worded to be identical with the NAWS, the better to facilitate direct comparisons of findings from the CAWHS with those of the NAWS. On the other hand, the CAWHS instrument includes lengthy sections on access to health care services, self-reported health conditions and doctor-reported health conditions. These comprise about 29 pages of the total of 70 pages of the instrument. Health-related data was requested not only about the subject but also for each member of the subject's household. A departure from the NAWS is the extensive use of census of housing and population (long form) questions relating to demographics and housing conditions in the CAWHS. Nearly all of these questions were directly copied from the census and will facilitate direct comparison of CAWHS findings with those of the census for each of the seven communities selected as CAWHS sites.

The structure of the main survey instrument is outlined in Table 2.

Table 2. Outline of Main Survey Instrument, CAWHS

Section	Topics included
Household Composition	Family enumeration, family member's age, place of birth, education, current employment, farm employment
Personal Demographics	Race, ethnicity, place of permanent residence, Spanish/English proficiency
Health Services Utilization	Health insurance, cost, most recent visit to doctor, clinic, dentist, eye care provider, chiropractor, and traditional healer, use of home remedies
Self-reported Health Conditions	Dental, respiratory, musculoskeletal, gastrointestinal, urinary, eye, ear, traumatic injuries, emotional illnesses, ethnospecific illnesses
Doctor-reported Health Conditions	Tuberculosis, cancer, diabetes, hypertension, heart attack, anemia, arthritis/rheumatism, stroke/embolism, asthma, hepatitis, allergies, skin conditions, learning disabilities, neurological disorders
Work History	Jobs in past twelve months, use of tools, transportation to job, employer provided health insurance, workers compensation insurance
Income and Living Conditions	Personal and family income, housing conditions and costs, use of social services
Workplace Health Conditions	Eye irritation, blurry or clouded vision, skin irritation, headache, dizziness, nausea or vomiting, numbness or tingling, diarrhea, dehydration
Field Sanitation	Toilets, drinking water & disposable cups, wash water
Work Related Injuries	Detailed profile of any injury while doing farm work or while traveling to and from farm work
Immigration Status	Current status, program, social security card

The main survey instrument, referred to herein as Instrument A, was piloted in Mecca, the first site attempted in the CAWHS. Revisions were then made, based on the experience in Mecca. The second version, Instrument B, was then utilized in portions of Firebaugh and Vista, and was again revised, based on those experiences. The third version, Instrument C, was subsequently utilized in the remainder of Firebaugh and Vista, and all of Cutler, Gonzales, Arbuckle and Calistoga.

The revised instruments ("B" and "C") were submitted, after use in the field, for review by the human subjects committee of the University of California as an addendum to the initial review and approval. All project investigators were asked to complete a course on the subject of ethical issues in human subjects research and all did so.

The physical examination component of the CAWHS comprised a relatively thorough examination. Dental, skin and breast examinations, as well as blood pressure, cholesterol, blood glucose, hemoglobin, pap smear, std screening, and full blood workup (CBC panel) were to be included.

Initially, it was intended to include tuberculosis screening as well because of the suspected relatively high prevalence of this disease in the agricultural worker population. However, despite the fact that TB is a reportable communicable disease, it proved impossible to make satisfactory arrangements for referral of subjects, should that be required. The planned TB screening had to be abandoned. In Mecca, the first community where the CAWHS was undertaken, chest x-ray facilities were not available. Thus, if a subject was found to have a positive PPD, which requires the subject to have a chest x-ray to determine if active tuberculosis is present, he/she would have to travel to another community. Moreover, it was determined that the nearest public facility offering this service was in Moreno Valley, some 75 miles away. The community of Indio, much closer to Mecca, had a private hospital that could offer the service, but subjects needing a chest x-ray would have to pay out-of-pocket for its cost. After careful review, it was decided to abandon the tuberculosis screening.

Another screening that was initially intended for inclusion in the CAWHS was for HIV status. Again, owing to the absence of local and reliable HIV counseling services, and the inability of CIRS to afford to provide such services on its own, this screening also had to be abandoned.

Table 3 provides a comprehensive overview of the components of the physical examination offered to CAWHS subjects.

Table 3. Components of Physical Examination, CAWHS

Component	Description
Biometric	Height, weight, blood pressure
Dental	Teeth, gums, caries, broken/missing teeth, impacted wisdom teeth, gingivitis
Skin	Lesions, dermatitis, pre-cancerous growths
Body	Palpation, respiratory function, breast examination
Screening	Cholesterol, blood glucose, PAP smear, STDs
Blood Chemistry	Full CBC panel
Medical History	Illnesses, immunization, family history

At the time and place of the physical examination, a second instrument was administered, described as the "risk behavior questionnaire." This survey covered all forms of risk behaviors: tobacco, alcohol, drugs, sexual behaviors, domestic violence, and workplace violence. Because many of the questions were of a highly personal nature, it was thought that the privacy of a medical facility would be conducive to obtaining cooperation from the subjects. For that reason, all types of questions relating to these behaviors were separated from the main instrument and included in this one.

To ensure confidentiality of the risk behavior interview, only the subject's ID number was coded onto the face of the instrument. The administration of this instrument was problematic in the early phases of the project. Initially, medical assistants at the facility where the physical examination was conducted were asked to carry out this work. When this procedure was discovered to have unsatisfactory results in a few cases, CAWHS project staff members were assigned to conduct these interviews.

Separate instruments were developed for male and female subjects. Table 4 describes the main subject areas of the risk behavior instrument.

Table 4. Risk behavior instrument, CAWHS

Section	Topics included
Reproductive Health (female only)	Menstruation, pregnancies, births
Health Habits	Tobacco, alcohol
Threats And Violence	Workplace and domestic violence
Sexual Behaviors	Partners, STDs, safe sex practices
Drug Use	Extent of use, type of drugs, intravenous drug use
Mental & Psychological Illness	Mental health history, treatment
Workplace Risks	Workplace alcohol use, workplace injury, treatment and workers compensation, use of raiteros

Field research began in March 1999 and was completed in December 1999. The project design contemplated beginning the work in Mecca, the Desert site, in the spring season when employment there reaches an annual peak. Since Mecca was also

the "pilot" for the project, all aspects of the work there were subject to intensive review. As a result of this review, changes were made in the main survey instrument, and suitably experienced project staff replaced clinic staff to administer the risk behavior questionnaire in the other six sites.

The enumeration of dwellings presented some unusual challenges that were specific to particular sites. In Mecca, for example, several dozen vehicles that parked each night in the few parking lots in town, or along various streets, were "home" to the workers who inhabited them. Since these "dwellings" were not stationary, but were relatively few in number, separate enumerations and random sampling was done on several successive evenings. Interviews for this group of workers were separately identified since they were not drawn following the standard protocol.

Calistoga presented a different challenge: agricultural workers were found to be living in dwellings located just a couple of blocks on one end of town. For nearly all of the city of Calistoga, random selection of ten dwellings per block turned up no agricultural workers, and such blocks were then stricken from the list of areas to be sampled. Overall, just 11.5% of Calistoga dwellings sampled had eligible persons residing there.

In Vista, most agricultural workers were found to be living in a relatively few extremely large apartment complexes. Slightly more than 10% of dwellings sampled in Vista using the standard protocol were found to be residences for eligible persons. It was also found that there were groups of workers who assembled each morning at "pick-up points" along key intersections in town. After some review, it was decided to add to the Vista sample portions drawn from both the large apartment complexes in a systematic fashion and also from the groups found at pick-up points. Both of these sub-groups were separately identified since they were not drawn following the standard protocol.

The CAWHS Sample

Some 11,876 dwellings were enumerated in the seven communities, and 2,989 randomly selected dwellings were contacted. Hence, the overall sampling fraction in the seven communities was 25%, meaning that on average, in the seven communities, one in four dwellings was actually contacted in person. The sampling fraction varied considerably from community to community, and was as high as 40% in Cutler but as low as 12% in Calstoga.

In all seven communities, an aggregate total of 1,612 eligible agricultural workers were recorded in the dwelling enumeration process. Using the lottery table process, 1,174 individuals were asked to participate in the health needs assessment. This is the CAWHS sample. Of these, 971 agreed to cooperate. Thus, the overall participation rate was 82.7%, which is a quite satisfactory response. Health information was gathered for nearly 3,000 persons, representing the 971 subjects and limited, self-reported information for roughly 2,000 household members.

An additional 1,300 individuals also resided in these same dwellings but were not considered 'household members' by the selected subject. For these additional persons, only very limited data was gathered: whether they were children or adults, whether they worked in agriculture, other types of employment or were not working.

One of the unusual aspects of the CAWHS is that it is also a housing survey. By using a rigorous enumeration and sampling procedure, important information about housing conditions was determined. Vacancy rates were found to be extremely low in these communities, averaging just 4.5% among conventional housing units. However, the vacancy rate was found to be far below this average in several communities: Gonzales, 1.3%; Mecca, 1.7%; Cutler, 2.4%. It is fair to say that these communities have a severe shortage of available housing. This finding is certainly related to the finding that two of them (Cutler and Mecca) have substantial numbers of temporary housing or labor camps, including informal structures that house significant numbers of workers.

In Mecca, there were more temporary, labor camp or informal dwellings than permanent dwellings (915 vs. 829). While about 60% of permanent dwellings in that community provided residence for agricultural workers, more than 80% of temporary or informal dwellings were agricultural worker homes.

Just 33 subjects preferred to complete the main instrument in English, and most of the remaining 938 preferred Spanish. However, a few subjects spoke an indigenous dialect and a bilingual (Spanish/Mixteco) interviewer was employed to complete these interviews. Over 96% of the interviews were conducted in Spanish.

About two-thirds of the subjects who completed the main survey instrument also participated in the physical examination and risk behavior questionnaire (n=652). Thus, the overall participation rate for the physical examination was 55.5%. Table 5 summarizes the participation for each community site and for the project as a whole, listed in temporal sequential order of completion.

Table 5. Participation rate, California Agricultural Worker Health Survey, 1999

Field Site Locations	Mecca	Vista	Firebaugh	Arbuckle	Cutler	Gonzales	Calistoga	Totals
Total Number Of Interviews	116	127	267	89	188	152	32	971
Total Number Of Physical Exams	94	102	165	76	108	86	21	652
Total Refusals	57	43	55	11	23	11	3	203
Participation Rate For Interview	67.1%	74.7%	82.9%	89.0%	89.1%	93.2%	91.4%	82.7%
Participation Rate For Physical Exam Of Subjects Interviewed	81.0%	80.3%	61.8%	85.4%	57.4%	58.6%	65.6%	67.1%
Number Of Female Interviews	52	35	92	34	66	67	3	349
Number Of Male Interviews	64	92	175	55	122	85	29	622
Number Of Female Physical Exams	39	27	54	30	43	45	1	239
Number Of Male Physical Exams	54	75	111	46	65	41	20	412
Physical Exam Participation Rate Of Subjects Interviewed: Men	84.4%	81.5%	63.4%	83.6%	53.3%	48.2%	68.9%	66.2%
Physical Exam Participation Rate Of Subjects Interviewed: Women	75.0%	77.1%	58.7%	88.2%	65.2%	67.2%	33.3%	68.5%
Overall Participation Rate	54.3%	60.0%	51.2%	76.0%	51.2%	52.8%	60.0%	55.5%

Participation rates in the CAWHS interview varied from site to site, from a low of 67% in Mecca to a high of more than 90% in two of the sites. Two-thirds of subjects interviewed completed the physical examination and behavioral risk instrument, and this rate also varied considerably from site to site (57% in Cutler to 85% in Arbuckle). The participation rate of female interview subjects in the physical examination was not significantly different than for the men (68.5% vs. 66.2%), although it was slightly higher.

Discussions with some of the subjects who chose not to complete the physical examination revealed a variety of factors that were difficult to take into account in designing the study. Matching available appointments for the voluntary physical examination with subjects' work schedules was extremely difficult. This is because most subjects' work schedules conflicted with usual clinic business hours, which meant that many subjects might have to take an unpaid day off work to participate in the physical examination. However, most of the clinics were able to schedule a limited number of evening or weekend appointments in an effort to overcome this barrier. For some of the subjects, an opportunity for work came up unexpectedly and the individual chose to gain earnings rather than keep the appointment and forego wages. In a few cases, the subjects decided not to complete the physical examination because they felt they were not treated respectfully at the local clinic. One individual stated that he had

waited two hours without being seen at the time of his appointment and had simply given up.

CAWHS: Demographic and other characteristics of the CAWHS sample

The main feature of the CAWHS sample is that it is mostly comprised of young, married, Mexican men who have little formal education and who earn very low annual incomes. Overall, as summarized in Table 6, the sample median age is 34 years, about 92% are foreign-born, 59% are married, 63% have attained six or fewer years of formal education, only half say they can read Spanish well, and the median total annual earnings from all sources is between $7,500 and $9,999.

Table 6. Characteristics of the CAWHS sample, California, 1999, N=971

Characteristic	CAWHS Sample
Age – median	34 years
Gender	36% female
Place of birth	92% foreign-born
Race	91% "other"
Ethnicity	96% Latino/Hispanic/Mexican
Indigenous	8%
Marital status	59% married
Educational attainment	63%, six years or less
Literacy	Just half (51%) say they read Spanish well; only 5% read English well
Income – median 1998 (all sources)	$7,500 - $9,999
Children	48% have children

Interestingly, when asked to identify their race, using the exact wording of the census, 91% of respondents chose "other." Clearly, they do not believe in the usefulness of the standard choices offered: White, Black or African-American or Negro, Indian (American) or Eskimo or Aleut, Asian or Pacific Islander.

Respondents who were of indigenous origin, whether from Mexico or Central America, frequently chose to identify as Latino, Hispanic or Mexican in response to the "other" category for race. Only by comparing their responses to both race ("other", as specified by the respondent) and to ethnicity for Hispanic persons (again, in the "other" category as specified by the respondent) was it possible to determine that 8.2% of respondents claimed "Indio," "Indigena," or "Indigenous" in at least one of their responses. It is likely that additional indigenous persons did not so identify because of the obfuscation of their ethnic identity in this series of Census questions.

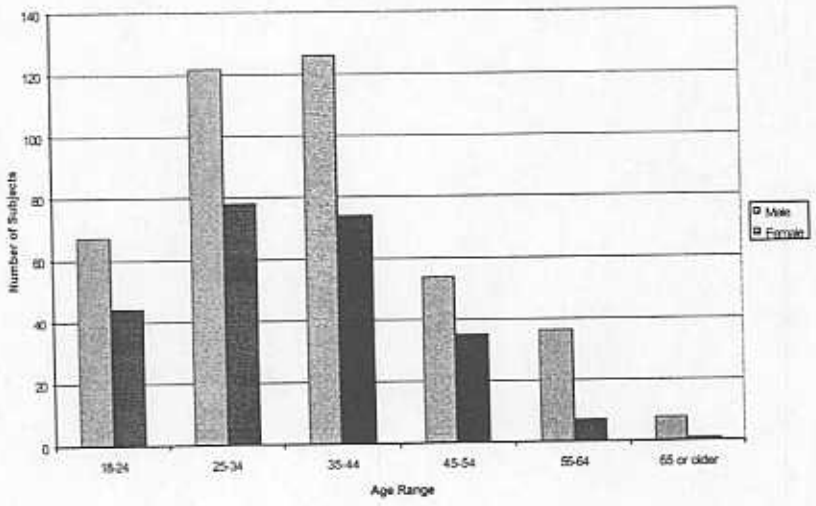
About 36% of the CAWHS sample is female, reflecting, in part, the deliberate over-sampling of women described previously. The actual fraction of female agricultural workers found in the randomly selected population of agricultural workers is smaller and is more fully described in a later section of this report.

CAWHS: Initial Health Status Findings

Physical examination and blood chemistry results for the 652 CAWHS subjects who completed all components of the survey, hereafter referred to as the PE sample, have been reviewed and analyzed. The proportions of male and female interview subjects who completed the physical examinations differed slightly from the corresponding fractions for those who completed the main interview: 61.9% male and 38.1% female vs. 64.1% and 35.9%, respectively, for subjects who participated in the main instrument.

The age distribution of the PE sample is shown in Figure 1. The main point here is that roughly the same proportion of male and female subjects were obtained in each age cohort, with the exception of the oldest cohorts. Female subjects over the age of 55 were rare, both in the full CAWHS sample as well as in the PE sample.

Figure 1
Subjects Completing Physical Examination, CAWHS, 1999, N=652



Measures of high blood pressure are shown in figures 2 and 3. For this purpose, a minimum systolic blood pressure of 140 mmHg, or a minimum diastolic blood pressure of 90 mmHg were used as indicators of high blood pressure. No account was taken of patients who may have been taking medication to control hypertension. Clinical determinations of hypertension require three independent measurements of blood pressure, ideally on three different days, and after the subject has been resting for a period of time. It was not possible to accomplish three such measurements for the CAWHS sample. Hence, the CAWHS did not make a clinical determination of hypertension. Nevertheless, evidence of high blood pressure was obtained.

Figure 2
High Blood Pressure, Male Subjects, CAWHS, 1999, N=353

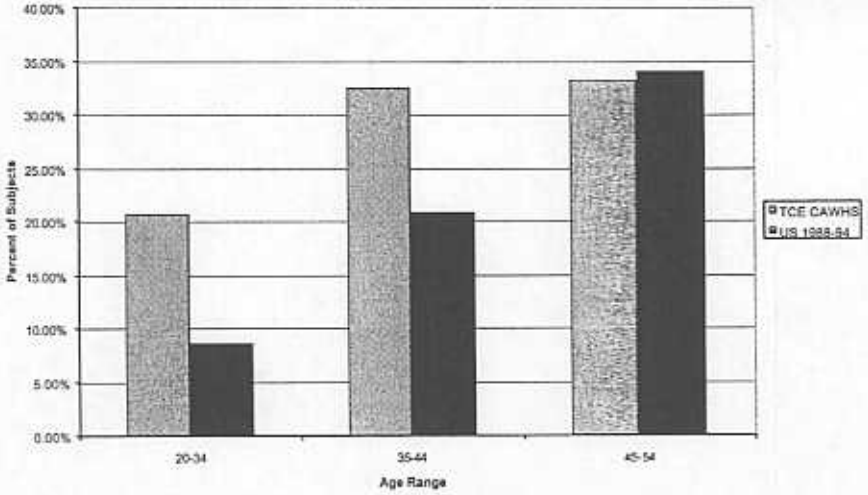
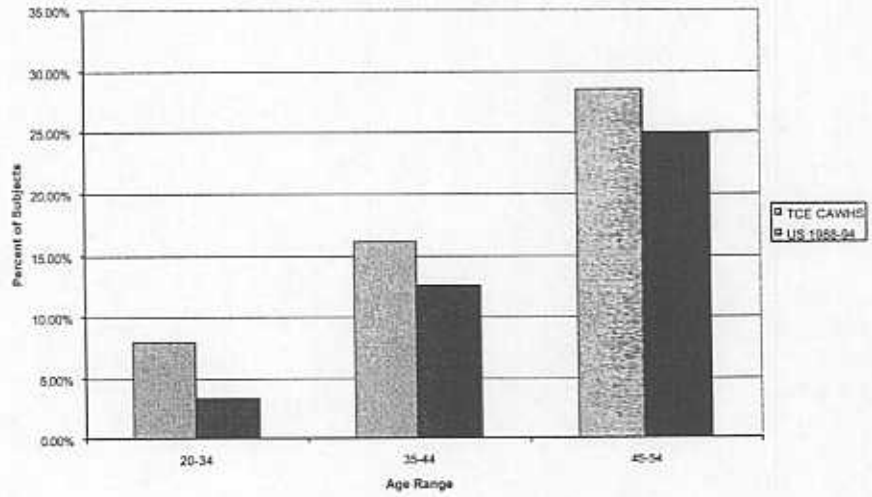


Figure 3
High Blood Pressure, Female Subjects, CAWHS, 1999, N=221

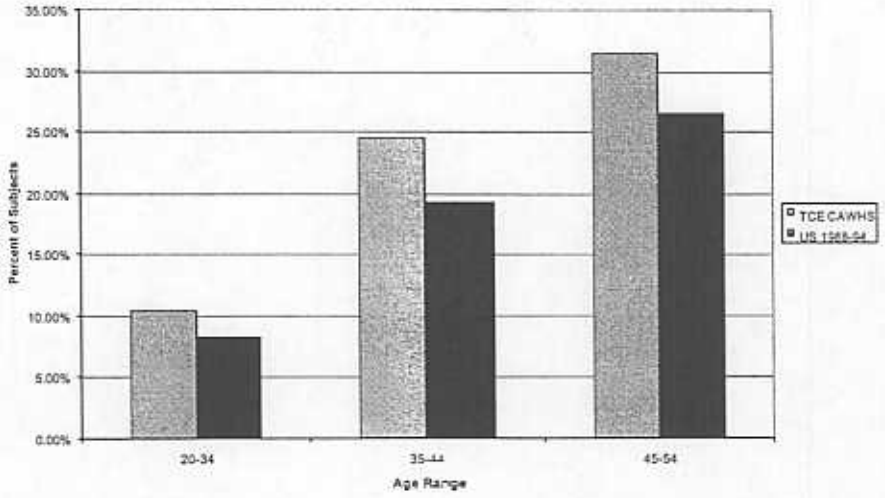


Both male and female subjects in the CAWHS sample show substantial evidence of high blood pressure as compared with the incidence of hypertension among all U.S. adults. For the two age cohorts, 20-34 and 35-44, which includes most persons of the CAWHS sample, a very substantially greater share of both male and female subjects exhibited high blood pressure. Among young workers, age 20-34, more than twice as many male and female subjects exhibited high blood pressure as compared with the incidence of hypertension among U.S. adults.

In the general U.S. population, it is well-established that hypertension is closely correlated with obesity. Obesity in the CAWHS is discussed later in this report.

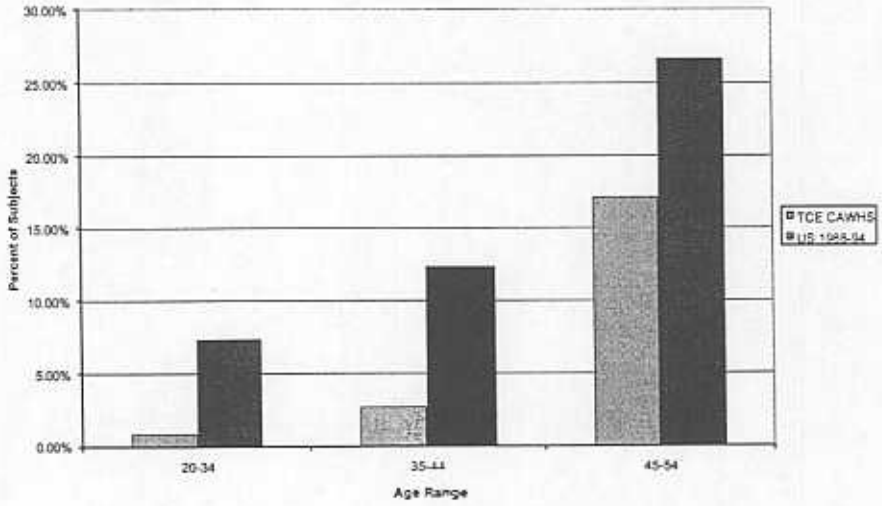
Serum cholesterol measurements were also obtained for all subjects who completed the physical examination. For this purpose, the laboratory blood chemistry analysis was used. Figures 4 and 5 show the findings for male and female subjects.

Figure 4
High Serum Cholesterol, Male Subjects, CAWHS, 1999, N=353



High serum cholesterol is defined to be 240 mg/dl or greater. The desirable range for adults is 125-200 mg/dl and "borderline" is 200-239 mg/dl.

Figure 5
High Serum Cholesterol, Female, CAWHS, 1999, N=221

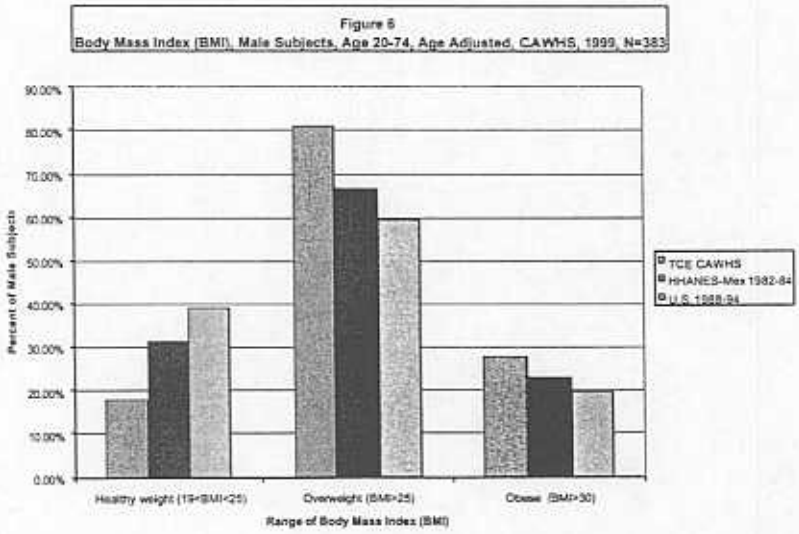


For all three age cohorts, male subjects showed a greater fraction of persons with high serum cholesterol as compared with the U.S. adult population, again, a surprising and unexpected finding. Only for female subjects was the fraction of persons showing high serum cholesterol found to be significantly below the average for U.S. adults.

Figures 6 and 7 show outcomes that are indicators of healthful body weight, called the body mass index (BMI). The BMI can be thought of as a measure of a person's two-dimensional body mass density: it is defined as the person's weight, in kilograms, divided by the height of the individual, in meters squared. The larger the BMI, the more massive the person will be as indicated by physical breadth. Persons with a BMI value that equals or exceeds 25 are considered overweight, while those with a BMI of 30 or greater are obese. The data in these two figures have been age adjusted to take account of the very different age distribution of the CAWHS sample as compared with reference populations. For this purpose the 1980 census population was used, since it was the reference for the Hispanic population age adjustment described below.

Remarkably, 81% of men and 76% of women in the CAWHS sample are overweight, according to this measure. Even more troubling, 28% of men and 37% of women in the sample are obese. And only 18% of men and 21% of women in the CAWHS sample have "healthful weight." The remaining 1% of men and 2.5% of women were found to be underweight.

These findings are compared with the whole U.S. adult population in Figures 6 and 7, which show that just 20% of all U.S. men and 25% of all U.S. women are obese. Thus, two-fifths more men and a slightly greater proportion of women in the CAWHS sample are obese as compared with all U.S. adults.



Comparisons with a second reference group are also shown: the Mexican-American identified subpopulation of the Hispanic National Health and Nutrition

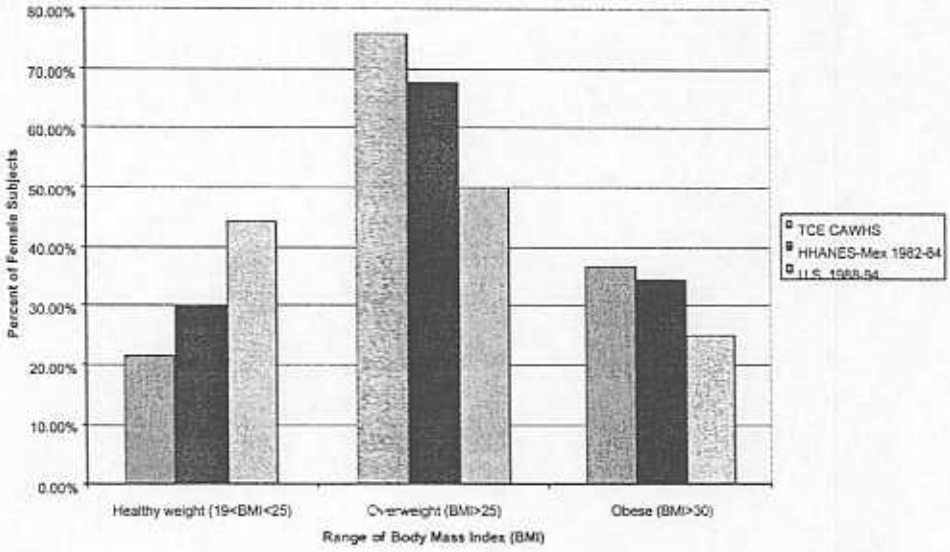
Examination Survey (HHANES). This group is virtually identical to the CAWHS sample as regards ethnicity and some other characteristics. But when BMI data for this group is compared with the CAWHS sample, important differences are found, but not as pronounced as for the U.S. adult population: both men and women in the CAWHS sample are significantly more obese and overweight. The HHANES data are roughly midway between the CAWHS sample and all U.S. adults as regards both overweight and obesity.

It is also important to note that CAWHS reports observations recorded in 1999, whereas HHANES was completed in 1982-84. It is well-established that all age and ethnic groups in the U.S. have higher BMI now compared to the mid-1980s.

Since ethnicity, gender and age cannot explain the relative absence of healthful weight in the CAWHS sample in comparison with other population groups, other factors must be considered. Apart from genetic heritage, both diet and exercise are known to be important factors in maintaining healthful weight.

Overall, a majority of male subjects (52.7%) in the CAWHS sample showed at least one of the three clinical risk factors: obesity, high blood pressure or high serum cholesterol. For female subjects, 45.6% had at least one risk factor.

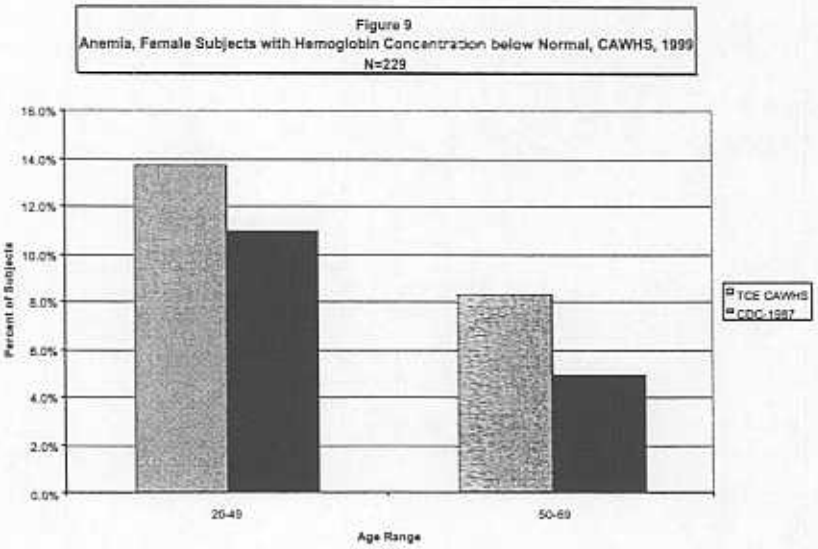
Figure 7
Body Mass Index (BMI), Female, Age 20-74, Age Adjusted, CAWHS, 1999, N=222



Nearly one in five male subjects (18.2%) had at least two of these three risk factors. Just 8.1% of women had at least two of the risk factors, mainly because their very much lower incidence of high cholesterol levels tended to offset the higher proportion of women who were obese.

Hemoglobin data from the laboratory blood chemistry analysis was used to serve as an indicator of iron deficiency anemia, a condition often found in populations experiencing poor nutrition. Figures 8 and 9 show the findings. For male subjects age 18 or older, hemoglobin concentrations of 13.5 gm/dl or lower are considered below the normal range and indicate anemia; and for females concentrations of 12.0 gm/dl or lower are below the normal range.

In both male and female subjects, for both age cohorts, a significantly greater fraction of persons in the CAWHS sample show evidence of anemia than is the case for U.S. adults. For males, in both age cohorts, it is about four times greater in the CAWHS sample than among comparable groups of U.S. men. For females, in the younger age cohort, the CAWHS sample showed about one-fourth more cases of possible anemia, while in the older age cohort it was two-thirds larger.



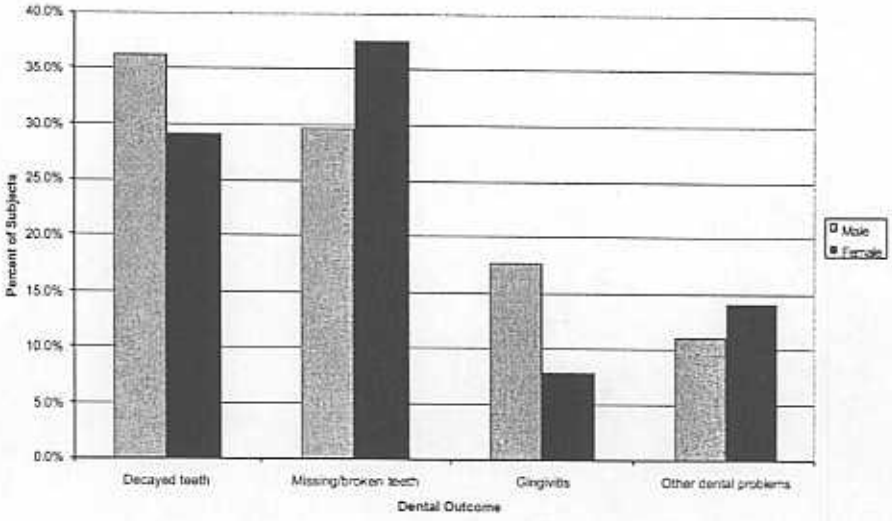
Two other laboratory blood chemistry findings were used to test whether the hemoglobin findings might be anomalies. First, hematocrit values were analyzed. The cutoff point that is an indicator of anemia in males is 39.9%, and it is 35.7% for females. For the CAWHS sample, 6.1% of male subjects and 14.2% of female subjects had hematocrit values below the normal levels. Second, total binding iron values were reviewed. For both men and women, the recommended range that is greater than 40 mcg/ml. In the CAWHS sample, 6.4% of male subjects and 21.8% of female subjects were below the normal range.

Thus, three distinct measures of anemia all point to the same conclusion. Of course, a definitive clinical diagnosis of iron deficiency anemia would require additional laboratory tests and verification by the patient's medical provider.

Serum glucose was also measured as part of the SMAC/CBC panel. For U.S. adults, the recommended range is 65-115 mg/dl for subjects who have undergone a fast prior to the blood draw. The CAWHS subjects did not undergo a fasting serum glucose measurement and so the measured outcomes can not be relied upon for clinical diagnosis. However, 4.3% of the male subjects had serum glucose levels above 200 mg/dl, and nearly all of these had levels above 260 mg/dl. Inasmuch as diabetes is a federally recognized health problem among Hispanics, further research would be needed to clarify the extent of this condition among agricultural workers.

Finally, the clinically determined dental outcomes provided startling findings. These are shown in Figure 10. Just over one-third (36.1%) of the male subjects and 29.2% of female subjects had evidence of at least one untreated decayed tooth. And a comparable share of both male and female subjects had at least one broken or missing tooth. Evidence of other dental problems was widespread: gingivitis, impacted wisdom teeth, and poorly fitting dentures were among the many adverse dental health outcomes found in the course of the physical examinations.

Figure 10
Dental Outcomes, CAWHS, 1999, N=652



Comparable data is not available for U.S. adults, with the exception of tooth decay. Among U.S. adults, a reported 28% have at least one untreated dental caries. In the CAWHS PE sample, the comparable figure is 33.5%.

CAWHS: Access to health care and self-reported health conditions

Subjects in the CAWHS sample were asked to report on their patterns of health care utilization and related access to care issues. First, very nearly 70% of all persons in the sample lacked any form of health insurance. This is shown in Figure 11. Just 11.4% said they had health insurance through their place of employment, a figure far lower than in any other industry. All government programs combined (Medical, Medicare, Healthy Families, MIA and so on) covered only 7% of agricultural workers.

About 16.5% said their employer offered health insurance, but nearly one-third of these same workers did not participate in the insurance plan that was offered, most often because they said they could not afford either the cost of premiums or because they could not afford the co-payments for treatment.

Figure 11
Health Insurance Status, CAWHS, 1999, N=971

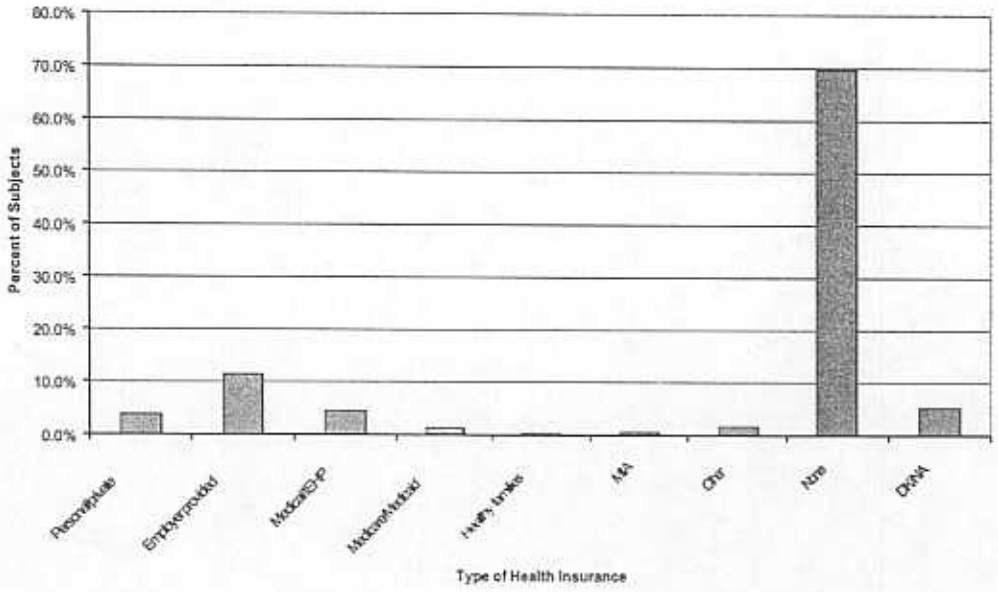
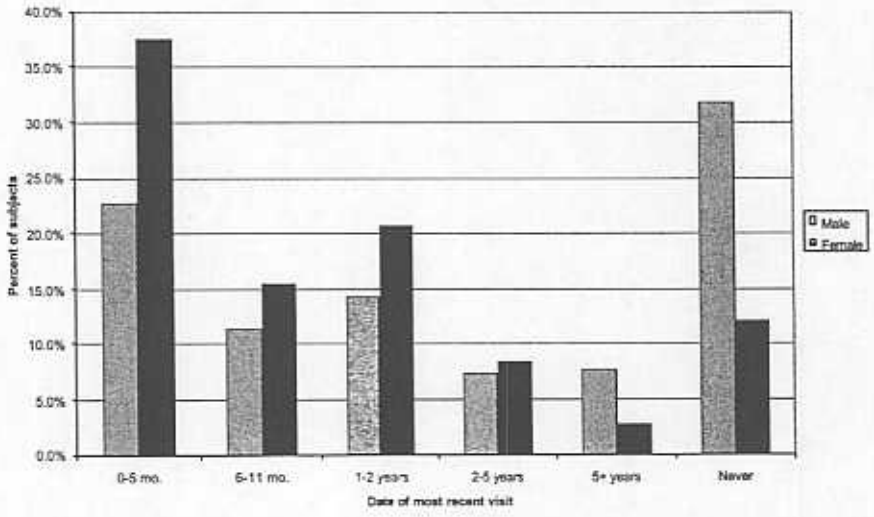


Figure 12 shows responses to the question regarding their most recent visit to a doctor or clinic. More than one-third (37.5%) of women reported a medical visit within the previous five months. And nearly three-quarters (73.6%) had a medical visit at some point in the prior two years. But among men, a plurality (31.8%) said they had never been to a doctor or clinic in their entire lives. Just under half (48.4%) of the male subjects reported a doctor or clinic visit in the prior two years.

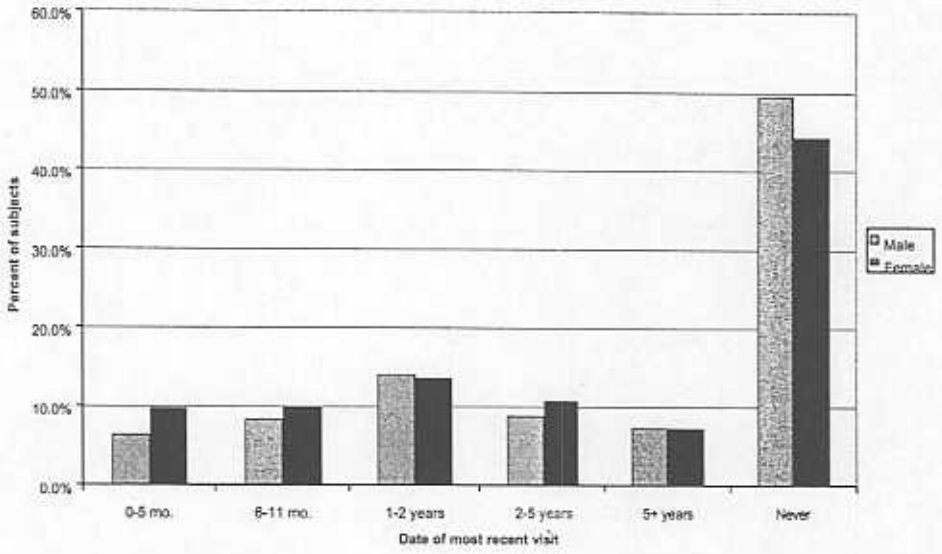
Figure 12
Most Recent Visit to Doctor or Clinic, CAWHS, 1999, N=971



Interestingly, nearly one-fifth (18%) of those who said they had a doctor or clinic visit went to Mexico for that visit. Since the cost of a medical visit is much lower in Mexico than in the U.S., it is likely that the lower expense was a major factor in this decision. But it is also true that language remains a barrier: among those who said they had been refused treatment in the U.S., the language barrier was mentioned.

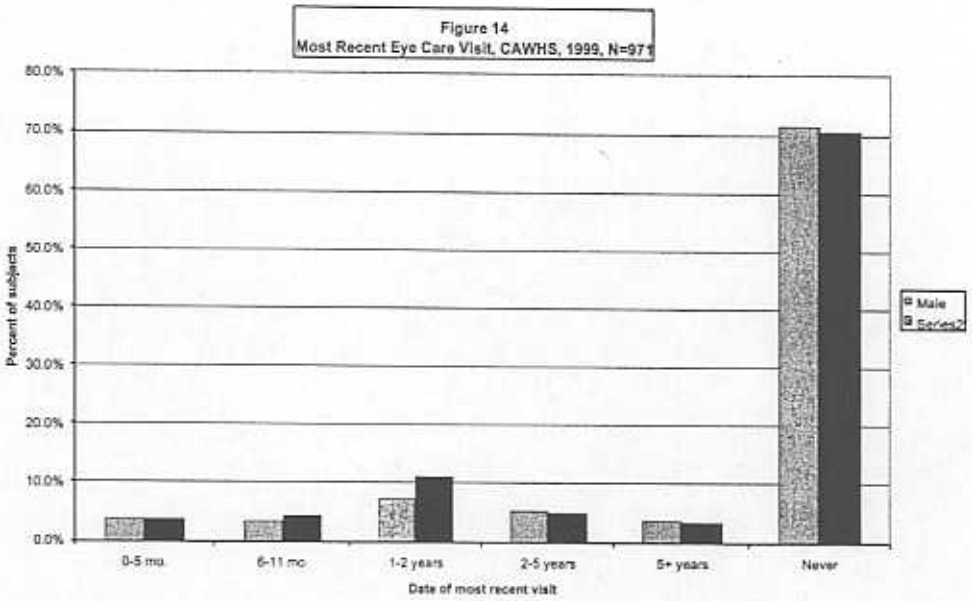
With respect to dental visits, both male and female subjects reported very little utilization of dental health services. Half (49.5%) of all male subjects and two-fifths (44.4%) of female subjects said they had never been to a dentist, much less having an annual check-up and cleaning visit. This is shown in Figure 13.

Figure 13
Most Recent Dental Care Visit, CAWHS, 1999, N=971

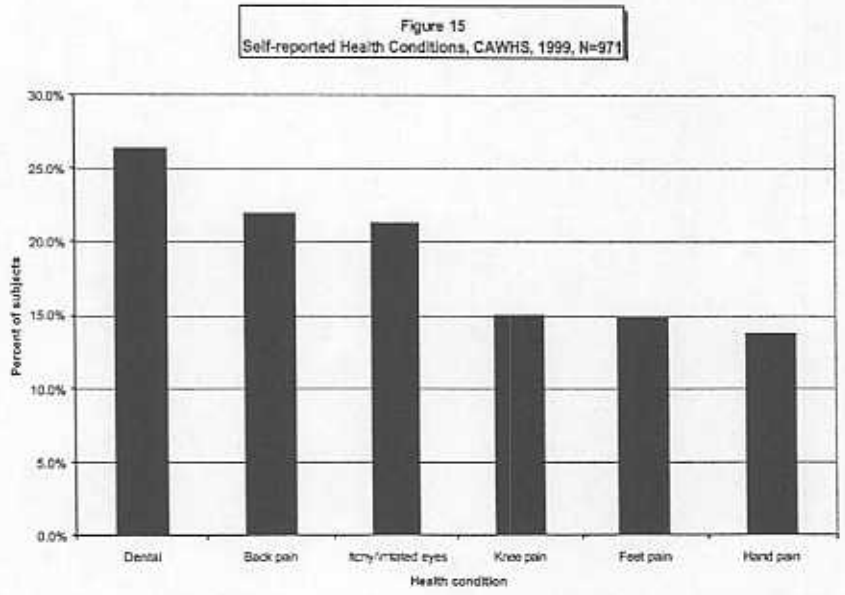


The extremely low access to dental health services is reflected in the high proportion of adverse dental health outcomes reported above (see Figure 10). Since dental insurance is even rarer than health insurance for agricultural workers, very poor people are often forced to regard dental care visits as a lower priority expense than food and shelter. Only when a problem becomes sufficiently serious do most agricultural workers seek care. Among the CAWHS subjects were individuals who reported having toothaches for as long as one year, most often treated with herbal medications that were intended to numb the pain.

Vision care was even rarer for the CAWHS subjects. Figure 14 shows the pattern of access to eye care professionals. More than two-thirds of subjects reported never having had an eye care visit.



Figures 15 and 16 show self-reports of various health outcomes, and of mental or ethnospecific health conditions. In every instance, the subject was asked to describe only those health conditions that had occurred in the prior year. It was thought that questions probing beyond the previous twelve months would be less reliable.



The most common complaint of subjects in the CAWHS sample is one or another of numerous dental health problems. Slightly more than one-fourth of subjects reported a dental problem. Given the poor access to dental health care noted above, this should not be a particularly surprising finding.

Ranking next in importance was back pain. Pain was also reported by many subjects as occurring in numerous other parts of their bodies: knee pain, feet pain, hand pain, neck pain and shoulder pain. The actual questions posed regarding body pain were analogous to the following one asked about back pain:

"Have you had persistent back pain that lasted at least one week?"

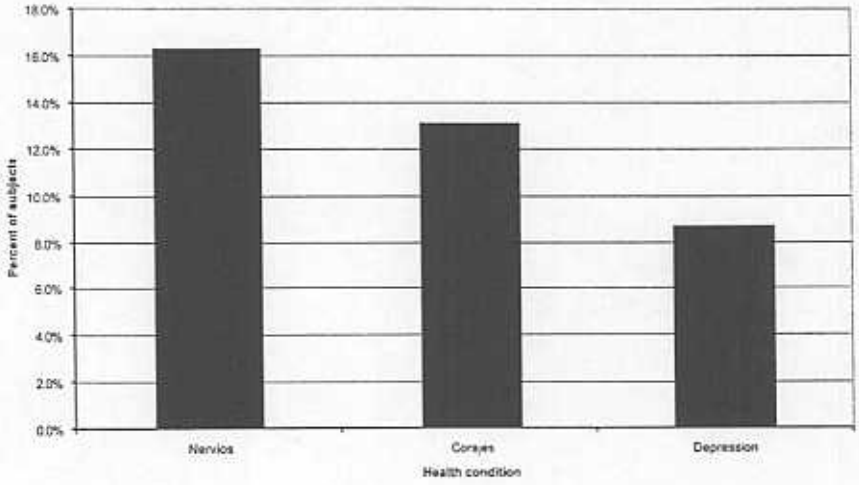
The purpose of this form of the question was to attempt to limit responses to those that were more likely to reflect chronic conditions.

By taking account of separate responses of subjects for each specific body part, it was found that 41% of all subjects reported pain that had lasted for at least one week in one or more body parts. That is, during the prior year, four out of ten agricultural workers reported at least one experience of persistent body pain that had lasted at least one week.

Ranking third in importance was itchy or irritated eyes, reported by more than one out of five subjects. It is not known what specific irritants may have caused these complaints, but exposure to dust, allergens or agricultural chemicals are among the most likely possible agents.

Figure 16 shows the three most commonly reported mental health or ethnospecific conditions. An ethnospecific condition is a health outcome that is self-identified within the belief system of a specific ethnic group.

Figure 16
Self-reported Mental Health and Ethnospecific Conditions, CAWHS, 1999, N=971

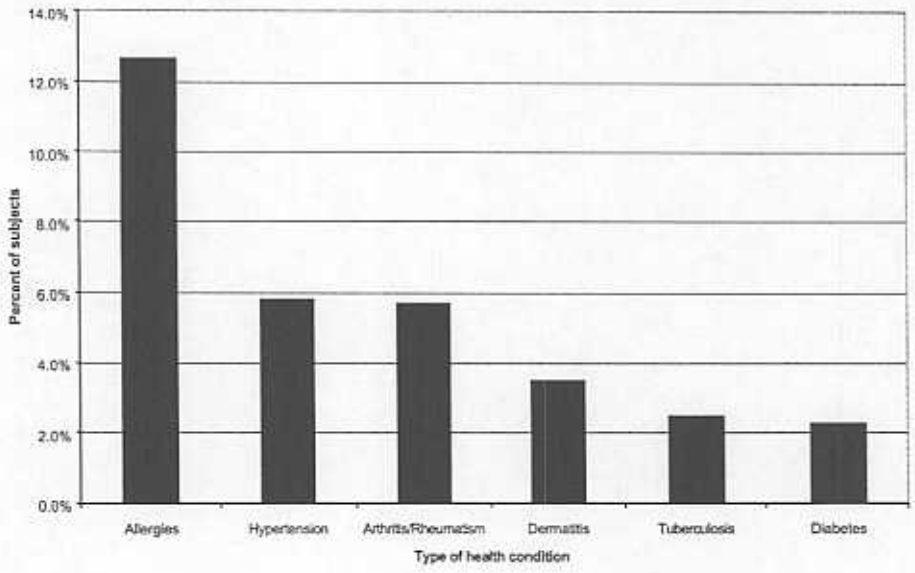


In western medicine, the "placebo effect" is the most widely found ethnospecific health outcome. It is characterized by marked improvements in a patient's health when they are told they are receiving a specific medication but who, in fact, are given a sugar pill, or other similar medically benign equivalent. Double-blind patient trials are now routinely used in all developed countries to measure the efficacy of medications compared with a placebo.

Among CAWHS subjects, the most widely reported ethnospecific condition is known as nervios, reported by 16% of all subjects. This condition is often characterized by a high degree of agitation or irritability. Next in importance was corajes, found in 13% of subjects. This condition is often characterized by rage or anger. Finally, depression was reported by roughly 9% of subjects. Since few western medical practitioners are likely to be familiar with the Mexican view of the first two conditions and their probable cause within traditional belief systems, treatment may prove to be extremely difficult.

Finally, CAWHS subjects were asked if a doctor had ever told them they had one or more of a series of adverse health outcomes. The results are shown in Figure 17. The most frequent instance reported was allergies (13% of subjects), which may be the source of a large share of cases of itchy or irritable eyes reported above.

Figure 17
Has a doctor ever told you that you have?, CAWHS, 1999, N=971



Next in importance was hypertension (6%), which also correlates well with the high blood pressure measurements reported in the PE sample. Ranking next in order were arthritis or rheumatism (6%), dermatitis (3.5%), tuberculosis (2.5%) and diabetes (2.3%).

It is likely that these health conditions have been significantly underreported by CAWHS subjects, especially since such a large fraction say they have never been to a doctor. On the other hand, it is also likely that many of those who have never seen a medical care provider may be in excellent health.

CAWHS: Workplace Safety And Health

Some 18.5% of CAWHS subjects reported having had a workplace injury at some point in their farm work career that was compensated by a payment to them under the California's Workers Compensation Insurance system. However, 64% said they had not had such an injury, and 17.4% did not answer the question or didn't know how to answer, possibly because they were unaware that they were entitled to this insurance coverage.

When asked if they had been injured while working on a farm or while traveling to or from a farm job during the prior twelve months, 4.6% said "yes," and each respondent who answered this question affirmatively was asked to provide specific details about the incident. A comprehensive analysis of this data is now underway.

Another series of questions inquired if they knew they were protected by workers compensation insurance at their farm job. The specific question was as follows:

> "If you ever become sick or have an accident while working, do you receive any payment while you are recovering, for example, 'compensation' for any injury or illness that occurred while you were working?"

Just one-third of all CAWHS subjects answered "yes" to this question, despite the fact that virtually all California private sector businesses (except self-employed persons) have been required to provide this coverage for all employees for more than three-quarters of a century. Most agricultural workers are unclear about this form of workplace health insurance.

Table 7 summarizes the responses to questions about workplace safety training and field sanitation compliance. The specific questions posed were the following:

> "Has anyone given you training or instructions in the safe use of pesticides through: video, audio cassette, classroom lecture, written materials, informal talks or by any other means?"
>
> "Does your employer provide a toilet everyday?"
>
> "Does your employer provide clean drinking water and disposable drinking cups everyday?"
>
> "Does your employer provide water to wash your hands everyday?"

Table 7. Workplace Safety And Health, CAWHS, 1999

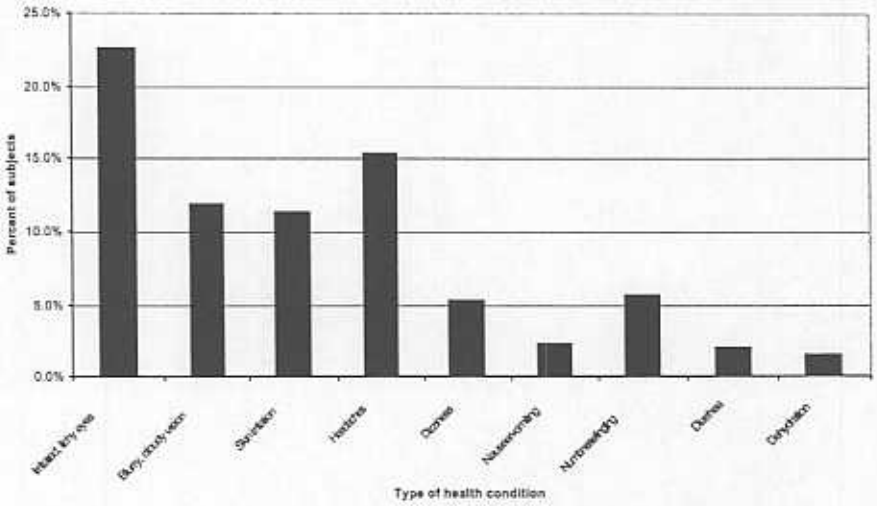
Question	CAWHS Respondents
Pesticide safety training	57% Yes
Toilets	88% Yes
Clean drinking water and disposable cups	79% Both, 5.5% Water only, 13% No water and no cups
Wash water	82% Yes

Compliance with these workplace regulations varied considerably from site to site. For example, compliance with pesticide safety training was quite high as reported by agricultural workers from both the Arbuckle and Gonzales sites, but was substantially lower among workers at the Cutler site. Conversely, workers at the Cutler site reported very much higher compliance with field sanitation standards than did workers at most other sites.

A workplace problem specific to Mecca was the report by about 60% of subjects that they were required to "test the fruit" by eating unwashed grapes during harvest to find out if they were sweet enough to be picked. A number of workers expressed concerns about pesticide residues that might be on the fruit they were told to eat. It appears that this practice is not regulated under California pesticide safety law.

When asked about workplace health conditions, the CAWHS sample responded that itchy or irritated eyes was most common (23% of subjects), followed by headaches (15%). These findings are shown in Figure 18. Headaches could be symptomatic of dehydration.

Figure 18
Self-reported Workplace Health Conditions, CAWHS, 1999, N=971



Comparison with the National Agricultural Workers Survey (NAWS)

The CAWHS findings are, in most respects, quite consistent with the California findings of the National Agricultural Workers Survey (NAWS) conducted by the U.S. Department of Labor. In what follows the dwelling enumeration (participant selection list) conducted by the CAWHS is compared with the findings of the California NAWS. This procedure is justified by the fact that the CAWHS dwellings were randomly selected and represents a cross-section of the population of agricultural workers in the seven sites. The CAWHS sample, described in some detail in the preceding sections of this report, differs somewhat from the dwelling enumeration since female subjects were deliberately over-represented in the CAWHS sample. Table 8 shows the comparison of the most recently published California NAWS data with that of the CAWHS dwelling enumeration.

Table 8. Comparison of CAWHS Hired Farm Workers (1999) and California NAWS Hired Crop Farm Workers (FY1995-97)

Topic	CAWHS	NAWS
Eligible age	18 or older	14
Commodities represented	All	Crops only
Farm work to qualify	Any in 12 months prior to survey	Current farm work (at least one day in prior two weeks)
Geographic area	Seven communities in seven counties	Nine counties
Sample frame	Dwellings (households)	Employers
N	1,612	1,885
Median age	32	30
Female	32%	18%
Child farm workers (age 17 or younger)	3.7%	3%

The median age found by the California NAWS was 30 years for the 1,885 observations reported for FY1995-97. The dwelling enumeration for the CAWHS found 1,612 eligible agricultural workers, for whom the median age was 32. Since the NAWS includes workers as young as 14 but the CAWHS does not, the small difference in median age is at least partly accounted for by the differing age criteria of the two surveys.

NAWS finds that 18% of hired crop farm workers are female, while CAWHS finds that 32% are female. This is a significant difference between the two survey results and may reflect the fact that the CAWHS includes persons who performed only seasonal tasks in the prior twelve months, irrespective of how little they worked. It is believed that female agricultural workers are less likely to be active in the hired farm labor force on a year-round basis. Finally, NAWS finds that 3% of hired crop farm workers in California are minors (under age 18). CAWHS finds that 3.7% are minors.

The results reported in previous sections of this report for the demographic and other characteristics of the CAWHS sample are also consistent with the California NAWS. Specifically, the data on foreign place of birth, ethnicity, educational attainment and income are quite similar. But significantly more of the CAWHS sample

report being married as compared to the California NAWS (59% vs. 40%, respectively).

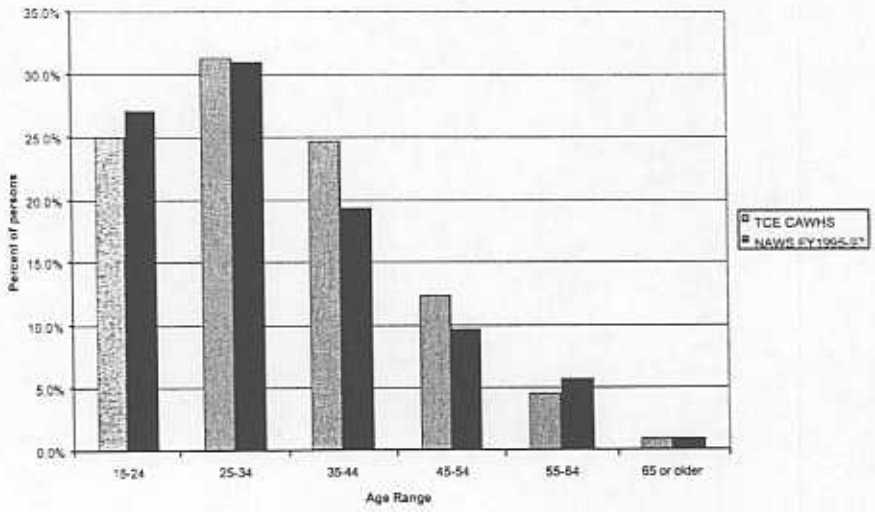
The CAWHS required that subjects be 18 years of age or older and they must have performed hired farm work at some time in the prior twelve months. NAWS, in contrast, is an employment-based survey for which subjects are 14 years of age or older, and worked at least one day on a crop farm during the two-week period prior to the survey.

NAWS is a survey of crop farm workers and has been on-going for twelve years. It conducts three seasonal cycles of interviews each year, returning to the same counties to capture workers who may be employed only for certain seasons of the year. CAWHS is a one-time survey that simply asks whether a person worked at all on any type of farm in the prior twelve months.

CAWHS found workers who were injured or ill at the time of the survey, and were not working at that time. Some or all of these individuals would not have been captured using the NAWS survey criterion. Thus, the crude rate of agricultural worker injury found by the NAWS is likely to be lower than was found by the CAWHS.

Figure 19 shows a comparison of the age distribution of CAWHS agricultural workers with that of the NAWS. There is remarkably close agreement between the two samples for every age cohort, suggesting that they are likely to refer to the same population.

Figure 19
Age Distribution of Agricultural Workers, Dwelling Enumeration, CAWHS, 1999, N=1,612



On balance, this evidence supports the conclusion that both surveys (NAWS and CAWHS) are essentially two independent measurements referring to the same base population.

Summary of Findings

Agricultural workers are mostly young Mexican men, with low educational attainment and very low incomes. Most are poor, according to U.S. Department of Labor criteria for establishing "official" poverty status. Many, if not most, of California's agricultural workers are members of binational families or village networks, often having family members, including dependents, on both sides of the southern U.S. border.

A significant number of these workers are indigenous people, migrants from southern Mexico or Central America. For these individuals, Spanish, if spoken, is a second language. Low literacy, the handmaiden of low educational attainment, is widespread. Just half say they can read Spanish well. Very few read English well.

Poor access to medical care is also a shared characteristic. Fewer than one-third have any form of medical insurance, and only 7% are enrolled in any government program that serves low-income people. Just one in six say their employers offer any form of health insurance.

Further evidence of poor access to medical care is the lack of regular care: medical, dental and vision care. Nearly one-third of male subjects said they had never been to a clinic or doctor's office. But three-fourths of female subjects had a medical visit at some time in the prior two years. This difference in gender outcomes regarding access to care suggests that programs emphasizing maternal and child health have been significantly able to gain the participation of women agricultural workers. The challenge is how to engage the men.

The physical examinations revealed widespread problems with dentition: tooth decay, missing or broken teeth and gingivitis. This finding is strongly correlated with the lack of access to dental care. Overall, nearly half (48%) of all subjects said they had never had a dental visit.

An even larger fraction had never had an eye care visit. Future surveys of this population should include a rudimentary vision examination.

Self-reported health conditions and subjects' recall of doctor-diagnosed conditions are also a matter of considerable concern. Allergies were surprisingly frequently mentioned. Hypertension and diabetes were among the most frequently reported chronic health conditions. And contagious disease, such as tuberculosis, was also among the more frequent doctor-diagnosed health outcomes.

Self-reports by subjects in the CAWHS indicate a high proportion of dental problems, followed in importance by persistent pain in various body parts, notably back pain and itchy or irritated eyes. The lack of eye care visits and the high frequency of eye complaints indicates a need for attention to vision care.

Several ethnospecific health conditions were also frequently reported, most importantly, nervios and corajes, along with universally recognized mental health conditions such as depression.

The observations regarding obesity, high blood pressure and high serum cholesterol are very disturbing. This is a group that is mostly comprised of young men who are likely to be in the peak of physical condition. Hired farm work is often very strenuous and surely qualifies as regular exercise.

Inadequate or unhealthful diets are likely to be major contributors to the three conditions noted above. But relatively little is known about the actual eating habits of agricultural workers. Thus, if diet is a major factor, public health nutritionists will need to participate in determining current dietary preferences of agricultural workers and to assist in recommending suitable interventions.

It is well established that very low-income populations in the U.S. have a poorer diet from the standpoint of nutrition as compared with middle and upper income groups. Foods with high fat content, excess sugar or excess salt are more commonly found in the diets of poor people.

The findings regarding the prevalence of iron deficiency anemia support the suggestion that unhealthful diet may be a leading factor in the chronic health outcomes noted above. More investigation is needed to demonstrate the prevalence of chronic health conditions in this population.

It is a tragedy and more than a little ironic that the labor force that is responsible for producing such a great abundance of healthy food in California should themselves be suffering from the effects of inadequate diet.

Nearly one in five (18%) agricultural workers experienced a workplace injury at some point in their farm work career that led to a workers compensation payment. Nevertheless, just one worker in three was aware that their employer had that form of insurance.

About 4.6% of all workers had experienced a farm workplace injury in the prior twelve months. At that rate, it would not take many years for the figure of 18% to be achieved for a labor-force-wide cumulative occupational injury rate.

Just over half (57%) of all workers had some form of pesticide safety training. But compliance with field sanitation standards was widespread: four out of five workers said that their employer provided toilets, fresh drinking water or wash water everyday.

The CAWHS has validated the reliability of self-reported health information gathered from agricultural workers. In instance after instance, the objective, third-party clinical observations of the PE sample supports what workers themselves report are their most prominent health care problems.

The CAWHS demonstrates that agricultural workers are willing to cooperate with serious investigations of their health and workplace safety conditions, and are even willing to undergo extensive physical examinations that include a blood draw.

Conclusion

The findings of this study demonstrate that we, as Californians, need to reevaluate how to address the unmet health and health care needs of agricultural workers. Attention is urgently needed to address the access to health care problems found in this survey. The lack of health insurance, the inability of existing programs to meet the needs of this population, and the infrequency of health care visits demonstrates a breakdown of this nation's health care system for hired farm workers.

These findings point to the need for vigorous efforts to address the lack of health insurance coverage issues, and the shortage of culturally compatible health care providers and facilities in rural areas. The lack of dental care in particular, has been shown to be a serious concern; that many hired farm workers are working every day with dental pain, numbed only by herbal medications, is unacceptable.

As the authors of this report we applaud The California Endowment for its creation of a high-profile task force to formulate recommendations for the foundation and policy makers to address these serious issues. It is our sincere desire that the findings of this report will serve as motivation for other public and private interests to respond accordingly with effective strategies to relieve the suffering of those who provide us with our daily food.

Appendix I: CAWHS Methodology

Within each of the state's six agricultural regions, all Medical Service Study Areas (MSSA), defined by the California Office of Health Planning and Research, were enumerated and ranked. An MSSA is a geographic unit within which most residents obtain nearly all of their needed health care services. Each MSSA is comprised of a number of Census Tracts, which are defined by the U.S. Census Bureau. Since there are 487 MSSA and roughly 6,000 Census Tracts within California, there are an average of about twelve tracts per MSSA, each containing, on average, about 60,000 persons.

For purposes of the CAWHS, MSSA data that was obtained from the California Department of Health Services were supplemented by additional data items obtained from the 1990 Census of Population and Housing. Specifically, total employment and agricultural industry employment data were obtained for each tract, and subtotals for these items were added to the data file for each of the state's MSSA.

Rankings of all MSSA within each agricultural region were based on two factors: the fraction of each MSSA's total employment accounted for by farm employment, and, second, each MSSA's share of total regional farm employment. Two dimensional scatter plots based on these factors were constructed for each region that displayed the values for these two factors for each MSSA.

The second stage of sampling involved selecting a number of MSSA within each region for which the factors that measure agricultural employment were deemed sufficiently large as compared with other MSSA within the same region (the specific criteria were agricultural employment amounting to at least 5% of MSSA total employment, and totaling at least 2% of regional agricultural employment). To illustrate, for the Desert Region, census data indicated that MSSA #128 (located in south-central Riverside County) had 50.9% of its employment in the agricultural sector, and it also accounted for 8.9% of total farm employment for the entire three-county Desert Region. No other MSSA of the Desert Region had a level of agricultural employment as high as 28% of total employment, and the one MSSA that was closest in farm employment had less than 1.5% of the regional total. Clearly, this ranking scheme separates and identifies those MSSA whose farm employment is both locally important as well as regionally significant. It is this combination of factors that was used for selecting communities for potential sites for the health needs assessment of agricultural workers in California.

Using this procedure, twenty-four MSSA were selected as candidates for choosing community sites for the health needs assessment. Each of the six regions was represented, as were fourteen counties and an aggregate total of 164 census Tracts.

The third stage of sampling involved ranking the selected census tracts within each region according to the two factors used to rank the MSSA (described above). A subset of census tracts in each region was selected for which the combined factors were found to be sufficiently large. Ultimately, 58 Census Tracts were deemed to be suitable candidates using this criterion.

Each census tract was weighted by the number of persons reported by the Census to be employed in agriculture, and a random selection of one tract was made for each of five of the state's six agricultural regions. The random number function of Microsoft Excel was used for this purpose. A sixth site was purposefully selected to represent the Desert Region based on feasibility considerations to serve as the 'pilot' community in which to test the survey methodology and the willingness of subjects to participate in the physical examinations. The community of Mecca was chosen to represent the Desert Region because of the presence of a federally-funded migrant clinic willing to provide the needed physical examinations, and because the community is both relatively small and geographically isolated.

A seventh site was purposefully selected to provide a second community to represent the San Joaquin Valley. This was done because a very large share of the state's agricultural worker employment is located in the valley (EDD reports that about 50% of all California agricultural worker employment is located in the valley), and it was thought that two San Joaquin Valley sites would be more representative of this large and diverse region than just one. The second San Joaquin Valley community was purposefully chosen to represent a different county than the one where the randomly selected site was located, and, as well, to be located on the opposite side of the Valley (West vs. East). These considerations for selecting the second San Joaquin Valley site were also prompted by a desire to seek a diverse range of farm tasks represented among the work experience of subjects, as reflected in the differences in cropping found on the two sides of the valley (tree fruit, raisin grapes, and livestock farms on the east side vs. cotton, alfalfa, vegetables and melons on the west side).

The fourth stage of sampling involved mapping <u>all</u> dwelling units located within a selected census geographic sub-unit. Dwelling units were also classified within three strata according to whether they are permanent dwellings with a street address and also recognized for assessment purposes by the County Assessor (usually houses or apartments), temporary dwellings lacking a permanent street address and not recognized as dwellings by the County Assessor (sheds, garages, motor homes, most trailers, tents, or vehicles), and Farm Labor Camp dwellings that are self-identified as such by residents. Separate random draws of dwellings from each of the three strata were conducted to insure proportionate representation of residents of these different types of dwellings.

Each randomly selected dwelling was contacted 'in-person' by a project interviewer. If at least one individual age 18 or older resided there who had performed hired farm work in the previous twelve months, then all eligible residents of the dwelling were enumerated. The dwelling enumeration served as a Participant Selection List and was structured such that only those residents who were age 18 years or older and who had worked as agricultural workers for any duration during the previous twelve months were listed. Women were listed first in descending order of age, and men were listed next, again in descending order of age. A subject was then

randomly selected from the Participant Selection List. Specially prepared lottery tables were prepared in advance for this purpose. The sealed envelope containing the lottery table for the dwelling was opened in the presence of residents and the randomly selected individual was then asked to be a participant in the health needs assessment.

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