

## *Migrant and Seasonal Farmworkers in the United States: A Review of Health Hazards, Status, and Policy*<sup>1</sup>

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Although the occupation and associated living conditions of migrant and seasonal agricultural workers in the U.S. pose exceptional health hazards to the workers and their dependents, relatively few occupational health professionals have been involved with this group. This article examines the basis for this neglect and proposes a definition of the population that should be considered in farmworker health policy. It then reviews existing evidence regarding hazards of four major occupational exposures — pesticides, the sun, injuries, and poor field sanitation — and policies that have been developed to address these hazards. The extremely negative health consequences of farmworker living conditions, which are indirect occupational hazards, are also summarized. Numerous policy, planning, and research recommendations are made. Adequate solutions for this impoverished and powerless group, however, will require significant sociopolitical advances, such as are developing with unionization and other forms of political organization.

Each year a large number of temporary workers performs a wide variety of labor-intensive tasks in support of United States agricultural production. A sizeable and flexible labor force is required to support the world's major producer and consumer of fruits and vegetables, and its smaller but substantial poultry, shepherding, and other livestock operations. Estimates of the size of the population of temporary farmworkers whose primary income is derived from agriculture range from less than one million to around five million. This wide range reflects different definitions of the population — whether nonmigrating seasonal workers, undocumented foreign workers, and accompanying dependents are included — as well as enumeration difficulties (Salber and Beza, 1980) and the divergent political interests of those producing estimates. Most migrant and seasonal farmworkers are Latino and/or black, although numerous other minorities and "Anglos" are also

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employed. An increasingly diverse ethnic composition in recent years is in part attributable to shifts in U.S. immigration patterns. Surveys repeatedly conclude that the average farmworker family lives below the poverty level and that the average farmworker has not completed grade school.

Ironically, these workers who are so essential to the nation's health suffer a high rate and vast range of work-related health disorders. Although an individual agricultural worker's health status is inevitably influenced by such contextual factors as policies of particular growers and crew leaders, nature of particular jobs, local regulations and laws, gender, age, ethnicity, and climate, widely prevalent conditions allow some generalization about health risks of the occupation as a whole. These conditions include the niche the workers occupy in the United States economy; pertinent federal policies, regulations, and legislation; characteristic attributes of the "culture of poverty"; and hazards widely prevalent in agricultural settings.

### *OCCUPATIONAL HEALTH PROFESSIONALS AND FARMWORKERS*

Many growers, crew leaders, and others who have primary associations with temporary agricultural workers have little concern for the workers' health. Others who have been committed to improving the workers' health have frequently had difficulty meeting particular needs of this group. Although occupational health professionals might be expected to fill this gap and play a significant role in the assessment of farmworker health problems and the development of effective solutions, their involvement with this population has been limited. Analysts have identified overall shortages of occupational health professionals (Lehmann and Kalmar, 1979) and problems of divided loyalties of such professionals (Walsh, 1986). In addition, several prevailing assumptions and orientations in the occupational health fields preclude adequate understanding of farmworker health problems.

First, the occupational health and safety movement has been overwhelmingly oriented toward construction, manufacturing, and mining. These traditional interests are reflected in the agenda of the chief federal agencies for worker protection: the Occupational Safety and Health Administration (OSHA) and its advisory research agency, the National Institute for Occupational Safety and Health (NIOSH), and the Mine Safety and Health Administration and its training agency, the National Mine Health and Safety Academy. Research, standards and regulations, enforcement mechanisms, and educational programs regarding agricultural settings have been inadequate. For example, of the 63,842 federal OSHA inspections conducted in 1982, 938, or one percent, were in agricultural settings (U.S. Department of Labor, 1983:50,5). Although this figure approximates the proportion of total workers in agriculture, it is not commensurate with the exceptionally

disproportionate risks of the industry, described below. A NIOSH report recommended the development of comprehensive health and safety guidelines for farm and ranch jobs (U.S. Department of Health, Education and Welfare, 1976:72); yet such guidelines have not been developed. OSHA's authorization statute, the Occupational Safety and Health Act of 1970, was amended in the late 1970s to exclude authority over farms with ten or fewer employees, thus leaving the major segment of farmworkers without any protection from the occupational safety and health agencies. Nascent or nonexistent unionization and other limits on worker power, as well as logistical problems of the agricultural setting and the strength of the grower lobby, undoubtedly contribute to this exclusion from the province of occupational health professionals.

Secondly, occupational health and safety practice tends to focus exclusively upon on-the-job exposures and injuries. In addition to significant health and safety hazards during actual work periods, temporary agricultural laborers face severe health risks as a consequence of the attendant living conditions of the occupation. For example, they frequently suffer abject poverty, live in hazardous dwellings, face major barriers to obtaining medical care, and are excluded from or have difficulty obtaining such customary workers' benefits as hospitalization insurance, sick pay, and workers' compensation. Such secondary conditions may result in even more severe and pervasive health consequences than do primary, on-the-job exposures and injuries.

Thirdly, in most occupational settings employee benefit packages and government laws, regulations, and surveillance and enforcement mechanisms provide incentives for employers to maintain a safe workplace and promote preventive practices. Employers of temporary agricultural workers, however, rarely incur expense or other penalty when individual workers become ill or injured. Health advocates for this population, then, lack the customary pressures that can be brought to bear on employers who maintain hazardous conditions and do not take responsibility for work-associated illness and injury.

Furthermore, occupational health and safety practice has largely limited its concerns to risks faced by employees themselves. In the case of migrant laborers, however, accompanying dependents, including young children, older parents, and the occasional nonemployed spouse, are subjected to nearly all the hazards that the workers face. Children of such workers are exceptionally disadvantaged. Due to such problems as chronic exposure to harmful chemicals, poor nutrition, negligible medical care, and discontinuous schooling, they frequently lag developmentally. Their formal education often ends at an early age so they can work in the fields and contribute to the family income, thus perpetuating a vicious cycle.

Finally, occupational health professionals rarely address the broader social

forces affecting their constituents. Although substantive solutions for many occupational health problems can be developed at the local, workplace and medical care delivery level, adequate solutions for temporary agricultural workers must include the fostering of broader structural changes. Unless this group secures greater political power, medical care will only palliate and safety standards will have little consequence. The responsibility of health and medical professionals involved with this population thus includes advocacy, the willingness to use one's knowledge, authority, and other resources to shape policy.

### *POPULATION DEFINITIONS*

Who shall be considered a temporary agricultural laborer for purposes of health evaluation, policy and planning? I take the position that those seasonal workers, dependents of workers, and foreign workers whose primary means of financial support is in agriculture should all be included. The many students, homemakers, and others who supplement primary income sources with agricultural work should be excluded.

The distinction between migrant and seasonal workers is often context-dependent and somewhat arbitrary. Many workers shift back and forth between "seasonal" and "migrant" status according to political and economic conditions, weather conditions, personal circumstances, time of year, and other factors. Furthermore, when this distinction has been imposed, as in a study comparing the dental health status of the two groups, essentially no differences have been identified (Avery, 1975).

Numerous studies have documented the poor health status of farmworker children relative to the general population (*See, e.g.,* Slesinger, Christenson and Cautley, 1986; Porteous, 1977). The children are occupationally exposed to hazardous substances and circumstances while working and playing in fields, while living near fields, while in contact with parents who have worked in fields, and during prenatal development.

Some may assume that the issue of whether or not domestic policies and programs should address health problems of various categories of foreign workers is less clear-cut than is the case of domestic seasonal workers or dependents. Nonetheless, a strong affirmative argument may be made. Such a position requires that one goes beyond the one-sided myth of a resource-draining "alien invasion" to accept both the push from impoverished countries with rapidly-growing populations and high unemployment (most notably, Mexico) and the pull by the United States in the form of wide-ranging institutional support (Bustamante, 1983; Portes, 1978; Jenkins, 1978; Bach, 1978; Stoddard, 1976). Such institutional support includes agribusiness interests and activities in nearly every state, the U.S. Immigration and Naturalization Service (INS), and social services provided by churches and

other relief agencies. A large number of foreign workers are legal laborers. Growers frequently prefer to hire undocumented immigrants: because such workers are politically weak and vulnerable to deportation, they work hard, accept low wages, make few demands, and may be used to undermine organizational efforts of domestic workers. The Border Patrol and other INS divisions carry out the nation's longstanding immigration policy, which favors agribusiness and other powerful domestic interests over those of domestic farmworkers and other less powerful groups. Media releases about the "alien problem" serve to reassure displaced or depressed American workers that something is being done and to provide a scapegoat for domestic labor and economic problems.

Many would deny foreign workers basic services on the grounds that they take jobs away from domestic workers. The matter is not clear-cut, for agribusiness interest argues that cheap immigrant labor allows them to compete with Third World producers and remain in business (Guttmacher, 1984:512), and some policy analysts believe that these workers create more jobs than they displace (Morganthau, 1984:21).

The frequent charge that foreign agricultural workers drain local social service and medical resources seems to be unfounded. During unemployed periods of the annual cycle and the life cycle, these workers frequently choose to be in their native countries, and INS enforcement frequently accelerates during the off-season. Jorge Bustamante, director of the Center for Border Studies of Northern Mexico, estimates that at least one million of the Mexican citizens who illegally enter the U.S. for the growing season return home for the rest of the year (Meislin, 1984). There is also evidence that when undocumented workers are in the United States, they tend to pay taxes at rates substantially higher than the value of services received (Weintraub, 1984; Stoddard, 1976:166).<sup>2</sup> Exclusion from services, difficulties in negotiating bureaucracies to obtain those services for which they are eligible, and, in the case of undocumented migrants, fear of detection are formidable barriers.

The use of non-domestic labor is an integral component of agricultural production, as currently organized in the United States (Martin, 1985). The recent creation of the H-2A class of nonimmigrant temporary agricultural laborers and a series of special provisions for agricultural workers within the Immigration Reform and Control Act of 1986 constitute clear and formal acknowledgement of the institutionalization of these workers within U.S. agriculture.<sup>3</sup> Essentially all agree that as long as these jobs are available,

<sup>2</sup> One administrative unit — *e.g.*, cities — may, however, incur net losses as another — *e.g.*, states — makes larger net revenue gains (Weintraub, 1984).

<sup>3</sup> An analysis of the projected impact of the recent immigration reform legislation on the temporary farmworker population warrants distinct and detailed treatment, and is beyond the scope of this paper.

foreign workers will continue to come. In light of wide-ranging institutional support given to these workers and of the benefits that all in the United States reap from lowered food costs, the health needs of foreign workers warrant serious consideration in domestic policies and programs.<sup>4</sup>

This position notwithstanding, present binational relationships cause significant hardship for three groups: domestic farmworkers, whose working conditions and wages are depressed; individuals belonging to domestic minority communities, who are frequently conflated with the foreign workers and seen as alien and less than legitimate; and the exploited foreign workers. An appropriate goal is continued political organization of agricultural workers through grassroots organization, unionization, and protective labor legislation (Jenkins, 1985).<sup>5</sup> By one estimate, only 5.5 percent of U.S. workers in the farming-fishing-forestry industry category belong to unions (U.S. Department of Labor, 1985a).

Officially or unofficially the federal authorization for migrant health and medical services funding, the Migrant Health Act of 1962, acknowledges the need to serve dependents, seasonal workers, and foreign workers. The initial act provided for dependents' medical care, and a 1970 amendment extended eligibility to seasonal workers. Although the act initially stated that its beneficiaries are domestic workers, the *de facto* policy of migrant health programs has been to provide services for foreign workers as well.

### *PRIMARY OCCUPATIONAL EXPOSURES*

Although agriculture has traditionally been unregulated, receives minimal attention from occupational health professionals and agencies, and is the missing component in the rural health movement (Donham and Mutel, 1982), it involves significant occupational hazards. Despite strikingly different population definitions and occupational mortality figures, reports of both the National Safety Council and the U.S. Department of Labor (DOL) point to the hazards of agriculture.

According to the National Safety Council estimates, the 1985 work death rate for the agricultural industry group (which includes forestry and fishing) was 49 per 100,000 workers per year. This rate was similar to that of the mining and quarrying industry group (50 per 100,000 workers). It far exceeded all six remaining major industry groups, as well as the industry-wide

<sup>4</sup> This argument of social responsibility to provide basic services to those who contribute to society has also been put forward in support of access of non-domestic workers to public education (Flores, 1984:510).

<sup>5</sup> Agriculture is exempt from the federal Taft-Hartley Act, which protects workers' rights to bargain collectively with their employers. To date, California is the only state that has enacted legislation to give agricultural workers this right. The effectiveness of California farmworker initiatives under this legislation has been strongly influenced by the changing political climate in the state. Unionization of farmworkers, however, has not been limited to California.

rate of 11 annual deaths per 100,000 workers (National Safety Council, 1986:23).

Of the eight major industry divisions classified by the federal government and analyzed by DOL, only mining and construction had higher occupational fatality rates than agriculture (including forestry and fishing) for the years 1980 through 1983. Data within industry divisions, given only for occupational injury and illness incidence rates, indicate that average agricultural rates are approximately fifty percent higher than average forestry and fishing rates. Total workplace fatality for this four-year period was, according to DOL figures, 6.36 per 100,000 workers per year, fatality in the agriculture-forestry-fishing division was 16.91 per 100,000 per year (U.S. Department of Labor, 1983:86; U.S. Department of Labor, 1985b:39). According to DOL figures for the eleven-year period 1972 through 1982, the occupational injury and illness incidence rate steadily declined in all industry divisions except agriculture-forestry-fishing and mining, which remained stable (U.S. Department of Labor, 1985c:412-414). Because a large proportion of agricultural workers are employed considerably less than full time, and because agricultural reporting procedures are weaker than those of other industry groups, the hazards of agriculture are likely to be far more severe than these figures indicate.

A survey of Idaho farmworkers included numerous items associated with occupational exposures (U.S. Department of Health, Education and Welfare, 1976:49-50). The workers were asked to identify their own health problems from an established list: 41 percent reported nausea and/or dizziness (frequently attributed to the sun and bending activities), 35 percent reported eye problems (frequently attributed to dust), 25 percent reported aches and pains (various causes), 25 percent reported hearing loss (possibly due to recurrent unchecked otitis and machinery noise), and 24 percent reported skin rashes (may be primarily due to contact with toxic plants and pesticides). Similarly, headache, eye trouble, and backache were the most common physical complaints in a survey of migrant farmworkers in Wisconsin (Slesinger and Cautley, 1981:258). Respondents over 16 years of age in a recent New York survey indicated that the two most common symptoms for which they sought care were back problems and skin rashes (State University of New York at Buffalo, 1984:55). Similarly, an earlier study identified high disability rates in a national random cluster sample of farmworkers, with many of the injuries having suspected occupational origins (U.S. Department of Health, Education and Welfare, 1974). A comprehensive review of descriptive farmworker health status data from screenings, surveys, and clinic records suggest that this population experiences elevated rates of many forms of occupational illness and injury (Wilk, 1986:13-39). These data imply that there is a critical need for the application of occupational health and safety methodologies to develop causal data and worksite interventions.

Pesticides, sunlight, injuries, and poor field sanitation constitute major occupational hazards for farmworkers. Currently, sufficient data do not exist regarding adverse health effects from other potential occupational hazards. Among identified agricultural hazards that bear further investigation with respect to the farmworker population are hearing loss from equipment noise (Thelin, Joseph, *et al.*, 1983), respiratory aggravation from many forms of agricultural particulate (Cockcroft and Dosman, 1981), zoonotic diseases common to animals and humans (Donham, 1975), and stress associated with monotony, piecework, high energy expenditure, and similar characteristics of the occupation (Sharit and Salvendy, 1982).

### *Pesticides*

Pesticide exposure, which has received more attention than any other agricultural exposure, is a problem of immense proportions. Fourteen hundred active pesticide ingredients, marketed in 40,000 to 50,000 different formulations, are currently registered with the Environmental Protection Agency (EPA) (Moses, 1983:565). In the United States, the annual sales volume is in excess of \$6 billion (Beamer and Leng, 1980) and about 2.3 billion pounds are sold to U.S. farmers annually (Wasserstrom and Wiles, 1985).

Of the three principal sources of pesticide exposure to fieldworkers, foliar residues are considered to be of greatest importance, soil dust residues of medial importance, and airborne residues of least importance. Dermal absorption is the primary avenue of exposure; inhalation and ingestion are secondary avenues (Iwata, 1980).

Acute exposure may result in systemic toxicity (from an active ingredient, from degradation products of storage, or from environmental by-products) or topical damage to skin, eyes, and respiratory tract (Davies and Freed, 1980:10; Morgan, 1980:98). Widely-used organophosphate pesticides inhibit cholinesterase activity, causing dizziness, pinpoint pupils, nausea, headache, and other symptoms (Knaak, 1980:81). Longterm effects of chronic residue exposure to farmworkers involved in harvesting operations are poorly understood (Moses, 1983:563; Gunther, Ware, *et al.*, 1980:2-3). Clinical conditions that have been associated with pesticide exposure include: Bell's palsy, Guillain-Barré syndrome, Parkinson's disease, aplastic anemia, hemolytic anemia, pseudotumor cerebri, asthma, sensitization, chloracne, toxic epidermal necrolysis, deafness, azoospermia, stillbirth, premature birth, developmental impairment in offspring, hemorrhagic cystitis, pancreatitis, diabetes mellitus and porphyria (Moses, 1983:562; Morgan, 1980:100; Bang, Lockey and Keye, 1983:51). Suspected but generally unconfirmed conditions associated with pesticide exposure include accelerated atherosclerosis, hypertension, carcinogenesis, teratogenesis, mutagenesis, impaired



immunity and immunopathies, and various adverse effects on the brain, heart, liver, kidney, lung, reproductive organs, and blood (Wilk, 1986:60-71; Moses, 1983:564; Morgan, 1980:100; Davies and Freed, 1980:11).

Many farmworkers are unaware of health hazards associated with pesticide use. Forty-six percent of adult male farmworkers surveyed in the Mississippi delta area did not associate pesticide application with health hazards, and 57 percent stated that indiscriminate disposal of the pesticide containers involved no health risks. Over 25 percent stated that they did not know whether or not application and disposal could be hazardous. The workers' observed behavior relating to pesticides reflected their poor awareness of associated risks (Omishakin, 1983:240).

The Federal Insecticide, Fungicide, and Rodenticide Act of 1947 (FIFRA) provided guidelines for minimal pesticide regulation from 1947 to 1972. This act specified rules of safe application that were to appear on labels of chemical containers. The government did not enforce these rules, however, and generally accepted standards that had been established by chemical manufacturers with respect to consumer rather than fieldworker exposure (Porteous, 1977:66; Dunbar and Kravitz, 1976:75-76). The Federal Environmental Pesticide Control Act of 1972 ("new FIFRA") made it unlawful to use registered pesticides in a manner inconsistent with product labeling and established penalties for violation. The act requires that all commercial pesticides be registered with the EPA and that, as a condition of registration, manufacturers provide scientific data regarding both effectiveness as a pesticide and safety to crops, humans, and the environment.

The EPA acquired responsibility for setting and enforcing pesticide standards in 1974 and the following year established post-application time intervals for safe worker reentry for a small number of pesticides. The standards are based upon laboratory studies designed to protect consumers, and valid epidemiological data regarding field conditions were not sought (Kilgore and Akesson, 1980:28). These standards are crude and generally inadequate. The EPA, for example, has established a 48-hour interval for parathion, which, since its introduction, has been responsible for more deaths than any other organophosphate pesticide (Moses, 1983:557). By contrast, the state of California, which has established its own intervals, has determined that safe reentry is only assured from 14 to 60 days after parathion application, depending upon type of crop and method of application (Moses, 1983:549). Mandated to review and register the 600 active ingredients in approximately 50,000 pesticide products that had been marketed over several decades, the EPA completed only 26 such reviews over a twelve-year period, with virtually no attention to chronic exposures of fieldworkers (Wasserstrom and Wiles, 1985:22-23). The process is severely constrained by lack of data. In considering 3,350 pesticide ingredients, a National Research Council study group determined that a complete assessment is possible for only 10

percent, while a minimal assessment could not be made for nearly 65 percent (National Academy of Sciences, 1984). To date, there is little indication that the EPA intends to obtain better data and fulfill the letter or spirit of the mandate, which is legally circumventable because the law allows for economic considerations.

Adequate data on the incidence of worker morbidity and mortality from pesticides are unavailable. An ineffective EPA reporting system has been discontinued. California has a fairly rigorous reporting system, yet an investigation following the 1976 poisoning of 108 grape pickers near Fresno found that most physicians in this area of high migrant density were unaware of the law requiring reporting of pesticide-related illness (McClure, 1978:424). Such systems also underenumerate cases of pesticide-associated disorders due to the nonspecificity of symptoms, physicians' failures to ascertain their patients' occupations, and the numerous barriers between farmworkers and the medical care system. One assessment used epidemiological data to estimate that the California system may identify less than two percent of residue-related illness (Kahn, 1976). Conservatively extending this analysis, over 300,000 farmworkers annually experience pesticide-related illness (Coye, 1985:364). The need for improved methods for reporting, surveillance, and exposure prevention and control is clear.

Recommendations for improved pesticide field safety include:

- pursue a national policy of integrated pest management (IPM), which has been endorsed by the Office of Technology Assessment, the World Health Organization, the Food and Agriculture Organization, and other national and international groups, and may enable up to 75 percent reduction in pesticide use (*See*, Wasserstrom and Wiles [1985] for IPM references and for a comprehensive reformulation of pesticide policy concerning field workers);
- strengthen pesticide control generally by strengthening EPA's legislative mandate or by transferring jurisdiction over field exposure to OSHA (*See*, Goldfarb, 1981:35-36; Dunbar and Kravitz, 1976:78; Shenkin, 1974:17);
- conduct investigations to develop an improved epidemiological profile of pesticide-induced disorders among farmworkers and to determine acceptable exposure conditions;
- establish safe reentry level standards (ug residue/cm<sup>2</sup> foliar surface), ascertainable by simple chemical tests (*See*, Knaak, 1980), to reflect particular field conditions and allow earliest safe reentry, and explore the feasibility of using such standards in place of time standards;
- substantially increase monitoring;
- increase awareness of standards by workers, growers, crew leaders,

and local clinicians and public health departments through appropriately formulated and disseminated audiovisual media, verbal instruction, newsletters, and other health education channels (Wilk [1986:116-18] lists various existing resources);

- establish pesticide health hazard management programs through Migrant Health Centers and Projects (U.S. Department of Health and Human Services, 1982); and

- advise workers to wear and frequently launder 100 percent cotton limb-covering clothes, which absorb a high rate of foliar residue (Freed, Davies, *et al.*, 1980).

### *Heat and Light from Solar Exposure*

Transient heat fatigue from work in hot environments has been associated with a reduction in physical performance and mental alertness, an increase in irritability and other emotional states, and an increase in injuries (U.S. Department of Labor/U.S. Department of Health and Human Services, 1980). Common effects from prolonged exposure to high heat include heat stroke, heat exhaustion, heat cramps and heat rash. Although farmworker employers seldom provide an adequate supply of potable water, it is estimated that from one to three gallons per worker per day are required for such prolonged exposure to high heat and humidity. Considerable evidence indicates that heat stress problems are prevalent in this population. Extensive and voluminous recent testimony throughout the country pointed to numerous farmworker deaths and a broad range of prevalent morbid conditions associated with heat stress (Migrant Legal Action Program and Farmworker Justice Fund, 1984).

Sunlight, an obvious potentially harmful exposure from the perspective of occupational medicine, is largely unaddressed in the literature of the health of U.S. migrant and seasonal farmworkers. With the exception of the general duty clause of the Occupational Safety and Health Act of 1970, which requires a workplace free from recognized hazards likely to cause death or serious physical harm, worker exposure to sunlight is unregulated.

Intensity of exposure to sunlight depends upon a variety of circumstances, including season, time of day, distance from the equator, altitude, atmospheric conditions, environmental reflectivity, skin pigmentation, clothing (coverage, tightness of weave, color, fit), and other barriers (sunglasses, sun-screening agents) worn by the exposed individual. The skin and eyes are the primary sites affected.

In the Idaho farmworker survey, 89 percent reported that they commonly wear a hat and 86 percent reported regularly using gloves (U.S. Department of Health, Education and Welfare, 1976:45). Workers were not asked about the regular wearing of long-sleeved shirts (probably somewhat less) and of

sunglasses (probably negligible). Due to long hours in the sun during the period of greatest annual intensity, environmental reflectivity, direct exposure of even a hat-protected head and neck during constant physical activity, and the permeability of warm-weather clothing, all regular outdoor workers receive substantial exposure.

The principal harmful dermal effect of the sun is carcinogenesis. Ninety-five percent of skin cancers are basal cell carcinomas (Glazer, 1981:47). As opposed to melanomas, these cancers generally appear in old age following a history of prolonged occupational or recreational sunlight exposure; they seem to correlate with total lifetime dose (Lee, 1982:129). The cure rate is 95 percent and they rarely metastasize (Glazer, 1981:44). The incidence of such carcinomas in farmworkers, whose total lifetime dose is substantial, is unknown. Given the health care utilization rates and patterns of these workers, most occurrences are probably undiagnosed and untreated.

Malignant melanoma is much less common but of greater concern due to metastasis and frequent death. The national relative five-year survival rate is only 68 percent (Smart, Lyon and Eyre, 1979:61). Epidemiological studies have related degree of skin pigmentation, latitude gradient, differential male-female incidence by anatomic site, and various other patterns to melanoma incidence, and have estimated that 75 percent is attributable to solar exposure (Lee, 1982:129; Movshovitz and Modan, 1973; Glazer, 1981:49). The etiology of such melanomas is complicated and incompletely understood; they seem to be associated with a much smaller dose than localized carcinomas and the dose seems to operate in conjunction with other factors to produce the tumor (Lee, 1982:130). Intermittent exposure of untanned skin has been proposed as the primary risk factor, and the melanogenic tanning and stratum corneum thickening that accompany chronic exposure are considered to have a protective effect (Lee, 1982:130; Glazer, 1981:46). This theory would explain the positive correlation of melanoma incidence with socioeconomic status reported in studies from Finland and Australia, where incidence in farmers and other outdoor workers is significantly lower than that in clerical, technical, and professional indoor workers (Lee, 1982:125-126). Questions remain, however, about confounding due to urban-rural differences in medical care services and utilization and, particularly in Australia where larger farmer-professional incidence differences are described, confounding due to racial differences in pigmentation. Furthermore, an Israeli study found agricultural workers to have a greater-than-expected incidence of melanoma (Movshovitz and Modan, 1973:779). The incidence of melanoma among U.S. farmworkers does not seem to have been examined.

Biochemical, photochemical, histological, and epidemiological research have established strong evidence that near-ultraviolet radiation from sunlight and artificial light sources stimulates cataract formation (Zigman, 1983). A positive and highly significant correlation has been found between

cataractogenesis and hours of exposure per day (Zigman, 1983:319). The data are inconclusive, but again, pigmentation may offer some protection (Zigman, 1983:318). A significant number of farmworkers require removal of pterygium, a thickened conjunctiva extending over the cornea, which is attributable to exposure to both ultraviolet radiation and agricultural particulates (Arbab, 1985). Reports of health screenings of farmworkers and their families inevitably mention high rates of visual defects. The exact problems and the extent to which they may be due to sun or other occupational exposures as opposed to associated problems of poverty and powerlessness (*e.g.*, nutritional deficits or uncorrected defects associated with aging) have not been explored.

Recommendations for reduction of harmful solar effects on agricultural workers include:

- conduct epidemiological studies of effects of solar exposure on U.S. agricultural workers;
- enforce recent regulations requiring provision of adequate supplies of potable water in fields (*See*, Migrant Legal Action Program and Farmworker Justice Fund [1984: Proposed Findings of Facts, 82-138]);
- identify and implement incentives for appropriate rest periods (piecework, for example, is a strong disincentive);
- increase awareness of potential harm from solar exposure and of protective measures through a series of appropriately formulated and disseminated audiovisual media, verbal presentations, newsletters, and other health education channels addressed to workers, growers, crew leaders and local clinicians and public health departments;
- encourage workers to wear protective clothing: hat, neckerchief, loosely-fitting long-sleeved shirt and long pants of tightly woven cloth — cotton is best for air circulation (sunscreening agents are costly and inconvenient, and various ingredients are suspected to cause dermatitis, photosensitivity, and allergy, as well as carcinogenic, mutagenic, and toxicogenic effects); and
- encourage workers to wear protective lenses that filter out near-ultraviolet radiation.

### *Injuries*

Of the eight major industry divisions within which the federal government collects labor statistics, only construction had a higher occupational injury incidence rate than agriculture-forestry-fishing for the years 1982 and 1983

(U.S. Department of Labor, 1985b:18-32). According to National Safety Council figures, the rate of disabling injury in 1985 was higher for agriculture (5,313/100,000) than for all seven other major industry divisions, considerably exceeding even mining-quarrying (4,000/100,000) and construction (3,667/100,000) (1986:23). Again, these figures and comparisons undoubtedly underestimate the relative severity of agriculture because many agricultural workers work considerably less than full-time and because reporting is weaker in that industry. A national random cluster sample indicated that 44.5 percent of migrant and seasonal farmworker households have at least one disabled member (U.S. Department of Health, Education and Welfare, 1974).

Temporary workers may well be subject to higher rates of injuries than permanent workers or the growers themselves, in part because growers and crew leaders have few of the incentives of most other employers to provide safe work places and promote preventive practices. The Farm Labor Contractor Registration Act of 1963 (FLCRA) was designed to prevent abuse and carelessness by crew leaders. The act was strengthened through amendments in 1974, and replaced in 1983 with the Migrant and Seasonal Agricultural Worker Protection Act (AWPA). Poor worker knowledge of rights, constraints on workers' freedom to protest, and poor enforcement limit AWPA's effectiveness.

For many migrants, hazards begin before arriving at the work site. Crew leaders often transport workers and their families between their home bases and work sites and between residential camps and fields. Many injuries have resulted from the use of unsafe vehicles and careless driving. During a ten-year period in California, 112 documented farmworker deaths and 2,575 documented injuries occurred while workers were being so transported (Goldfarb, 1981:24). During 1982 and 1983, 24 percent of reported fatalities in the agriculture-forestry-fishing industrial division were attributed to highway vehicles, and an additional 25 percent were attributed to farm vehicles and equipment (U.S. Department of Labor, 1985b:40).

Musculoskeletal injuries are probably endemic to this population, whose activities frequently involve recurrent bending, stooping, lifting, and carrying. Several surveys have identified high rates of musculoskeletal problems. Twenty-five percent of farmworkers participating in a survey in Idaho stated that they suffered from aches and pains (U.S. Department of Health, Education and Welfare, 1976:49-50). Back problems were the most common symptom for which New York farmworkers sought medical care (State University of New York at Buffalo, 1984:55) and were among the most frequent complaints in a Wisconsin survey (Slesinger and Cautley, 1981:258). Such injuries are undoubtedly exacerbated by a system in which many workers are not compensated for and cannot afford sick leave, and in those settings that involve piecework remuneration.

The problem of pesticides is not limited to safe worker reentry practices; these chemicals are also responsible for numerous accidents involving workers' children. Of 350 known cases of pesticide exposure in North Carolina between 1970 and 1972, nearly one-half involved children under ten (Dunbar and Kravitz, 1976:74). The actual number of such victims was probably many times higher, and large numbers of children are chronically exposed from the prenatal period onward.

Although details have not been reported specifically for temporary agricultural workers, falls, eye injuries, injuries involving animals, electrocutions, and fires are among other major agriculture injury categories that may be significant for this population (U.S. Department of Labor, 1985b:40; Saari and Aine, 1984).

Procedures that may reduce job-related injuries of farmworkers and their dependents include:

- develop safety standards for the full range of farm activities; apply ergonomics to equipment, containers, and work areas to minimize musculoskeletal injuries; require manufacturers of farm machinery to incorporate safety features (Simpson, 1984);
- inform workers, growers, crew leaders, and local clinicians and public health departments of common types of farm accidents and of preventive practices through a series of appropriately formulated and disseminated audiovisual media, verbal presentations, newsletters, and other educational channels (72% of surveyed Idaho farmworkers expressed interest in participating in evening or off-season safety programs [U.S. Department of Health, Education, and Welfare, 1976:51]); and
- maximize participation of farmworker children in Migrant Head Start and other off-site educational programs.

### *Poor Field Sanitation*

Conditions associated with contaminated water and poor sanitation practices are prevalent in the farmworker populations. In a comparison with poor non-farmworker clients of a Community Health Center, clients of the Utah Migrant Health Project exhibited 13 times the nausea and vomiting, 19 times the diarrhea of unknown origin, 7 times the abdominal/intestinal pain, 9 times the bloody stools, and 11 times the fevers of unknown origin. These figures are likely to underestimate the differences in the two populations (Arbab and Weidner, 1986). Several screenings of farmworkers and/or their children in areas of the East have found consistent intestinal parasite infection prevalence rates of approximately 35 percent (Ungar, Iscoe, *et al.*, 1986). Poor field sanitation, substandard housing conditions,

and lowered resistance must all contribute significantly to such findings.

Inadequate field sanitation must also be considered to be a factor in pesticide poisoning, conditions associated with chronic pesticide exposure, heat ailments and malnutrition secondary to chronic infectious and parasitic diseases (Migrant Legal Action Program and Farmworker Justice Fund, 1984). Prolonged urine retention significantly increases risk of urinary tract infection and numerous related adverse health conditions (Migrant Legal Action Program and Farmworker Justice Fund, 1984: Proposed Findings of Facts, 37-45). Current conditions also involve indignity and inconvenience, reduced productivity and efficiency, and increased medical expense.

Voluntary provision of adequate arrangements for field sanitation (potable water supply and facilities for handwashing and excreta disposal) has been negligible. Fourteen states have some field sanitation regulations, with only two requiring toilet facilities and water for drinking and handwashing under all circumstances (Wilk, 1986:107). Enforcement is poor. We are currently in the United Nations International Water Supply and Sanitation Decade. Following fifteen years of advocacy, persistent court action by the Migrant Legal Action Program and others, and concerted and powerful testimony and other support from the public and the medical community, federal field sanitation standards have recently been established to protect farmworkers. The regulations were developed in response to a Federal Court of Appeals ruling in early 1987 that the Department of Labor must issue guidelines requiring growers to provide proper sanitation facilities for field workers. No other occupational group has been required to provide OSHA with "substantial evidence" of significant risks from inadequate sanitary facilities at the worksite (Migrant Legal Action Program and Farmworker Justice Fund, 1984: Proposed Findings of Facts, 3).

Provision of appropriate water and sanitation facilities must be coupled with education, for surveys indicate that many farmworkers do not appreciate the association between the fecal-oral pathway and disease. In a survey of adult male Mississippi agricultural workers, 51 percent did not believe that indiscriminate defecation and improper sewage disposal are health hazards, and 24 percent indicated uncertainty about such hazards (Omishakin, 1983:240).

Recommendations for adequate field sanitation include:

- implement federal standards for drinking water and handwashing and toilet facilities (See, Migrant Legal Action Program and Farmworker Justice Fund, 1984: Proposed Findings of Facts, 82-138); provide viable enforcement mechanisms; and
- provide workers, growers, crew leaders and local medical care providers and health departments with water sanitation information



relating to the farmworker population through appropriately formulated and disseminated audiovisual media, verbal presentations, newsletters, and other health education channels.

### *SECONDARY HEALTH CONSEQUENCES ASSOCIATED WITH THE FARMWORKER OCCUPATION*

#### *Difficulties in Obtaining Appropriate Health and Medical Care Services*

Despite their exceptional needs, migrant and seasonal workers are poorly integrated into health and medical care services. Whether adjusted for expected rates based on the general population, a youthful population, or a poverty population, medical care utilization by temporary agricultural workers is low (Walker, 1979:670-671). Male workers who are black or Latino receive particularly low rates of care (Kaufman, Lewis, *et al.*, 1975:606; Shenkin, 1974:12), and foreign-born workers have been found to receive considerably less care than native-born workers (Chi, 1985).

To some extent, these rates can be attributed to the workers' unfamiliarity with free or sliding-scale services, their unwillingness to take time off from work and hence forfeit wages, the costs of the medical services themselves, the tendency for rural areas of the United States to be medically underserved, and transportation difficulties. Yet medical care providers have frequently been inhospitable to the farmworker population. Of the Utah physicians who consented to participate in a survey, 93 percent were willing to establish evening hours exclusively for migrants, 89 percent were unwilling to adjust fees for migrants, and 72 percent would only accept migrants as patients on an emergency basis. Although the most common reason for service refusal was a heavy caseload, physicians also expressed many negative expectations about the population, anticipating, for example, welfare cases, failure to pay or keep appointments, language barriers, and general patient undesirability (Endo and Sherlin, [1972?]). Medical care providers and agencies have also attempted to thwart those who have been committed to meeting farmworker health needs. In the early 1970s, the strongest opposition to several innovative federally-funded Migrant Health Projects came from local physicians threatened both by ostensible competition for patients and by the establishment of new forms of medical care organization in their areas (Shenkin, 1974:146; *See also*, Goldfarb, 1981:38). Negative reactions of state and county health departments and state medical societies have also adversely affected migrant medical services (Dans and Johnson, 1975). Given the growing physician surplus and the increasingly competitive med-

ical care environment, one might reasonably expect similar opposition to be widespread at present.

Over 90 percent of migrant workers do not have hospitalization insurance (Goldfarb, 1981:37). To meet the needs of such a population, all hospitals receiving funds authorized by the Hospital Survey and Construction Act of 1946 ("Hill-Burton" Act) are required to provide "a reasonable volume of hospital services" to the medically indigent during the amortisement period. Nonetheless, migrant and seasonal farmworkers are frequently turned away from Hill-Burton hospitals (U.S. General Accounting Office, 1981:16; Dunbar and Kravitz, 1976:72; Baumheier, *et al.*, 1973:61-62).

Even if traditional medical services were widely available, most providers would not have the experience and knowledge to meet many of the needs of the farmworker population. For example, an investigation following mass pesticide poisoning of grape pickers in an area with a high concentration of temporary farmworkers established that most area physicians were: 1) unaware of guidelines for diagnosing and treating pesticide poisoning; 2) unaware of state reporting requirements regarding pesticide-related illness; and 3) reluctant to submit workers' compensation forms for Mexican citizens (McClure, 1978). Well-intended screening and treatment programs have lost many migrants to follow-up because organizers did not adequately appreciate the importance of taking quick action before the workers moved on to new work sites (Eisner, Cobb, *et al.*, 1972; Smith, De Angelis and Hansen, 1978). Good service also requires the ability to communicate freely in the client's language, a sensitivity to the client's cultural background, and general familiarity with the client's living conditions (Sakala, 1985), knowledge that providers generally lack regarding farmworkers. In a survey of farmworkers in Wisconsin, 25 percent stated that they had delayed obtaining medical care because they either feared medical practices or did not have faith in the medical profession (Chi, 1985). This population clearly requires community-oriented primary care models of service delivery.

The Migrant Health Act, a 1962 amendment to the Public Health Service Act, was designed to fill the medical care service void. This act authorizes funds to public and private organizations to establish clinics and other health-related services for migrants. The original formulation had several major shortcomings. Perhaps the foremost flaw was that the clients themselves were not involved in the development of the general program or of specific projects. In addition, the projects provided neither services for seasonal workers nor inpatient care. Few clinics had on-site laboratory, x-ray, and electrocardiograph capabilities, necessitating migrant utilization of non-project providers. The projects addressed health conditions in homes and camps to a limited extent, but did not deal with field conditions. Nor did they compile records of disorders attributed to agricultural hazards. Finally, annual reports stressed the number of services provided and counties served,

but did not qualitatively assess program efforts (Shenkin [1974] provides a comprehensive assessment of the early years of this program).

Later amendments addressed most of these shortcomings. They expanded eligibility to include seasonal workers. Coverage was extended to include but not require both inpatient services and more comprehensive outpatient services. The amendments mandated consumer representation on governing boards, bilingual services where necessary, and attention to both camp and field conditions. Unfortunately, some of these improvements have not reached significant numbers in the target population. For example, the program planned to fund 3,300 hospital admissions for 1977, serving an estimated 0.1 percent of the target population (U.S. Department of Health, Education, and Welfare, 1977:112-113). It has been estimated that the Migrant Health Program provided services to 17 percent of migrant and seasonal farmworkers and their families during Fiscal Year 1985 (Wilk, 1986:5). The target population is widely dispersed, and many workers do not have ready access to a Migrant Health Center or Project.

Major accomplishments of the twenty-five-year-old Migrant Health Program are considerably improved: 1) access to community-oriented health and medical care; 2) immunization status; 3) control of communicable diseases; 4) water supplies and waste disposal; and 5) dialogue among diverse interests associated with the farmworkers and their health (Johnston, 1985:178-79). Clinicians and administrators have provided critical support for the development of favorable public policies concerning farmworkers. Program providers have recently established the Migrant Clinicians' Network to address fundamental health issues of the farmworker population. At present, the Migrant Health Program serves over 300 areas through over 100 projects.

Among recommendations for improved migrant-seasonal worker health and medical care services are:

- continue to establish comprehensive centers with personnel who are familiar with farmworker problems and favorably disposed toward and able to communicate with this population; maximize community representation on staffs and governing boards; use the Migrant Health Project network to distribute available health education materials (*e.g.*, U.S. Department of Labor, 1982); provide program funds for outreach and advocacy services to publicize the centers' specialized services and receptivity, and to address housing and field conditions (current efforts require staff donation of off-hours time or allocation of project medical care delivery funds, which compromises required productivity); provide program funds for liaison services to link workers with appropriate grievance, social service, and other channels (again, current efforts are donated or at expense of medical care budgets and productivity);
- develop programs to use community health aides and to recruit children from farmworker families to clinical training programs (a

recent issue of the newsletter *Catalyst* describes a training program for community health aides with farmworker backgrounds [Mouch, 1985: 4-5];

- supplement overburdened rural medical care systems with student summer internship programs, in which medical, nursing, dental, health education, nutrition, and other students use facilities of and are supervised by local providers, who in the process become sensitized to farmworker health needs (See, Barnett and Call, 1979; Barnett, Orleans and Larson, 1978; and Barnett, *et al.*, 1972 for reports of a successful student internship program);

- reproduce through the U.S.G.P.O. portable medical records forms (See, *e.g.*, Johnston, 1985:130-131), distribute these to Migrant Health Program projects and centers, and encourage workers to take the records to all provider visits (projects must currently purchase these forms at commercial rates and at the expense of other budget items); and

- organize infrastructure that supports eventual use of laser-optical medical record in "credit card" format, which can encode a large amount of health information and graphics (such a system may have limited acceptability by undocumented workers concerned with confidentiality issues).

#### *Exclusion from Traditional Workers' Benefits*

Farmworkers receive few benefits because they have little power, their jobs are necessarily temporary, and agriculture continues to be poorly regulated. In addition to problems associated with lack of sick pay and medical care insurance, these workers received limited or no workers' compensation, as well as limited benefits from the Fair Labor Standards Act and the Social Security Act.

Despite exceptional occupational risks, and in contrast to nearly all other occupations, job-related diseases and injuries of a large segment of the agricultural workforce are not treated as a cost of production. Farmworkers are completely unprotected by workers' compensation laws in twenty states. Restricted categories of temporary agricultural laborers are eligible for workers' compensation benefits in fifteen states and Puerto Rico, and they receive the same workers' compensation benefits as other workers in only fifteen states (Wilk, 1986:109). Given farmworkers' tenuous control over their lives and limited ability to negotiate official channels, few of those eligible actually receive workers' compensation. As with indirect "non-occupational" injury and disease, they may well continue to work, exacerbating their conditions and diminishing their general state of health and capacity to be self-supporting.

Provisions of the Fair Labor Standards Act of 1938 have negatively affected farmworkers' health by legitimizing their poverty and facilitating children's entrenchment in the system. The original act guaranteed most workers, but not farmworkers, a minimum wage and time-and-one-half wages for overtime, and restricted child labor. Amendments in 1966 extended eligibility to farmworkers, excluding the majority employed on small farms, paid piece wages, or working under certain conditions for less than thirteen weeks per year. These amendments also extended coverage to children working on farms, but their labor was less restricted than that of other child workers: during non-school hours, farm children of any age could work at nonhazardous jobs (other child workers were required to be at least fourteen years old), and sixteen-year-old farm children (versus eighteen-year-old nonfarm children) could work at hazardous jobs. The 1974 amendments provided parity for those previously eligible, but continued to exclude those who had not been eligible. The most significant point, however, is that even existing Fair Labor Standards provisions for farmworkers are regularly violated.

Adequate unemployment coverage is of particular importance to farmworkers because their work is necessarily temporary and is frequently affected by adverse weather conditions and mechanization. This group, however, was excluded from benefits provided by the Social Security Act of 1935 until a 1950 amendment incorporated most into the Old Age, Survivors, and Disability Insurance program. Over one million farmworkers were eligible for temporary unemployment benefits instituted from 1974 to 1976 during a period of high unemployment. Amendments in 1976 officially extended unemployment eligibility to employees on large farms. Union pressures have led to expansion of unemployment insurance for a small proportion of farmworkers. Survivor, disability, and unemployment benefits address prevalent problems among agricultural workers, yet it is likely that large numbers who are eligible are not receiving these benefits.

Recommendations regarding worker protection laws include:

- legislate farm-nonfarm parity regarding employment benefits;
- conduct studies to determine the extent to which eligible workers receive needed benefits;
- publicize benefits and procedures for obtaining them to workers, growers, crew leaders, and local medical care providers and public health departments through appropriately formulated and disseminated audiovisual media, verbal presentations, and newsletters and through social and medical service agencies; and
- provide advocacy services through Migrant Health Projects.

#### *Poverty and Powerlessness*

The health consequences of farmworker poverty and powerlessness are

profound. Survey after survey reports elevated rates of overall and infant mortality, prematurity, developmental deficits, infections, parasitic diseases, chronic diarrhea, heart disease, kidney injuries, musculoskeletal injuries, tooth decay, gum disease, hearing loss, uncorrected vision defects, vitamin deficiencies, anemia, low rates of immunization, and other conditions in the workers and their dependents (See, for example, Avery, 1974, 1975; Eisner, Cobb, *et al.*, 1972; Enriquez, Garcia, *et al.*, 1983; Kaufman, Lewis, *et al.*, 1975; Larson, Dodds, *et al.*, 1974; Miller, 1976; Schaefer, 1977; and Smith, De Angelis and Hansen, 1978).

Migrant housing conditions are addressed in both the Housing Act of 1949 and the Occupational Safety and Health Act of 1970, yet reports of their housing conditions are as discouraging as other details of their lives. Some reportedly live in converted trailers, vehicles, chicken coops, and various other previously abandoned farm structures. Lack of hot water, contaminated water, no or limited indoor plumbing, leaking pipes and roofs, hazardous wiring, crowding, structural problems, absence of laundry facilities, pit toilets, dumping as a common means of refuse disposal, and poor insect and rodent control inevitably contribute to infectious diseases, injuries, and other negative health effects. High lead concentrations have been found in the peeling paint of these buildings (Perrin and Merckens, 1979; Smith, Nelson and Stewart, 1976), and at least one screening found unacceptable blood lead levels in migrant children (Perrin and Merckens, 1979).

In light of the conditions described, severe mental health problems are to be expected. Several investigators of farmworkers' psychological adjustment have come to a similar conclusion: the widely prevalent depression, anxiety, suspicion, alienation, and pathos are appropriate responses to the stress and exploitation these people experience (Harper, Babigian, *et al.*, 1979; Dunbar and Kravitz, 1976:70; Shenkin, 1974:12).

### CONCLUSION

Despite limited documentation in many areas, health problems of temporary agricultural workers and their dependents are clearly extensive and severe. The scope of these problems is a consequence of conditions of the workers' lives. In turn, health problems undoubtedly exacerbate the population's poverty and powerlessness by limiting productive capacity and draining personal resources. Centers and projects authorized by the Migrant Health Act address significant needs and fill a gap in the medical care system. Nonetheless, the most effective of delivery systems cannot by itself provide substantive solutions to the health problems. Such solutions must also include links to the occupational safety and health movement; to nonmedical services, benefits and other rights; and ultimately, to structural changes in the conditions that generate the population's poor health level.

With its grounding in a public health model and emphasis on worksite conditions, the occupational safety and health movement has much to offer to the temporary farmworker population, and policy should be developed to facilitate this connection. The Occupational Safety and Health Act should be amended to expand and strengthen provisions for farmworkers (at present only five standards in the act address agricultural operations) and to cover the majority of farmworkers (an estimated 85% are now excluded from its provisions [Wilk, 1986:105]). Occupational safety and health training programs should incorporate substantive agricultural content and should develop recruitment programs for people with farmworker and other rural backgrounds. Research should be conducted to facilitate the development of comprehensive farm health and safety guidelines, as a NIOSH report recommended over ten years ago (U.S. Department of Health, Education, and Welfare, 1976:72).

With respect to links to nonmedical needs, I recommend that Migrant Health Centers and Projects be mandated and funded to provide — in addition to medical services — nonmedical information and referrals. This function would address such specialized matters as eligibility and procedures for obtaining workers' compensation, pesticide regulations and grievance procedures for violations, and local opportunities for dependents' care and education. It is acknowledged that under some circumstances advocacy leads to grower interference with farmworker clinic utilization, and that clinic personnel may often be required to identify the best balance between providing clinic services and advocacy.

Such liaison services, along with the various health-related recommendations noted above, would undoubtedly result in important improvements. Substantive change, however, will require much more than newsletters, tougher pesticide regulations, and improved medical care services. Despite journalists' exposes, numerous investigations and legislative provisions, and a fair number of friends in Congress, the Migrant Health Program and other agencies, various religious and other voluntary organizations, and academia, this population remains exceptionally disenfranchised and vulnerable. Significant changes may only be possible through widespread unionization and other forms of political organization. Denied collective bargaining under the Wagner Act of 1935 (later National Labor Relations Act), farmworkers secured their first and to date only rights to bargain collectively in California under the Agricultural Labor Relations Act of 1975. This action has not been a panacea and has brought its own problems. Its effectiveness has waned as the state and national political environment has become more conservative. Nonetheless, subsequent to unionization in California, real wages have increased, the crew leader system has been abolished, and union funds and support have established various social and educational programs dealing with health (See, e.g., Rudd,

1975), economic security, language training, housing, and other services that enhance farmworkers' control over their lives. Similarly, the Arizona Farm Workers Union has established a cooperative irrigation project in a Mexican area of high outmigration; preliminary assessment indicates that the project is increasing local productivity and reducing migration (Gerstner, 1985). Without such organization, political and economic forces will undoubtedly continue to keep temporary agricultural workers on the fringes of the system.

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