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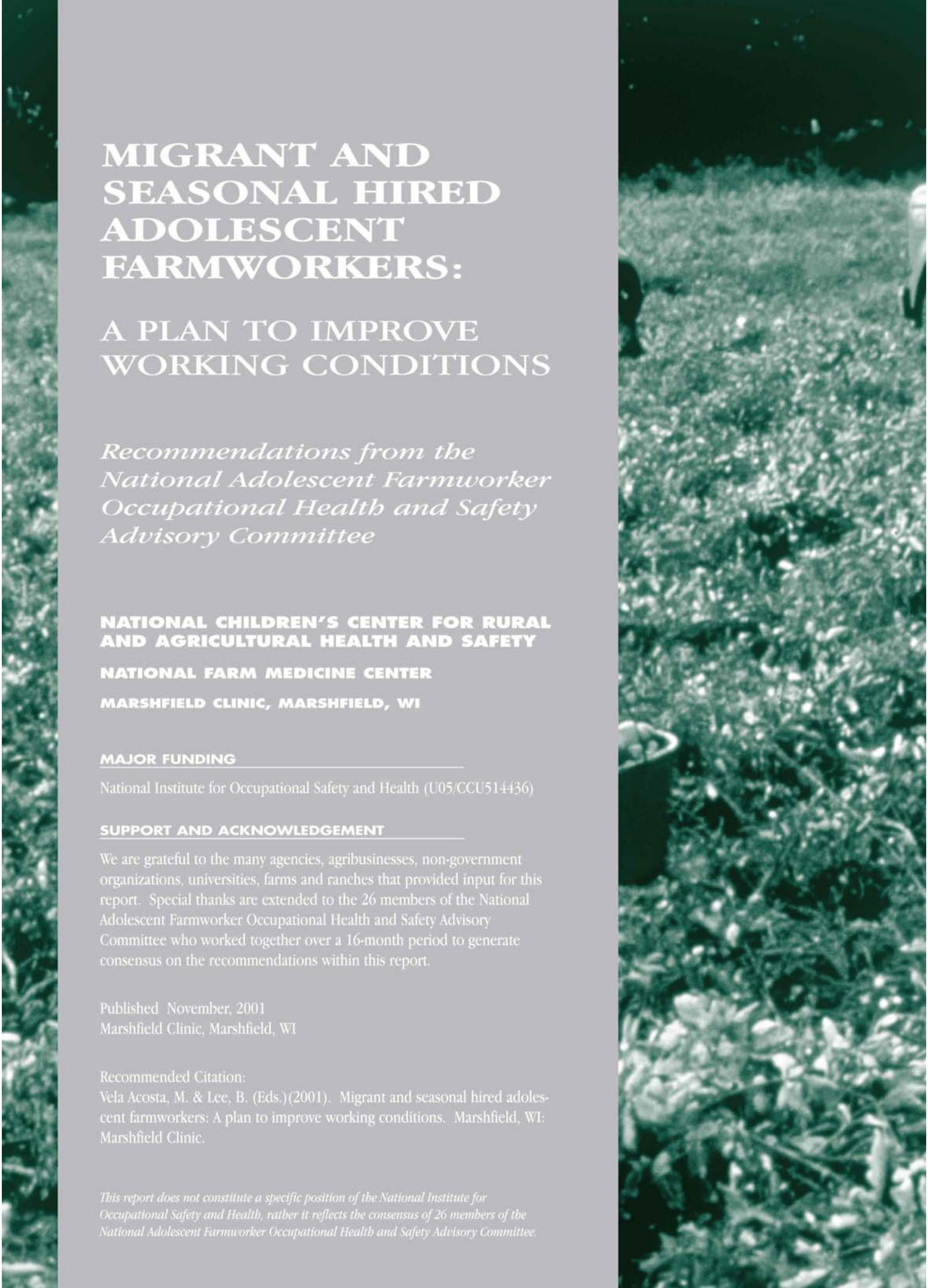
A PLAN TO IMPROVE WORKING CONDITIONS

Recommendations from the National Adolescent Farmworker Occupational Health and Safety Advisory Committee

November 2001



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Recommendations from the National Adolescent Farmworker Occupational Health and Safety Advisory Committee

NATIONAL CHILDREN'S CENTER FOR RURAL AND AGRICULTURAL HEALTH AND SAFETY

NATIONAL FARM MEDICINE CENTER

MARSHFIELD CLINIC, MARSHFIELD, WI

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We are grateful to the many agencies, agribusinesses, non-government organizations, universities, farms and ranches that provided input for this report. Special thanks are extended to the 26 members of the National Adolescent Farmworker Occupational Health and Safety Advisory Committee who worked together over a 16-month period to generate consensus on the recommendations within this report.

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This report does not constitute a specific position of the National Institute for Occupational Safety and Health, rather it reflects the consensus of 26 members of the National Adolescent Farmworker Occupational Health and Safety Advisory Committee.

Across the two million farms of the United States, workers conduct labor-intensive tasks that help our nation maintain its stature as a world leader in production agriculture. Recent estimates indicate that among the nearly two million migrant and seasonal farm laborers, about 7% are between the ages of 14 and 17 years; and among these adolescents, a large and growing proportion of them are single males. Many of these young workers travel long distances to secure temporary agricultural employment because they need work, and because agricultural employers need workers. What is unique about these young workers in agriculture? Why should we grant special attention to migrant and seasonal adolescent farmworkers? Consider the following facts about adolescent farmworkers:

- *About half of them are de-facto emancipated minors, lacking adult guardianship.*
- *Many live in households that do not include parents or other family members.*
- *Many are new international migrants, entering an unfamiliar country.*
- *Many are working in agriculture for the first time.*
- *Few are knowledgeable about occupational safety and health principles.*
- *Few have had the benefit of preventive health services.*
- *Many still have developmental needs for good nutrition, safety, and social support.*
- *Many are securing income to send back to their family members.*
- *Some are limited in their ability to speak or read English.*
- *Many have unsafe modes for transportation.*
- *Many have had limited opportunities for formal education.*
- *As adolescents, they tend to be risk takers who do not comprehend long-term implications of disease, injury, and disability.*
- *As adolescent workers, they are particularly vulnerable to inappropriate work assignments, workplace harassment and intimidation.*
- *As adolescents, they are going through a challenging passage in life…a time when adult supervision and guidance may not necessarily be welcomed, but often is warranted and subsequently appreciated.*

For adolescents, employment teaches important skills in accountability, reliability, financial knowledge, increased confidence and independence. Safe, meaningful employment opportunities for adolescents in agriculture are desirable. Wherever possible, occupational risks for young agricultural workers can and should be minimized so that the positive outcomes of work can be maximized.

The National Adolescent Farmworker Occupational Health and Safety Advisory Committee has developed this report as a planning tool for improving working conditions for adolescent farmworkers. This report involved extensive input and review from committee members. A multidisciplinary team of health care providers, farmworkers, parents, adolescent community groups, non-government organizations, federal agency representatives, and agricultural employers worked collaboratively to identify major problems and to pose recommendations for improving the well-being of adolescent farmworkers

I am grateful for the tremendous effort and cooperation of the many individuals who generated this report under the leadership of Dr. Martha Vela Acosta. It is my sincere hope that it will serve as a valuable resource for those who share our vision of making our nation's farms and ranches a desirable place for young people to have safe, appropriate and meaningful work experiences.

Barbara C. Lee, RN, PhD
Director
National Children's Center for Rural and Agricultural Health and Safety

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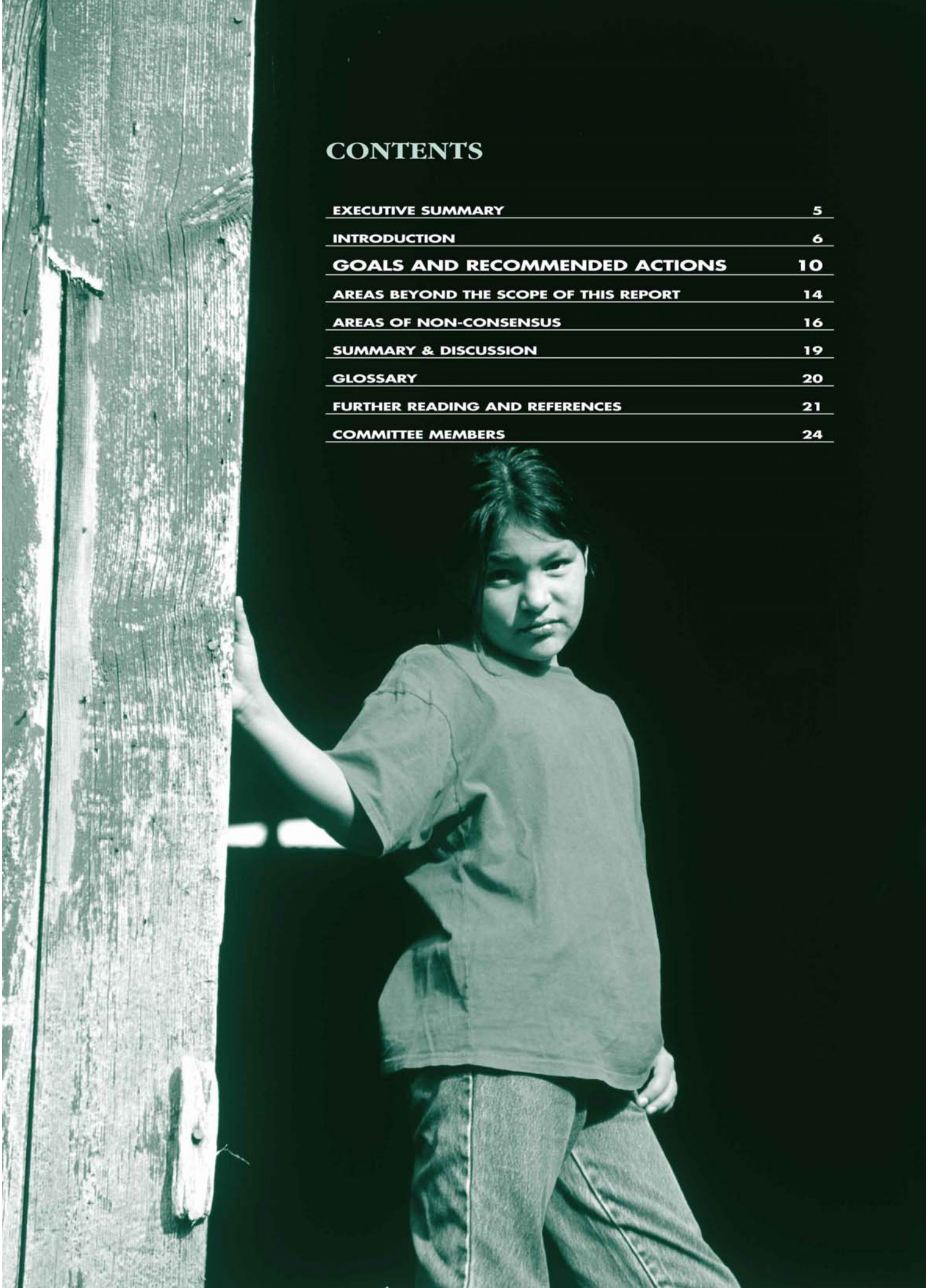

EXECUTIVE SUMMARY

The National Adolescent Farmworker Occupational Health & Safety Advisory Committee was convened by the National Children's Center for Rural and Agricultural Health and Safety to develop recommendations for research and intervention actions to prevent occupational injuries and diseases among hired migrant and seasonal adolescent farmworkers. Committee members' expertise and published literature as of July, 2001 was gathered to develop recommendations aimed to:

- Reduce risk of occupational injuries and diseases resulting from exposures to agricultural work environments.
- Promote knowledge and skills in agricultural health and safety for hired migrant and seasonal adolescent farmworkers.
- Encourage constructive, prosperous and healthy beginnings to work life for hired adolescent farmworkers.

Adolescents learn and exercise new abilities at work that will affect their future. Work is an integral part of life for hired adolescents and they need to be provided with an effective and comprehensive array of educational opportunities and life enhancement activities. Agricultural production in the United States (US) continues to have a high prevalence of injuries and fatalities, yet it also provides important working opportunities for adolescents. Each year an estimated 128,000 hired adolescent farmworkers aged 14-17 years are employed in US crop agriculture. The extent of agricultural injury and disease among adolescent farmworkers is difficult to establish.

Work is an integral part of life for hired adolescents and they need to be provided with an effective and comprehensive array of educational opportunities and life enhancement activities.

Data used to quantify the risk of exposure and injury lack consistency in defining agricultural hazards. Furthermore, mortality and morbidity rates for all age groups of migrant and seasonal farmworker populations are unknown.

Migrant and seasonal adolescent farmworkers face increased risks for occupational injuries and diseases. These adolescents lack work experience and training while coping with issues associated with physical development and limited access to medical care. They also are trying to balance the demands of school and work, which pose sociologic and economic challenges that affect their health.

Stakeholders interested in promoting the occupational health and safety of adolescent farmworkers developed twelve recommendations with the following goals:

1. **Identify profiles of hired adolescent farmworkers employed in production agriculture across the United States.**
2. **Identify occupational risks that are potentially unique and specific to hired adolescent farmworkers.**
3. **Plan, implement, and evaluate interventions to eliminate or minimize occupational health and safety risks of hired adolescent farmworkers.**

In striving to prevent occupational injuries and diseases among adolescent farmworkers, every effort should be made to incorporate and highlight established best practices.

INTRODUCTION

The National Adolescent Farmworker Occupational Health and Safety Advisory Committee (NAFOHSAC) has developed this report as a planning tool to improve working conditions for adolescent farmworkers. This multidisciplinary committee, composed of farmworkers' parents, adolescent farmworkers, researchers, non-government organizations, health care providers, federal and state agency representatives, and agricultural employers, has worked collaboratively to identify major problems and propose practical recommendations. Information was gathered from published literature, external sources, committee discussions, focus groups, and a committee workshop, which led to drafting the initial document. The subsequent review process involved input from committee members and feedback from peer reviewers across the United States.

Previous efforts to enhance agricultural health and safety for young workers have not addressed the unique issues affecting migrant or seasonal hired adolescent farmworkers. Efforts emanating from the 1996 *National Action Plan, Children and Agriculture: Opportunities for Safety and Health*, (National Committee for Childhood Agricultural Injury Prevention), the 1988 *Agriculture at Risk* (National Coalition for Agricultural Safety and Health) report, and the 1999 *North American Guidelines for Children's Agricultural Tasks* (Lee B & Marlenga B, 1999) have largely focused on children who reside on family farms.

Migrant and seasonal adolescent farmworkers face increased risks for occupational injuries and diseases. They are also trying to balance the demands of school and work, which pose sociologic and economic challenges that affect their health.

This NAFOHSAC report incorporates appropriate aspects of previous papers, making recommendations specific to the hired adolescent farmworker population, and focusing on strategies directed to adopt best work practices at the agricultural worksites.

For this report, the term "farmworkers" refers to hired persons who leave their homes and migrate to work in agriculture in one or more states. "Farmworker" also includes people who are hired to work locally in seasonal agricultural jobs, but do not leave their permanent residence. The term "adolescent" includes children from 12 through 17 years old. An "agricultural employer" is any person, corporation, association, or other legal entity that owns or operates an agricultural establishment; contracts with the owner or operator of an agricultural establishment in advance of production for the purchase of a crop and exercises substantial control over production; recruits and supervises employees; or is responsible for the management and condition of an agricultural establishment [Occupational Health and Safety Administration (OSHA), Code of Federal Regulations: 29: 1928.110].

Areas of non-consensus and issues beyond the scope of this report related to adolescent farmworkers' work conditions discussed during the preparation of this report are presented in a separate section. Migrant and seasonal children younger than 12 years old, and non-occupational issues remained outside of the primary focus of this committee's work.

SIGNIFICANCE

Across the US there are two million farms where workers conduct labor-intensive tasks supporting this nation to maintain its stature as a world leader in production agriculture (USDA, National Agricultural Statistics Services, 2000). While the overall number of farms that engage in labor-intensive agriculture has declined, the size of those farms has increased. In response to the growth in the annual US production of fruits and vegetables, more than 85% of the fruits and vegetables produced are harvested by farmworker hands (Villarejo D, Runsten D, 1993). The U. S. agricultural industry has been described as having one of the highest occupational rates for injury, fatality, disability, and disease (Boyle D, et al, 2000; Gerberich SG, et al, 1996; Brown M, et al, 1997; Loomis DP, 1992; Crandall CS, 1997).

Agriculture is the second-most common employer of youth, estimated to be 8% for the 15-17 year age group (Bureau of Labor Statistics, 2000). The majority of adolescents in the US are employed at some time during their youth. While farmwork teaches responsibility, work ethics, and dedication to crops and family, exposures to diverse hazards may result in injury (Rittichier KK, et al, 2001; (Bartels S, et al, 2000). Pediatric injury death rate is highest among 15-19 year olds (Laraque D, et al, 1999). Although the greatest number of young workers killed on the job are employed in agricultural work, detailed information is unavailable for approximately half the recorded cases (Castillo D, et al, 1999). Few preventive efforts to protect adolescent farmworkers have been implemented or evaluated. Further study for safe community interventions, innovative preventive strategies, and appropriate guidelines targeting adolescents needs to be conducted (Laraque D, et al, 1999; Carrabba JJ, et al, 2000, Quandt SA, et al. 2001).

The agricultural industry has been associated with numerous occupational hazards, and adolescent farmworkers have many characteristics that pose specific risk factors for occupational hazards (Adekoya N, & Meyers JR, 1999; Bartels S, et al, 2000). These risks include the psychological and social stresses associated with problems of English language skills, housing accommodations, disruption of family life, school, and medical demands related to farmworkers' environment and conditions. Adolescents with limited English speaking ability, in addition to experiencing social isolation, may be unable to read important written instructions or to translate and understand verbal orders.

An accurate count of the farmworker population has been described as difficult because of the diversity in definitions, high mobility, seasonal changes in location of agricultural work, locations of camps, language barriers, and avoidance by some farmworkers to contact government agencies (Mobed, K, et al, 1992). The National Agricultural Workers Survey (NAWS) is the only national information source on the demographics, working and living conditions of US farmworkers. Farmworkers represent 42% of the population employed in seasonal agricultural work. The majority (81%) of these farmworkers are foreign born with only about 42% authorized to work in the US (Gabbard S, et al, 1999).

Young farmworkers are commonly found to be either local youth from farm communities or the children of migrant and seasonal farmworkers. Current research shows, however, that although these two groups are still involved in crop agriculture, they account for less than half of the youth ages 14-17 working in agriculture. The remainder travel independently from their immediate families. (Gabbard S, et al, 1999).

Of all young workers employed in the US, the greatest proportion of fatalities occurs among those employed in agriculture (Castillo D, et al, 1999; Derstine B, 1996; Dunn K, 1993). About 70 fatal work-related injuries are known to occur among 16-17 year olds each year. However, this number probably underestimates age-specific mortality rates where agricultural settings present important dangers (Runyan C & Zakocs R, 2000). Approximately 32,800 injuries and 100 fatalities – about 20 percent of all farm fatalities – occur each year among children working on US farms (Myers JR & Hendricks KJ, 2001; Rivara F, 1997). Children working in agriculture had been reported to have more severe injuries and a disproportionate share of fatalities compared with other industries (US General Accounting Office, 1998).

The largest group of adolescent farmworkers is youth who live away from their natural families and migrate, mostly from Mexico, to work in US agriculture. About 80% of adolescent farmworkers are emancipated minors living on their own, and 59% are primarily international migrants (Gabbard S, et al, 1999). They are the youngest end of a stream of young Mexican men who are new entrants to farmwork. Eighty percent of emancipated minors are between the ages of 16-17, 89% are male, 85% are Latino, 75% are foreign-born, and 70% are unauthorized and recent arrivals to the US (Gabbard S, et al, 1999). There is a dynamic interplay between political, economic and social forces and health among multicultural populations

(Crandall CS, et al, 1997). Disparities in the health status of farmworkers are the result of housing quality, nutrition, employment, working conditions, education, stress, exposure to environmental hazards and disease agents, and access to health care (Arcury TA et al, 1999; Crandall CS, et al, 1997). Adequate housing for farmworkers is often difficult to secure, particularly in small-scale agricultural operations.

Adolescent farmworkers who are emancipated minors are probably the group most urgently in need of occupational health and safety protection. Outside of work they face numerous challenges associated with living in poverty, with limited access to health care and education. They are performing farmwork that is physically demanding, requiring sustained strength, endurance, and coordination. Work hours in agriculture, as a rule, are very irregular and are often performed under conditions of physical stress, becoming an injury risk factor (Stueland DT, et al, 1996). Limited information regarding adolescent farmworkers can impair the ability to adequately address their occupational health and safety needs.

Despite the lack of reliable statistical data, it is incumbent upon us to address occupational diseases and injuries among the adolescent farmworkers. Special emphasis should be given the many adolescent farmworkers who have only minimal work qualifications and are unaccustomed to the health and safety regulations and practices applicable to agricultural work. An environment with severely reduced or limited occupational hazards is necessary for adolescent farmworkers to benefit from their work experiences and learn skills in accountability, reliability, financial management, increased confidence, and independence.

PURPOSE

The committee's mission was to generate recommendations designed to prevent or reduce those agricultural work hazards that affect the health and safety of adolescent farmworkers 12-17 years old. The objective was to provide specific guidance for research, education, and programs to enhance occupational health and safety. The committee hopes this report will serve as a guide in the development and implementation of applied research activities and intervention programs, recognizing the increasing ethnic diversity of the farm labor force and particularly of transnational adolescent farmworkers.

METHODS

Consensus building techniques (Myers ML, 1998) were used to develop recommendations for adolescent farmworkers' occupational health and safety issues. Potential areas of concern and research topics for adolescent farmworker populations were sought from groups that included agricultural employers from the National Council of Agricultural Employers and the American Farm Bureau Federation. Migrant advocates, teachers, researchers and health professionals were contacted directly and via the Migrant Stream Forums. Farmworker parents and adolescents were contacted through migrant education programs and agricultural employers. Several focus groups were conducted to discuss issues relevant to adolescent farmworkers' occupational health and safety.

An advisory committee meeting was convened in April 2000 to analyze information previously gathered in focus groups and teleconferences, and to determine the consensus process and scope of the report. Advisory committee participants were selected based on their interest and expertise with adolescent farmworkers. The composition of the group was intended to reflect the diversity necessary to provide realistic and practical recommendations for the occupational health and safety of adolescent farmworkers. Participants were provided with a summary of issues/recommendations about adolescent farmworkers organized into three perspectives: agricultural employers, adolescent farmworkers, and published literature. Participants analyzed perspectives presented as well as additional recommendations. An informal evaluation of the process was conducted at the committee's in-person meeting.

After the in-person meeting three working groups were formed to address working conditions, living conditions, and adolescent development. For each working group, teleconferences were held outlining all recommendations using electronic mediation to review drafts. The final draft integrated all discussions relevant to occupational health and safety issues for adolescent farmworkers. Peer reviewers across the country from diverse backgrounds provided additional feedback and modifications to the final report. Recommendations for which the level of agreement was not consensual were left out of the main report and are presented separately as non-consensus discussions. Issues beyond the scope of this report were also recorded and are briefly described.

GUIDING PRINCIPLES

Committee deliberations focused on three issues: **characteristics of human development, best work practices,** and **occupational health and safety**. Factors considered when addressing adolescence and agricultural farm work are described below.

ADOLESCENCE AND AGRICULTURAL WORK

Adolescent Characteristics

- Adolescent bodies are in a developmental state with potentially different susceptibility to hazards than mature bodies.
- Young people learn through experience and practice as well as observation and instruction. It is the very nature of learning through trial and error that additional hazards exist while an adolescent is learning new skills, and why careful attention and training is necessary before young workers operate equipment, machinery or handle chemicals.
- During growth spurts, adolescents may be less coordinated than usual and have decreased flexibility, putting them at increased risk for strains, sprains, and other injuries.
- As adolescents mature from childhood to adulthood, emotional behavior may be unpredictable.
- Hired adolescent farmworkers often perform tasks intended to be undertaken by physically and developmentally mature adults.
- Emancipated minors work and travel alone, often without family or other personal support networks.
- In cases of substandard, crowded, or inadequate housing for migrant or seasonal hired adolescent farmworkers this may pose physical and psychological stresses that further add to the challenges of adolescent growth and development.

Adolescent Workers' Protections

- All hired adolescent workers should be protected from hazardous work, excessive work hours, and unsafe or unhealthy work environments, regardless of the work site in which he or she is employed.

Agricultural Work

- Agricultural work often involves a spectrum of occupational exposures, including extreme weather and climate, ultraviolet radiation, organic and inorganic dusts, natural toxins and allergens from crops and insects, potential contact with chemicals used in all stages of agricultural production, moving equipment, sharp tools, impure water sources, noise, physical and ergonomic factors, and psychological stress.
- The nature of agricultural work is such that workers often must manipulate equipment and/or products, as well as observe actions at a very close range, bringing them near enough to come in contact with machinery and/or materials that present potential risk.

This report describes committee consensus for three major goals, and recommends twelve specific actions for preventing or reducing agricultural work hazards affecting the health and safety of adolescent farmworkers.

Goal I.

Identify profiles of hired adolescent farmworkers employed in production agriculture across the United States.

Traditionally, family farms have been the primary focus of childhood agricultural injury data, with scarce information on hired adolescent farmworkers (McCurdy S, & Carroll D, 2000). Lack of documentation data, discrepancy in definitions, coding systems, etc., all contribute to the inability to determine current injury rates (Heyer NJ, et al, 1992; Rivara FP, 1992; Yoder AM & Murphy DH, 2000). Obtaining accurate information on the number of farmworker adolescents and health outcomes will facilitate determining the type of intervention needed to enhance their work experience while reducing adverse outcomes (McCurdy S. & Carroll D, 2000).

Counting the number of hired migrant and seasonal farmworkers presents exceptional difficulties due to their mobility (McCurdy S. & Carroll D, 2000). They are predominantly Hispanic, foreign born with low education and socioeconomic status. They face social and linguistic marginalization (McCurdy S, 1995). Hired adolescent farmworkers are part of the same workforce, 52% of which are unauthorized to work (Mehta K, et al, 2000). There are limited workers' compensation data and other information from existing agricultural injury surveillance systems (DeRoo LA & Rautiainen RH. 2000). Reliable statistics about injury and disease rates for adolescent farmworkers are not available.

Scientific literature about childhood injuries continues to report mainly descriptive studies relying on small samples with a focus on the nature of the injury and short-term consequences. Information regarding disability among children who experienced agricultural injury is scarce, in spite of the severity and seriousness (Reed DB &Claunch DT, 2000). A center for agriculture-related trauma has reported that 43% of the traumatic injuries sustained by adolescents in farm work resulted in severe permanent disability. Furthermore, 7% incurred a second injury during the six years of the study (Zietlow SP, et al, 1999; Belville R, et al, 1993). Even though agricultural fatality rates for youth may have declined in the last decade, it is impossible to document actual injury rates due to an inadequate denominator (Rivara F, 1985; Rivara F, 1997). Identifying the characteristics of this unique adolescent workforce will allow resources to be targeted to specific regions, agricultural tasks, or higher-risk farmworkers (i.e., emancipated males versus females), addressing well-defined problems with practical approaches.

RECOMMENDED ACTIONS

1. The Department of Labor (DOL) and the National Institute for Occupational Safety and Health (NIOSH), with the cooperation of migrant non-profit organizations, state health departments, and Migrant Clinicians Network (MCN) should be funded to develop and maintain a regional on-going database of occupation-related demographics. Data should include age, gender, race, type of work, housing location, permanent residency address, and access to health care.

2. Wage and Hour Division at state levels, in coordination with migrant agencies, DOL, NIOSH, and USDA should coordinate efforts to assess occupational risks at adolescent farmworkers' work sites and housing locations, which often are separate. Work sites where adolescent farmworkers are employed should provide facilities and resources that address adolescents' needs, including personal hygiene, emergency contact information, telephone communications, and adult supervision.

Goal II.

Identify occupational risks that are potentially unique and specific to hired adolescent farmworkers.

In addition to occupational injuries and fatalities, there is a wide range of chronic diseases as consequence of agricultural exposures. These include musculoskeletal, respiratory, dermatologic and reproductive disorders, increased hearing loss and several cancers. The magnitude of chronic and acute agricultural health outcomes among adolescent farmworkers needs to be evaluated, including cost-effective interventions, engineering changes and the consideration of appropriate laws. Eye pain and redness after working all day in the field have been reported by more than 40% of adult farmworkers (Quandt SA, 2001).

Exposure of adolescents 14-17 years old to farm machinery and chemical hazards result in injuries that include cuts, burns, and falls (Schulman M, et al, 1997). Injuries and occupational exposures have been described to be influenced by age, gender, and farmwork experiences (Schulman M, et al, 1997; Rivara F, 1985; Stueland DT, et al, 1991). Emancipated minors have their own unique set of problems, in addition to other underlying conditions such as linguistic, economic, education, and health barriers. While injury rates for adolescent farmworkers 12-17 years old have not been evaluated, the injury rate for 16-17 year olds has been estimated to be almost two times higher when compared with adults (Miller ME, & Kaufman, 1998). Occupational injuries are a substantial and under-recognized contributor to injury among adolescents (Belville R, et al, 1993). Risk assessments are essential in order to anticipate, recognize, evaluate, and control hazards in the complex adolescent farmworker environment.

RECOMMENDED ACTIONS

3. Congress should allocate funds to the Centers for Disease Control and Prevention (CDC), designating NIOSH to plan, implement and evaluate intramural and extramural research efforts to promote best work practices and to improve health and safety of hired adolescent farmworkers. NIOSH can convene a group of agricultural safety specialists, agricultural producers, and occupational health care providers who work with hired adolescent farmworkers to evaluate progress to improve their working conditions. Information gathered by these experts on ways to minimize risk factors should be disseminated to health professionals, agricultural employers and others serving adolescent farmworkers to help them understand agricultural risks by commodity groups.

4. Congress should allocate funds to the CDC, designating NIOSH as the leading agency along with the DOL, and the USDA, to establish effective data collection methodologies that will identify major sources of occupational risks, disease, and injury among adolescent farmworkers by crop, region, and type of employer. Comprehensive analysis of exposure to work hazards should integrate environmental conditions, ergonomic hazards, and physiological factors for adolescents. Research efforts need to be targeted to regions where adolescent farmworkers are concentrated.

5. The Environmental Protection Agency (EPA), DOL, migrant health professionals, agricultural health and safety professionals, agricultural employers, and others should provide language- and cultural-appropriate access (i.e., via toll-free telephone) for adolescent farmworkers to express their work questions and concerns about occupational hazards.

Goal III.

Plan, implement, and evaluate interventions to eliminate or minimize occupational health and safety risks of hired adolescent farmworkers.

Adolescent farmworkers are at potential risk for occupational illnesses from work exposures, and the effectiveness of field, housing and pesticide safety regulations has not been evaluated. It is important to learn from farmworker safety experiences to develop effective measures to improve agricultural workplace safety (Arcury TA, et al 2001). Generally, safety training for young workers has focused on educational sessions as interventions (Baker A, et al, 2001). However, prevention of occupational injury and disease in adolescent farmworkers will require addressing broader community influences beyond those of the agricultural employer (Arcury TA, et al, 2000).

The adolescent farmworker population is changing (Gabbard S, et al, 1999). This evolving population requires innovative approaches. Prior to intervention, the questions asked are as important as the lessons learned. Agricultural employers, teachers, community experts from across the country and from fields including health professionals, community psychology, public health, occupational health and safety professionals, public administration, and migrant advocates all need to be included in intervention planning. The impact of interventions involving coalition building efforts needs to be planned and evaluated effectively (Wolff T, 2001). Scientific evaluations of interventions should include assessments of the cost implications specifically in regard to adolescent farmworker health, the use of community resources, and agricultural employer's perceptions of intervention benefits. Encouraging agricultural employers and adolescent farmworkers to self-monitor to identify and correct particular hazards related to their tasks in agricultural production could be a successful outcome of health and safety interventions (Bartels S, et al, 2000). The engagement of affected populations is essential. Only then can progress be made through appropriate interventions that respond to specific communities' needs, thereby ensuring cost-effective and prolonged outcomes. Additional regulation by itself may not be an advantageous starting point to improve the safety and sanitation for adolescent farmworkers (Arcury TA, et al, 2001; Quandt SA et al, 2001). The emphasis for intervention must include educating farmers as well as farmworkers.

Many adolescent farmworkers belong to poor and underserved populations. Empowerment and culturally appropriate community participation are especially needed (Murray-Garcia J, et al, 1999). A coordinated approach will increase efficiency and equity across private and public sector initiatives.

RECOMMENDED ACTIONS

6. Congress should fund the NIOSH Agricultural centers and the USDA Cooperative Extension Services, via the Risk Management Education Division (RMED), to support agricultural employers' associations in the establishment of systems to educate agricultural employers, supervisors of adolescent farmworkers, and farm labor contractors about adolescent farmworkers' occupational risks and prevention strategies.

7. Agricultural employers' organizations and others, such as RMED from USDA, should facilitate discussions among members and researchers to promote best work practices helping agricultural employers to identify practical solutions for occupational hazards among adolescent farmworkers. They can provide time during regional, state, and national meetings for major presentations and group discussions to report innovative and effective interventions.

8. NIOSH should be funded to provide agricultural employer-targeted evaluation studies to determine the cost-effectiveness of intervention programs aimed at preventing occupational disease and injury among adolescent farmworkers.

9. The American Academy of Pediatrics (AAP), North American AgroMedicine Consortium, NIOSH, and other relevant organizations should provide advanced training for health professionals on occupational health and safety conditions in agriculture, with a special focus on adolescent farmworkers.

10. NIOSH should evaluate the impact of the agricultural media in enhancing public awareness to effectively promote best work practices involving adolescent farmworkers among agricultural employers.

11. A regional, coordinated approach should be established to address adolescent farmworkers' occupational health and safety needs. Funding should be available to universities, NIOSH Agricultural centers, and others to provide adolescent farmworker educational health and safety interventions. Those actions will: (1) maximize collaborative efforts with current initiatives; (2) develop language and culturally appropriate materials; (3) assess adolescent farmworkers' safety risk perceptions; (4) account for cultural beliefs about safety practices; and (5) be tailored specifically to adolescent learning needs and not just a part of a general session for all workers.

12. Congress should create a Farmworker Adolescent Network and designate the DOL, the USDA, NIOSH, and the Environmental Protection Agency (EPA) to lead and coordinate a multi-organization network for addressing adolescent farmworkers' occupational health and safety research and program activities. Organizations representing agricultural employers, migrant health professionals, migrant advocates, adolescent farmworkers, and agricultural safety professionals should be represented in this new Farmworker Adolescent Network (FAN). Joint venture funds from public and private sectors should be encouraged to support FAN to fund regional and national initiatives including data collection, research, training, and innovative prevention programs based on significant research findings from convened groups and FAN.

AREAS BEYOND THE SCOPE OF THIS REPORT

The consensus development process generated questions that extended beyond the parameters of the objectives of this project. Many issues that impact the well-being of adolescent farmworkers could not be addressed within this report. Although there was considerable discussion regarding problems and potential solutions, the advisory committee did not strive to achieve consensus on specific recommendations associated with these topics:

CHILDCARE

There is continuing need for certified childcare providers within the same culture available during working hours, and to secure federal government recognition and commitment to facilitate feasible solutions.

Recommendations include conducting regional needs assessments for child care to match farmworkers' schedules; extending services for children up to 13 years old; and promoting partnerships between agricultural employers and community-based organizations to develop childcare programs that are patterned after successful models.

HEALTH

The committee members recognized that the major predictor of adolescent farmworker health status is determined by quality-of-life issues: nurturing, social support, nutrition, housing, and education (Miller CA, 1989). There are no national data on child health indicators in the farmworker population. In addition to exposure to occupational diseases and injuries, adolescent farmworkers are coping with lack of preventive medical care, increased rate of infectious diseases and toxic exposures, increased risk of family violence and mental health problems, and nutritional and educational deprivation (McLaurin J, 2000). Published by the American Academy of Pediatrics, *Guidelines for the Care of Farmworker Children* provides a list of resources for health professionals working with migrant and seasonal farmworkers (McLaurin J, 2000). Demonstration projects were recommended for federal funding via CDC to allow for programs to:

There is continuing need for certified childcare providers within the same culture available during working hours, and to secure federal government recognition and commitment to facilitate feasible solutions.

- Identify effective methods to match health care services with needs of adolescent farmworkers, including preventive services, counseling and support programs for family violence and substance abuse. Those programs can continue to empower the successful liaison/health promoters *(promotoras)* to reduce cultural and linguistic barriers between agencies and adolescent farmworkers.
- Continue raising awareness and training for health care providers serving farmworkers promoting cultural and occupational considerations through the Migrant Clinicians Network.
- Modify eligibility requirements for adolescent farmworkers (emancipated minors) who should be able to receive health services even though they are not yet adults nor family dependents.
- Conduct research to evaluate family violence and substance abuse, since it is considered to be one of the highest health risks for adolescent farmworkers.

- Collect regional data on the prevalence of occupational diseases and injury outcomes among adolescent farmworkers. Data collection could include health centers, workers' compensation data, community-based farmworker organizations and other non-traditional methods of research to identify the occupational health profile of hired adolescent farmworkers.
- Integrate the prevalence of occupational diseases (such as dermatitis, eye injury, respiratory illness, etc.) into data collection to direct adequate interventions by region. Information gathered should be shared with Migrant Clinicians Network and other health professionals serving adolescent farmworkers to help them address occupational health outcomes by region.
- Increase funding by region (via NIOSH Agricultural centers, universities, USDA, etc.) to provide educational ergonomic programs directed to adolescent farmworkers.

EDUCATION, ROLE MODELING AND CAREER DEVELOPING

Adolescent farmworkers could become the skilled agricultural adult work force in this country if they have rewarding agricultural work experiences. Potentially, they could become expert agricultural producers. The committee recommended to:

- Provide optional educational programs on production agriculture among adolescent farmworkers to increase the awareness of agriculture career options and skills development. These programs could expand to develop a binational health education and outreach program, collaborating with the Mexican government, universities and other private organizations.
- Provide additional funding for resources to train adolescent farmworkers in production agriculture and supervisory skills with additional scholarship programs for adolescent farmworkers.
- Provide opportunities for adolescent farmworkers to work under adult supervision, encouraging existing programs (such as TASK: Teaching Agricultural Safety to Kids) to integrate adolescent farmworkers without cultural barriers, integrating employers, parents and co-workers.

HOUSING

Regional needs could be assessed according to farmworker population, with special emphasis on providing adequate housing, i.e., sanitation and means of communication, for adolescent farmworkers, and assuring access to schools. The DOL, USDA, and NIOSH Agricultural centers could coordinate the effort with interagency and community cooperation. The regionally-based NIOSH Agricultural Centers could collect successful model information with agricultural employers' collaborations. Federal funding through USDA should continue to provide financial and human support to agricultural employers to supply safe and sanitary housing facilities. In addition, assess optimal model housing to accommodate adolescent farmworkers' needs and develop a database of migrant farmworker camp locations to assess priorities and planning in solving this long-lasting problem.

FIELD SANITATION

USDA, DOL, NIOSH Agricultural centers and others, in collaboration with agricultural employers meeting field sanitation guidelines, could induce change in non-compliant employers by disseminating best-work practices, cost-benefit analysis, and possible insurance benefits (CFR 29 Standard Number 1928.110; Environmental Protection Agency (EPA), (1993).

RECREATION

Community advocates could be encouraged to organize recreation and social activities to create positive adolescent bonding experiences. Sports activities and recreation are excellent alternatives to alcohol, drugs, and other addictions to enhance the well-being of adolescent farmworkers. Additional funds are requested to create a national collaborative initiative providing financial resources for recreational adolescent programs, including evaluation of the effectiveness of interventions on the mental and sexual health of adolescent farmworkers. Activities suggested included promotion of family and community events, such as music and arts, appropriate for adolescent farmworkers.

TRANSPORTATION

Resources from the National Highway and Transportation Safety Administration could be provided to agricultural employers to reimburse adolescent farmworkers for travel expenses and to promote use of safe vehicles.

AREAS OF NON-CONSENSUS

The process of assessing the adolescent farmworker's work environment led to discussions about ethical issues beyond the agricultural employer-farmworker relationship. Several problems and issues were identified as being of interest to a number of committee members and were defined as influencing the well-being of adolescent farmworkers; however, general consensus was not reached on some of the recommendations and issues. A brief overview of non-consensus information gathered via focus groups, workshops, interviews, electronic dialogue, and other consensus processes follows.

ADOLESCENTS AND WORK

- Members of the farmworker force (parents and adolescents) were very interested in sharing their concerns, occupational and non-occupational, associated with farm work. Some of the farmworker parents affirmed their desire for their adolescents to work along with them to learn agricultural work skills, helping to provide income for their families, and to maintain family unity. Concerns by parents include that, while left alone, adolescents may use their time in a non-productive manner. Some adolescent farmworkers expressed their work experiences and life skills gained while working in agriculture as a motivation to go back to school. A smaller group of adolescent farmworkers shared their desire to remain in agricultural work as a lifestyle.
- Agricultural employers repeatedly expressed their opposition to having anyone less than 16 or 18 years old present in their fields or workplaces. Some employers were sympathetic to their farmworker parents' requests, but unwilling to allow any children to be in the fields because of regulations compliance.
- Migrant advocates expressed their support for keeping children out of the work places and were skeptical about compliance success throughout the country.
- Agricultural employers emphasized that business and healthcare services for farmworkers should be made available before and/or after their field work schedules.
- The "double standard" was noted in that a farm owner may legally have his/her young children working while the hired laborer's children cannot legally work alongside their parents before the age of 12 years.

HOUSING

- Adolescent farmworkers and farmworker parents described a wide range of housing facilities, from no telephone services, unsafe water, old corroded pipes, and lack of sanitation in some housing to housing with all requirements in place. They indicated they returned to work for the same agricultural employers when appropriate services were in place. Some of the adolescent first-timers or those without family more often faced poor sanitation, substandard housing conditions, and no telephone or Internet access at their housing.
- Agricultural employers expressed the challenge in complying with inconsistency between federal and state laws. Housing is seen as an additional burden placed upon the agricultural industry. Some employers questioned why they should be expected to provide housing for their work force, in addition to becoming familiar with extra regulations to comply with adequate housing, when other industries are not.

FIELD CONDITIONS

- Farmworker parents, adolescents and advocates described a variety of issues associated with compliance with field conditions. Again, the experienced workers returned to work for those same agricultural employers who were compliant with field sanitation standards.
- Agricultural employers described challenges in some regions with lack of access for rental equipment to comply with field sanitation. Thus, even in cases where they might desire improved field sanitation, options were limited.

OTHER ISSUES

- Advocates for the farmworker population expressed their concern about not having policy recommendations, such as more enforcement for lack of compliance, in this report.
- Researchers, advocates, and other professionals expressed disappointment in the lack of progress resolving farmworkers' issues over past decades.
- The feasibility of universalizing Workers' Compensation insurance for all agricultural employees and improved unemployment coverage for adolescent farmworkers was considered not achievable.
- Providing tax breaks for all agricultural employers who comply with providing adequate field sanitation was not seen as fair or feasible.
- To periodically document the employment of adolescent farmworkers to generate reliable estimates of employment by the Bureau of Labor Statistics at the state level was considered not achievable.

SUMMARY

Occupational health and safety priorities for adolescent farmworkers should be based on reliable and sustained data; however, at present there is insufficient information on the profiles of adolescent farmworkers' work-related health outcomes and the unique occupational hazards this workforce encounters in agriculture. A collaborative, empirical effort involving the commitment of agricultural employers, adolescent farmworkers, the health care community, researchers, migrant agencies, and others is necessary to identify problems and implement meaningful interventions. Information about adolescent farmworkers should be disseminated by NIOSH, DOL, USDA, and CDC to interested parties through newsletters, websites, and professional and commodity meetings and conventions. We anticipate the recommendations put forth by this committee will be useful in guiding a coordinated and collaborative approach for improving working conditions of these young farmworkers.

DISCUSSION

All participants in this committee were passionate about their beliefs and experiences. While advocates are looking to contribute to change, agricultural employers are willing to create and cultivate partnerships with their workers (Rothenberg D, 1998). Farmworker parents and adolescents work hard for a better future and do not want to work under hazardous conditions (Treviño Hart, 1999; Human Rights Watch, 2000).

Limitations in this report include the absent audience. Non-participants may have included agricultural employers who do not comply with regulations, and adolescent farmworkers who are not reachable (Mobed K, et al, 1992). The challenge remains to move forward in obtaining the best outcome for a new generation to provide an optimal agricultural work environment (Basran GS, et al, 1995). How can the changes be accomplished in the work environment regardless of who goes to work? How can non-complying agricultural employers be persuaded to invest in the health and safety of their farmworkers? How can farmworker-agricultural partnerships contribute to sustaining the agriculture industry in this country?

Farmworker parents and adolescents work hard for a better future and do not want to work under hazardous conditions

Initial steps must be taken to advance into the new agricultural age: new collaborations among researchers, agricultural employers, advocacy groups, and young inexperienced adolescent farmworkers; and new methods that reflect reality and innovative applied research to solve practical community problems. Barriers to effective collaboration need to be identified, including stereotypes and cultural differences (Quandt SA et al, 2001). Strategies can be exercised to create collaborative relationships to investigate occupational and environmental health issues within a community-based participatory framework of adolescent farmworkers. While researchers state that more data are needed, and advocates wish for more enforcement of current regulations, agricultural employers and adolescent farmworkers are making efforts to improve their way of living in agriculture. There are success models to pursue and challenges to meet in creating a better world for farmworkers in agricultural production.

GLOSSARY

Agricultural employer: Any person, corporation, association, or other legal entity that owns or operates an agricultural establishment; contracts with the owner or operator of an agricultural establishment in advance of production for the purchase of a crop and exercises substantial control over production; or recruits and supervises employees or is responsible for the management and condition of an agricultural establishment (OSHA 29 CFR 1928.110).

Adolescent farmworker: For this report, adolescent farmworker is defined as children from 12 through 17 years old who migrate to work in agriculture in one or more states, as well as a child who works locally in seasonal agricultural jobs, but does not leave their permanent residence.

Agricultural hazard: An existing or potential condition on or off the agricultural worksite, directly related to agricultural operations, that is associated with a high risk of physical or psychological harm. Examples of common agricultural hazards are rotating machinery parts, manure storage ponds, airborne contaminants in livestock confinement buildings, and chemicals.

Agricultural injury: Injury occurring on the agricultural worksite directly related to agricultural operations or an injury occurring off agricultural property that involves agricultural work, such as a tractor collision on a public road or in migrant housing. For purposes of this document, this definition also encompasses harm caused by exposure to hazards such as pesticides, volatile organic compounds, dusts, noise, and repetitive motion.

Best work practices: Methods of making effective use of available experiences, systems and resources, adapted and validated in specific agricultural contexts, with the goal of providing optimum environment while performing any agricultural task, solving a work related problem, improving a process, or actively managing a change. This definition includes two elements fundamental to the adoption of a best practice; a repository of experiences to search and analyze candidate practices and an adoption process to suggest a way for their adaptation and implementation in a specific agricultural context.

Child: Article 1 of the Convention on the Rights of the Child states that "a child means every human being below the age of eighteen years unless under the law applicable to the child, majority is attained earlier."

Cost-benefit: An economic analysis assessed as net present value in which all costs and benefits are converted into monetary values.

Effectiveness: The improvement in health outcome that a prevention strategy can produce in typical community-based setting.

Efficacy: The improvement in health outcome that a prevention strategy can produce in expert hands under ideal conditions.

Emancipated minors: Persons less than 18 years old who work, travel, and reside on farms, often without a family or other personal support network.

Engineering controls: Methods of controlling worker exposure by modifying the source, the means of exposure, or reducing the quantity of hazards.

Ergonomics: The study of human characteristics for the appropriate design of living and working environments.

Exposure: Contact with a chemical, biological, or radiological hazard; also, the near proximity to an unprotected physical hazard.

Farm: Any place from which $1,000 or more of agricultural products were produced and sold, or normally would have been sold during the census year (standard United States Department of Agriculture definition).

Farm labor contractor: A person (other than an agricultural employer, an agricultural association, or an employee of an agricultural employer or agricultural association) who receives a fee for performing farm labor contracting activities.

Fieldwork: Work related to planting, cultivating, or harvesting operations (which occurs in the field rather than in a processing plant or packing shed).

Hazard: A condition or changing set of circumstances that presents a potential for injury, illness or property damage. The potential or inherent characteristics of an activity, condition, or circumstance which can produce adverse and harmful consequences.

Health: A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (World Health Organization).

Injury: Physical harm or damage to some part of the body resulting from an exchange of mechanical, chemical, thermal, electrical, or other environmental energy that exceeds the body's tolerance.

Migrant agricultural worker: A person employed in agricultural work of a seasonal or other temporary nature who is required to be absent overnight from his or her permanent place of residence.

Occupational health: Concerned with health in its relation to work and the working environment; includes studies of all factors relating to work, working methods, conditions of work, and the working environment that may cause disease, injuries or deviation from health.

Personal protective equipment (PPE): Clothing, devices, or solutions worn by or applied to an individual to serve as a barrier between the human body and potential hazards in the environment. Commonly used PPE in agriculture include hats, long sleeve shirts, long pants, gloves, safety goggles, sunscreen, ear plugs, and masks.

Risk: A measure of the probability and consequences of all hazards of an activity or condition.

Safe: A condition of freedom from danger, hazard, or injury.

Safety: A state of control of recognized hazards to attain an acceptable level of risk; also an attitude that influences behavior of individuals in a positive manner in their relationships with others, in doing routine tasks and in reactions to situations that may occur.

Safety program: Activities designed to assist employees in the recognition, understanding, and control of hazards in the work place.

Seasonal agricultural worker: A person employed in agricultural work of a seasonal or other temporary nature who is not required to be absent overnight from his or her permanent place of residence.

Stress: A physical, chemical, or emotional factor that causes bodily or mental tension and may be a factor in disease causation or fatigue.

Toxin: Any poisonous substance (or any poisonous isomer, homologue
or derivative of such a substance) regardless of its origin or method of production.

FURTHER READING AND REFERENCES

Adekoya N. & Meyers J. R. (1999). Fatal harmful substances or environmental exposures in agriculture, 1992 to 1996. *J Occup Environ Med*, 41(8):699-705.

Arcury T. A., Quandt S. A., & Dearry A. (2001). Farmworker pesticide exposure and community-based participatory research: rationale and practical applications. *Environ Health Perspect*, 109 Suppl 3:429-34.

Arcury T. A., Quandt S.A., Austin C.K., Preisser J., & Cabrera L.F. (1999). Implementation of EPA's Worker Protection Standard training for agricultural laborers: an evaluation using North Carolina data. *Public Health Rep*, 114(5):459-68.

Arcury T. A., Quandt S. A., Cravey A. J., Elmore R. C., & Russell G. B. (2001,May). Farmworker reports of pesticide safety and sanitation in the work environment. *Am J Ind Med*, 39(5):487-98.

Arcury, T. A, Quandt, S. A., & McCauley, L. (2000, August). Farmworkers and pesticides: community-based research. *Environ Health Perspect*, 108(8):787-92.

Baker, A., Esser, N. M., & Lee, B. C. (2001). A qualitative assessment of children's farm safety day camp programs. *J Ag Safety Health*, 7(2):89-99.

Bartels, S., Niederman, B., & Waters, T. R. (2000). Job hazards for musculoskeletal disorders for youth working on farms. *J Agric Saf Health*, 6(3):191-20.

Basran, G. S., Gill, C., & MacLean, B. D. (1995). Farmworkers and Their Children. Vancouver, British Columbia: Collective Press.

Bellville, R., Pollack, S. H., Godbold, J. H., & Landrigan, P. J. (1993). Occupational injuries among working adolescents in New York State. *JAMA*, 269(21):2754-9.

Brown, M., et al. (1997). Five years of work-related injuries and fatalities in Minnesota. Agriculture: A high-risk industry. Minneapolis, MN: Minnesota Department of Health, 80(8):29.

Boyle, D., Parker, D., Larson, C., & Pessoa-Brandao, L. (2000). Nature, incidence, and cause of work-related amputations in Minnesota. *Am J Ind Med*, 37(5):542-50.

Bureau of Labor Statistics. (2000). *Report on the Youth Labor Force*. Washington, DC: U. S. Department of Labor.

Camacho de Schmidt, A. (1994). Cultivating Health: An Agenda for Adolescent Farmworkers. Boston, MA: National Coalition of Advocates for Students.

Carnegie Council on Adolescent Development. (1993). Promoting Adolescent Health. Washington, DC: Third Symposium on Research Opportunities in Adolescence.

Carrabba, J. J., Field, W. E., Tormoehlen,R. L., & Talbert, B. A. (2000). Effectiveness of the Indiana 4-H tractor program at instilling safe tractor operating behaviors and attitudes in youth. *J Ag Safety Health*, 6(3):179-89.

Castillo, D. N. (1999). Young Workers. *Occup Med*, 14(3):519-36.

Castillo, D. N., Adekoya, N., & Myers, J. R (1999). Fatal work-related injuries in the agricultural production and services sectors among youth in the United States. *J Agromedicine*, 6(3):27-41.

Centers for Disease Control and Prevention & U. S. Department of Health and Human Services. (1997). Child labor research needs: Recommendations from the NIOSH Child Labor Working Team.

Centers for Disease Control and Prevention & U. S. Department of Health and Human Services. (1998). Surveillance for nonfatal occupational injuries treated in hospital emergency departments – United States, 1996. Morbidity and Mortality Weekly Report, 47(15):302-306.

Centers for Disease Control and Prevention & U. S. Department of Health and Human Services. (1999). Childhood work-related agricultural fatalities – Minnesota, 1994-1997. *Morbidity and Mortality Weekly Report*, 48(16):332-335.

Code of Federal Regulations, Environmental Protection Agency. 1992 Federal Worker Protection Standards, Title 40, Part 170.

Crandall, C. S., Fullerton, L., Olson, L., Sklar, D. P, & Zumwalt, R. (1997). Farm-related injury mortality in New Mexico, 1980-91. *Accid Anal Prev* 29 (2):257-61.

Davis, S. & Leonard, J. B. (2000). The ones the law forgot: Children working in agriculture. Washington, DC: Farmworker Justice Fund, Inc.

DeRoo, L. A. & Rautiainen, R. H. (2000). A systematic review of farm safety interventions. *Am J Prev Med*, 18, 51-62,

Derstine, B. (1996). Job-related fatalities involving youths, 1992-1995. *Compens Work Cond 1*, (1)49-42.

Dever, G. E. A. (1991). Migrant health status: Profile of a population with complex health problems. *Migrant Health Newsline*, 8.

Dunn, K. A. & Runyan, C. W. (1993). Deaths at work among children and adolescents. *Am J Dis Child*, 147, 1044-47.

Ehlers, J. K., Connon, C., Themann, C. L., Myers, J. R., & Ballard, T. (1993). Health and safety hazards associated with farming. *American Association of Occupational Health Nurses, Inc.*, 41(9):414-421.

Environmental Protection Agency (EPA). (1993). The Worker Protection Standard for Agricultural Pesticides, How to Comply. United States Environmental Protection Agency 735-B-93-001. Prevention, Pesticides, and Toxic Substances (H75506C). SSOP, Washington, DC.

Environmental Protection Agency. (2000). The National Assessment of the Worker Protection Program. Stakeholder Workshop #1 Report. Austin, TX.

Gabbard, S., Carroll, D., Baron, S., & Steege, A. (1999). Teens in Crop Agriculture. Paper prepared for the National Adolescent Farmworker Occupational Health and Safety Advisory Committee. Washington, DC: US Department of Labor.

Gerberich, S. G., Robertson, L. S., Gibson, R. W., & Renier, C. (1996). An epidemiological study of roadway fatalities related to farm vehicles: United States, 1988 to 1993. *J Occup Environ Med*, 38, 1135-1140.

Golub, J. S. (2000). Adolescent health and the environment. *Environ Health Perspect*, 108(4).

Guiao, I. Z. & Esparza, D. (1997). Family interventions with "troubled" Mexican American teens: An extrapolation from a review of the literature. *Ment Health Nurs*, 18, 191-207.

Gwyther, M. E., Jenkins, M. (1998). Migrant farmworker children: Health status, barriers to care, and nursing innovations in health care delivery. *J Ped Health Care*, 12,(2) 60-6

Heyer, N. J., Franklin, G., Rivara, F. P., Parker, P., & Haug, J. A. (1992). Occupational injuries among minors doing farm work in Washington State: 1986 to 1989. *Am J Public Health*, 83(4):557-60.

Horton, D. (1989). Considerations for a migrant health information system. *Health Newsline*, Vol. 6.

Human Rights Watch. (2000). Fingers to the Bone: United States Failure to Protect Child Farmworkers. pg 16.

International Labour Office. (1983). *Encyclopaedia of Occupational Health and Safety*. Third Edition. Geneva, Switzerland

Krieger, G. R., & Montgomery, J. F. (1997). *Accident Prevention Manual for Business and Industry*. National Safety Council, 11th Edition.

Laraque, D., Barlow, B., & Durkin, M. (1999). Prevention of youth injuries. *J Natl Med Assoc*, 91(10):557-71.

Lee, B. & Marlenga, B. (1999). *Professional Resource Manual: North American Guidelines for Children's Agricultural Tasks*. Marshfield, WI: Marshfield Clinic.

Lewis, M. Q., et al. (1998). Work related injuries among Iowa farm operators: An analysis of the Iowa Farm Family Health and Hazards Surveillance Project. *Am J Ind Med*, 33, 510-17.

Loomis, D. P. (1991). Excess cancer among white-collar workers in studies based on death certificates. *J Occup Med*, 34(6):592-3

Mansdorf, S. Z. (1993). Complete Manual of Industrial Safety. Prentice-Hall, Inc.

McCurdy, S. A. & Carroll, D. J. (2000). Agricultural injury. *Am J Ind Med*, 38, 463-480.

McCurdy, S. (1995). Occupational health status of migrant and seasonal farmworkers. In: McDuffie, H., Dosman, J., Semchuk, K., Olenchock, S., Senthilselvan, A., editors. *Agricultural Health and Safety: Workplace, Environment, Sustainability (supplement)*. Chelsea, MI: Lewis Publications, pp 213-216.

McLaurin, J. A. (1995). Health Care for Children of Migrant Farmworkers. The Practice of Contextual and Integrative Child Care: New Opportunities. *American Academy of Pediatrics*.

McLaurin, J. A. (2000). Guidelines for the Care of Migrant Farmworkers' Children. *American Academy of Pediatrics*.

Mehta, K., Gabbard, S. M., Barratt, V., Lewis, M., Carroll, D., & Mines, R. (2000). *Findings from the National Agricultural Workers Survey (NAWS) 1997-1998: A Demographic and Employment Profile of United States Farmworkers*. U. S. Department of Labor, Office of the Assistant Secretary for Policy, Office of Program Economics.

Michael, R. J., & Salend, S. J. (1985). Health Problems of Migrant Children. *J Sch Health*, 55(10).

Miller, C. A. (1989). The need for a national health program: thoughts on examining the Jackson National Health Program. *Int J Health Serv*, 19(3)553-6.

Miller, J. (1988). A Grassroots Model: Health Services for Migrant Education Students. Clin Supp.

Miller, M. E. & Kaufman, J. D. (1998). Occupational injuries among adolescents in Washington State, 1988-1991. *Am J Ind Med*, 34(2):121-32.

Mines, R., Gabbard, S., Steirman, A. (1997). *A profile of U. S. farmworkers. Demographics, household composition, income and use of services*. U. S. Department of Labor.

Mobed, K., Gold, E. B., Schenker, M. B. (1992). Cross-cultural medicine – A decade later. Occupational health problems among migrant and seasonal farmworkers. *Western J Med*, 157, 367-373.

Mueller, K. J., Curtain, T., Hawkins, D., Williams, D. M., & Lefkowitz, B. (1997). Building a research agenda: Responding to the needs of community and migrant health centers. Community and Migrant Health Centers Conference.

Murray-Garcia, J. (1999). The public's health, its national identity, and the continuing dilemma of minority status. *J Health Care Poor Underserved*, 10(4):397-408.

Myers, J. R., & Adekoya, N. (2001). Fatal on-farm injuries among youth 16 to 19 years of age 1982-1994. *J Agric Saf Health*, 7(2):101-112.

Myers, J. R. & Hendricks, K. J. Injuries Among Youth on Farms in the United States, 1998. (2001). Cincinnati, OH: Department of Health and Human Services, Centers for Disease Control and Prevention.

Myers, M. L. (1998). Consensus Techniques Used for Policy Development. Winnipeg, Manitoba:

National Institute for Farm Safety, Inc.

Myers, M. L. (1999). Prevention effectiveness of rollover protective structures – Part I: Strategy evolution. *J Agric Saf Health*, 6(1):29-40.

Myers, M. L., Pana-Cryan, R. (2000). Prevention effectiveness of rollover protective structures – Part II: Decision analysis. *J Agric Saf Health*. 6(1)41-55.

NIOSH. (1998). Nine-year-old child helping with a blueberry harvest dies after being run over by cargo truck on field roads. Morgantown, WV: Fatality Assessment and Control Evaluation (FACE) Report 98-15.

National Advisory Council on Migrant Health. *2000 Recommendations*. Division of Community & Migrant Health.

National Advisory Council on Migrant Health. (1995). Losing Ground: The Condition of Farmworkers in America. *Recommendations*. Austin, TX: National Migrant Resource Program, Inc. September.

National Coalition for Agricultural Safety and Health. (1988). *Agriculture at risk: A report to the nation*. Iowa City, IA:The University of Iowa, pp. 1-67.

National Coalition of Advocates for Students. (1999). Cultivating health: An agenda for adolescent farmworkers.

National Committee for Childhood Agricultural Injury Prevention. (1996). National action plan, children and agriculture: Opportunities for safety and health. Marshfield, WI: Marshfield Clinic.

National Research Council and Institute of Medicine. (1998). Protecting youth at work: Health, safety, and development of working children and adolescents in the United States. Washington, DC: National Academy Press, p. 93.

Natural Resources Defense Council. (1998). Trouble on the farm: Growing up with pesticides in agricultural communities. New York: Natural Resources Defense Council, p 6.

Occupational Health and Safety Administration (OSHA): Field Sanitation Standard. Code of Federal Regulations: 29 Standard Number 1928.110.

Parrot, R., et al. (1999). Migrant farmworkers' access to pesticide protection and information: Cultivando buenos habitos campaign development. *Journal of Health Communication*, 4, 49-64.

Quandt, S. A., Arcury, T. A., & Pell, A. I., 2001. Something for everyone? a community and academic partnership to address farmworker pesticide exposure in North Carolina. *Environ Health Perspect* 2001, 109. Suppl 3:435-41.

Quandt, S. A., Elmore, R. C., Arcury, T. A., & Norton, D. (2001). Eye symptoms and use of eye protection among seasonal and migrant farmworkers. *South Med J*, 94(6):603-7.

Reed, D. B., & Claunch, D. T. (2000). Nonfatal farm injury incidence and disability to children: a systematic review. *Am J Prev Med* 18(4):70-9.

Reigart, J. R. & Roberts, J.R. (1999). Recognition and management of pesticide poisonings. Fifth Edition. *EPA*.

Rittichier, K. K., & Bassett, K. E. (2001). Metal lawn and garden edging: the hidden knife? *Pediatr Emerg Care*, 17(1)28-31.

Rivara, F. P. (1992). Injury control: issues and methods for the 1990s. *Pediatr Ann* 21(7)411-3.

Rivara, F. P. (1997). Fatal and non-fatal farm injuries to children and adolescents in the United States, 1990-93. *Inj Prev*, 3:190-4.

Rivara, F. P. (1985) Fatal and nonfatal farm injuries to children and adolescents in the United States. *Pediatrics*, 76:567-573.

Rothenberg, D. (1998). With These Hands: The Hidden World of Migrant Farmworkers Today. Harcourt Brace & Company, New York, NY.

Runyan, J. (2000). Summary of Federal Laws and Regulations Affecting Agricultural Employers, Washington DC: United States Department of Agriculture.

Runyan, C. W. & Zakocs, R. (2000). Epidemiology and Prevention of Injuries Among Adolescent Workers in the United States. *Ann Rev Pub Health* 21, 247-69.

Schenker, M. B., Lopez, R., & Wintemute, G. (1995). Farm-related fatalities among children in California, 1980-1989. *Am J Pub Health* 85(1):89-91.

Schulman, M., Evensen, C., Runyan, C., Cohen, L., & Dunn, K. (1997). Farm work is dangerous for teens: Agricultural hazards and iInjuries among North Carolina teens. *J of Rural Health* 13, 295-305.

Silletto, T. A. (1976). Implications for Agricultural Safety Education Programs as Identified by Iowa Farm Accident Survey. Doctoral Dissertation: Iowa State University.

Slesinger, D. P. (1999). Health and safety risks to children of migrant farmworkers. *Final Report to the National Institute of Occupational Safety and Health*.

Slesinger, D. P. (1992). Health Status and Needs of Migrant Farmworkers in the United States: A Literature Review. *Journal of Rural Health*. Summer.

Slesinger, D.P. & Ofstead, C. (1993). Economic and health needs of Wisconsin migrant farmworkers. *J Rural Health* 9, 2.

Stueland, D. T., Layde, P., & Lee, B. C. (1991) Agricultural injuries in children in central Wisconsin. *J Trauma* 31, 1503-1509.

Stueland, D. T., Lee, B. C., Nordstrom, D. L., Layde, P. M., & Wittman, L. M.(1996). A population based case-control study of agricultural injuries in children. *Inj Prev* 2(3):192-6.

The Traffic Safety Toolbox: A Primer on Traffic Safety. Washington, DC: Institute of Transportation Engineers.

Treviño Hart, E. (1999). Barefoot Heart: Stories of a Migrant Child. Bilingual Press. Tempe, Arizona.

Tri-National Cooperative Activity on Migrant Agricultural Work. (2000). *Legal background paper: Protection of migrant agricultural workers in Canada, Mexico and the United States*. Feb. 7-9.

U. S. Department of Agriculture, National Agricultural Statistics Service, 2000.

U. S. Department of Health & Human Services, National Advisory Council on Migrant Health, 2000 Recommendations.

U. S. Department of Health & Human Services, National Advisory Council on Migrant Health (1995). Losing Ground: The Condition of Farmworkers in America. September.

U. S. Department of Health & Human Services. (1999). Promoting safe work for young workers: A community-based approach. Nov.

U. S. General Accounting Office. (1998). Child labor in agriculture. Changes needed to better protect health and educational opportunities. Aug.

U. S. General Accounting Office. (1992). Hired farmworkers: Health and well-being at risk. Washington, DC: U.S. General Accounting Office, GAO/HRD-092-46, p 3.

U. S. General Accounting Office. (1998). Child labor in agriculture: Characteristics and legality of work. Washington, DC: U.S. General Accounting Office, GAO/HEHS-98-112R, p 2.

U. S. General Accounting Office. (1999). Migrant children: Education and HHS need to improve the exchange of participant information. October.

U. S. General Accounting Office (2000) Pesticides: Improvements Needed to Ensure the Safety of Farmworkers and Their Children. March.

U. S. Department of Agriculture. (1999). 1998 Childhood agricultural injuries. National Agricultural Statistic Service, Agricultural Statistics Board.

U. S. Department of Labor. (2000). Findings from the National Agricultural Workers Survey: 1997-1998. A demographic and employment profile of United States farmworkers. Research Report No. 8.

U. S. Environmental Protection Agency. (1993). A guide to heat stress in agriculture. PA-750-b-92-001, pp 24-25.

University of Iowa. (1995). 12-year old boy dies from tractor rollover in a roadside ditch – Iowa. Iowa City, IA: Fatality Assessment and Control Evaluation (FACE) Report 95-IA-029.

Vega W., et al. (1985). Psychiatric sympomatology among Mexican American farmworkers. *Social Science of Medicine* 20(1).

Villarejo, D. & Runsten, D. (1993). California's agricultural dilemma: Higher production and lower wages. Davis, CA: CA *Inst for Rural Studies*, pp 1-48.

Von Essen, S. G. & McCurdy, S. A. (1998). Conferences and reviews: Health and safety risks in production agriculture. *Western J of Med* 169, 214-220.

Wage and Hour Division, U. S. Department of Labor, and consult 29 Code of Federal Regulations and 29 United States Code.

Wage and Hour Division, U. S. Department of Labor. (1990). Child Labor Requirements in Agriculture Under the Fair Labor Standards Act. *Child Labor Bulletin No. 102*. Rev. July.

Wilk, V. & Holden, R. (1998). New directions in the surveillance of hired farmworker health and occupational safety. Cincinnati, OH: *A report of the work group convened by NIOSH May 5, 1995 to identify priorities for hired farmworker occupational health surveillance and research*. Publications dissemination, EID.

Williams, D. L. (1983). Iowa Farm and People Characteristics and Agricultural Accident Occurrence. Doctoral Dissertation. Iowa State University.

Wolff, T. (2001). Community coalition building—contemporary practice and research: Introduction. *Am J Community Psychol*, 2, 165-72; discussion 205-11.

Yoder, A. M., Murphy, D. J. (2000). Evaluation of the Farm and Agricultural Injury Classification Code and follow-up questionnaire. *J Agric Saf Health* 6(l):71-80.

Zietlow, S. P. & Swanson, J. A. (1999). Childhood farm injuries. *Am Surg* 65, 693-697; discussion 697-698.

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