Occupational Research Agenda

for Northwest Farming

Prepared by

The Pacific Northwest Agricultural Safety and Health Center

Department of Environmental Health

School of Public Health and Community Medicine

University of Washington

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Richard Fenske, Director of the UW Pacific Northwest Agricultural Safety and Health Center, headed this project. He was assisted by members of the planning committee, including Matthew Keifer, Co-Director; Sharon Morris, Associate Director; Adrienne Hidy, Program Manager; Norman Herdrich, Outreach Coordinator; and Marcy Harrington, Program Coordinator. We would also like to acknowledge the participation of Amy Hagopian, Associate Director of the UW Programs for Healthy Communities, in both the planning committee and in the Farm Summit facilitation group. Peter House, Director, UW Programs for Healthy Communities contributed his facilitation expertise during the Farm Summit. This report was written by Richard Fenske, Adrienne Hidy, and Marcy Harrington. Editorial assistance was provided by PNASH Center and UW Department of Environmental Health staff, Sharon Morris, Nitsa Allen-Barash, and Kathy Hall. Steven Deutsch, Professor with the University of Oregon's Labor Education and Research Center and member of the PNASH Center Science Advisory Board, also reviewed this document. Cathy Schwartz, UW School of Fisheries, was the graphic designer on this project.

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Table of Contents

FOREWORD

FARMING IS A REWARDING WAY OF LIFE, and in many ways a very healthy one. Yet each year, thousands of men and women in the United States are injured or made ill by hazards encountered in routine farming activities. Children living on or around farms are also at risk. Research focused on the identification of modifiable risk factors and on the development of effective interventions may minimize the loss of life or health in the agricultural workplace. Regulations and enforcement activities designed to reduce illness and injury in agriculture can sometimes be controversial, but there is general agreement that sound scientific knowledge is essential in preventing disease and improving our quality of life.

In the late 1980s, a broad coalition of private sector and professional groups joined together to discuss the very serious health and safety issues facing American agriculture. The resulting document, *Agriculture at Risk: A Report to the Nation*, made a persuasive case that health and safety needed to be addressed systematically in farming communities across the nation. In 1989, the US Congress directed the Centers for Disease Control and Prevention and the National Institute for Occupational Safety and Health (NIOSH) to create new programs that focused on the prevention of illness and injury in agriculture. NIOSH, in turn, created a network of regional centers for research and education in agricultural safety and health. The Pacific Northwest Agricultural Safety and Health Center was established in 1996 as a regional resource for research and education in farming, fishing, and forestry. Its purpose is to assist producers, workers, health professionals, and government agencies in the identification of hazards, and the implementation of practical solutions that will prevent or reduce workplace injury and illness rates.

The Occupational Research Agenda for Northwest Farming, described in the following pages, is the result of a process that involved key stakeholders throughout the region. We hope this document will serve as a useful guide for anyone concerned with farming health and safety in the Northwest. The Agenda can improve the use of existing resources by focusing our efforts in areas that can be effectively addressed by research. We thank all of the participants in our telephone interviews and in the subsequent Farm Summit, held in Portland in Spring 1998. We look forward to continued collaborations and partnerships aimed at investigating and solving the most pressing health and safety problems in our region's farming communities.

—Richard Fenske, PhD, MPH, Director

About the Occupational Research Agenda for NW Farming

What is the Occupational Research Agenda for Northwest Farming ?

The Occupational Research Agenda for Northwest Farming identifies health and safety research priorities for farming in Idaho, Oregon, and Washington. The Agenda process elicited the views of producers, labor, health care professionals, academicians, public agency officials, and others familiar with the region's farming health and safety issues. The Agenda focuses on areas where research can make a difference in reducing disease and injury among farm operators, farm workers, and their families.

How can research make a difference in farm health and safety?

Research is the systematic application of scientific principles to answer well-defined questions. It normally involves development of a study design, and the collection and analysis of data. When there is a lack of basic knowledge about injuries or illness, research efforts are aimed at a new understanding of causes. Why are disease rates higher for one occupation than for another? Why do workers in a particular industry develop serious lower back problems? Why do certain workers get sick or injured when others do not? What level of pesticide exposure is a public health concern? What causes skin disease in farming? When we have a clear understanding of why illnesses and injuries occur, research can also be helpful in testing solutions. Does a new work practice designed to reduce back stress really reduce injury rates and time lost from work? Do new regulations produce changes that improve health and safety? Does new protective clothing or worker training reduce pesticide exposure or dermatitis? The systematic evaluation of interventions has become an important part of public health research, and is particularly valuable in farming.

How was the Agenda developed?

The Agenda was initiated by the Pacific Northwest Agricultural Safety and Health Center (PNASH), one of nine regional centers in the United States charged with improving health and safety in farming communities. The agenda process was modeled on the successful National Occupational Research Agenda (NORA) that was developed by the National Institute for Occupational Safety and Health (NIOSH). Our own process was guided by the following goals:

- Examine the issues of farm health and safety in our region, including technical, social, and economic dimensions.
- Involve a diverse group of stakeholders in identifying issues that can be addressed by occupational safety and health research.
- Establish a priority list, or agenda, of occupational safety and health research topics relevant to Northwest farming.
- Provide a continuing forum for discussion of key health and safety issues for the region.

PNASH staff conducted more than 100 telephone interviews between November 1997 and February 1998 to learn the views of farm owners, cooperative extension agents, health care providers, labor representatives, academicians, government agency officials, and others familiar with health and safety issues in the region. In March of 1998 we sponsored a day-long conference (Farm Summit) attended by 30 representatives of the region's agricultural health and safety community. The results of the telephone interviews and discussions at the Farm Summit are the foundation of the Occupational Research Agenda for Northwest Farming. We have worked hard to ensure that the Agenda reflects the careful thought and effort that each individual contributed to the process.

What priorities has the Agenda identified for Northwest farming?

Upon reviewing the results of the telephone interviews and Farm Summit, PNASH staff identified 12 research priorities which fell within the three major categories used by NIOSH in its NORA process. The priority areas are not ranked. Each is deserving of increased research efforts to improve farm health and safety in our region.

Category	Priority Research Areas
Disease & Injury	Musculoskeletal Disorders
	Respiratory Disease
	Skin Disease
	Traumatic Injuries
Work Environment & Workforce	Chemical Exposures
	Special Populations at Risk
	Social and Economic Foundations of Workplace Safety
	Risk Communication Barriers
Research Tools & Approaches	Diagnostic Approaches
	Hazard Control Technology
	Intervention Effectiveness
	Surveillance Research Methods

How will the Agenda be used?

We hope that the Agenda will serve as a useful guide to anyone concerned with farming health and safety in the Northwest. This document has been distributed to all telephone interview and Farm Summit participants, and is available to the public. The Agenda will be particularly useful for researchers throughout the region, as it focuses attention on issues where research can make a difference in reducing disease and injury, and provides specific suggestions for research activities. We hope that regional policymakers will also find the Agenda valuable in their efforts to effectively allocate existing and new resources.

PNASH will use the Agenda to direct resources to relevant research and education activities. For example, we currently sponsor a pilot project program that provides initial funding for new projects in agricultural health and safety. The Agenda will serve as an important tool to encourage pilot project applicants to consider research in specific areas of need. We support graduate students who can use the Agenda as a valuable source of project ideas. The Agenda will also guide future planning of our continuing education courses and outreach efforts.

Why is the Agenda important?

Agricultural work places high demands on the men, women, and children whose livelihood depends on farming. This industry is affected by many external factors that are beyond the control of the individual producer or worker. These include weather, national and global market changes, technological changes, labor supply, and government regulation. Farmers, farm workers, and their families are also subject to a variety of workplace hazards that result in illness and injury, most of which are preventable.

The systematic study of health and safety hazards in farming communities has emerged as a new and important public health field. Farming has high rates of fatal and nonfatal injuries and a high prevalence of certain work-related diseases when compared with other occupations. There is an extraordinary opportunity for well-focused research and education programs to improve farm health and safety while maintaining a productive industry.

How can I be involved in farm health and safety research and education?

We hope that the distribution of the Agenda marks the beginning of a process that stimulates new thinking and efforts in the area of farm health and safety. PNASH can serve to facilitate these efforts, and to provide linkages across the region. Please contact us and we will be happy to work with you to find common interests and new resources to prevent disease and injury in our region's farming industries.

INTRODUCTION

THE NORTHWEST, SPECIFICALLY IDAHO, OREGON, AND WASHINGTON, is one of the most productive and diverse agricultural regions in the United States. The efforts of the region's farmers, farm workers, and their families contribute significantly to the local and national economy. Yet planting, management, and harvesting of crops place these groups at risk for a variety of health and safety hazards.

The occupations experiencing the highest numbers and rates of fatal occupational injuries in the Northwest are farming, fishing, and forestry. Agricultural work is characterized by a high risk of fatal traumatic injury and greater than average risk of nonfatal traumatic injury, cumulative trauma (noise and vibration exposure), respiratory, and dermatological conditions. In Washington state, workers' compensation claims data indicate that agricultural workers are at greater risk of fatal and nonfatal injury, systemic poisoning, and dermatitis than are nonagricultural workers. These conditions affect workers' daily living and life expectancy and are highly costly to the regional economies. Between 1988 and 1994, 145,908 workers' compensation claims for injury and illness were filed by agricultural workers (excluding logging) with the Washington State Industrial Insurance Fund, a rate of 19.2 injuries and illnesses per 100 full-time equivalent (FTE) workers. The costs of these claims totaled more than $450 million, averaging $3,129 per claim. This translates to $600 paid in workers' compensation benefits for every full-time agricultural worker each year.[1]

In Oregon and Idaho, workers' compensation claims filed in 1997 for agriculture and forestry ranked eighth and ninth respectively. In Idaho, the highest number (18) of job-related fatalities reached in 1997 was in farming, fishing, and forestry. Ten of these fatalities occurred in farming. This is the highest number in a single occupation following transportation and material moving occupations, for each of which 12 job-related deaths were reported.[2]

In Oregon, agricultural workers' claims ranked tenth with 3.4% of workers' compensation claims filed in 1997.[3] Of the claims submitted by agricultural, forestry, and fishing workers, farm workers submitted the highest number of claims at 36.2%. For these three occupations, the average cost per claim closed in FY 1997 included $5,087 in medical costs, $2,671 in time loss costs, and $2,009 in permanent partial disability costs for a total of $9,767. Average time lost was 106 days. For 1997, the incidence rate per 100 full-time workers in agriculture, forestry, and fishing was 8.7 total cases and 3.8 lost workday cases.[4]

Between 1993 and 1997, the highest fatality rates per year per 100,000 for Oregon occurred in agriculture, forestry, and fishing, following only construction. There were 81 fatalities among Oregon's farming, forestry, and fishing workforce between 1993 and 1997 making these occupations the second most dangerous. Of this total, 32 were job-related farmer and farm worker deaths.[5]

Efforts to decrease health and safety hazards in farming at the federal, state, and local levels are complicated by the diversity of tasks, worker populations, and geographical demands inherent to the region. For example, the diverse agricultural economy of the Northwest requires a large, but fluctuating, labor force. The size of the labor force is largely determined by the season, with migrant and seasonal labor comprising a substantial proportion of the labor force. The cultivation and harvesting of many of the major crops in the Northwest, such as tree fruit, berries, hops, grapes, and forest products, are not amenable to mechanization. These crops are labor intensive, with the size of the worker population determined by the seasonal needs of the agricultural products. For example, in Washington state in 1997, the seasonal worker population fluctuated from a low of 14,300 in January, to a high of 65,100 in July when apple thinning and several harvests were underway. The population dipped to 47,700 in August, but rose again in October to 61,600 with the apple harvest. This seasonal labor force is comprised largely of persons of Hispanic origin with at least one dependent.[6]

In addition, unlike most other industries, children make up a sizable proportion of the agricultural workforce. These children suffer injuries when engaged in farming, and the injuries that are reported are often severe. Minors under the age of 15 employed on farms in Washington state were overrepresented in the number of claims filed by all minors.[7] Furthermore, 26% of claims filed by minors employed in agriculture were for serious injuries, compared with 16% for all other occupations. In Oregon, the agricultural sector accounted for 12% of compensable claims for workers age 17 and under with 85% of young injured agricultural workers employed as farm laborers between 1986 and 1995. During this time period, 80 disability claims were accepted for agriculture workers aged 8 to 14.[8] According to the Oregon Census of Fatal Occupational Injuries, the youngest worker fatality in the state for 1997 was the death of a 16-year-old farm worker who fell from a cliff.[9]

Setting priorities for health and safety research and education in Northwest farming is a challenging task in light of the many types of agricultural production and the diversity of the workforce. However, many of the occupational diseases, injuries, and hazardous working conditions in this region's farming industry are similar to those identified in other regions and nationwide. In our efforts to develop priorities, we turned to a process recently implemented on the national level.

The NORA Process

The National Institute for Occupational Safety and Health (NIOSH) is a federal agency within the Centers for Disease Control and Prevention, and serves as the nation's primary research organization for occupational health and safety. NIOSH created a new process in 1996, the National Occupational Research Agenda (NORA), to better identify and prioritize significant health and safety hazards for research and public policy purposes. This Agenda process encompasses input from representatives of scientific, corporate, labor, and health care organizations. In the first phase, NIOSH compiled the results of committee meetings, public gatherings, and written comments to develop and refine the 21 research priorities (Table 1).

The criteria employed to guide the evaluation and selection of possible NIOSH NORA topics included some or all of the following:

- Seriousness of the hazard based on death, injury, disease, disability, and economic impact
- Number of workers exposed or magnitude of risk
- Potential for risk reduction
- Expected trend in importance of the research area
- Sufficiency of existing research
- Probability that research will make a difference

The NORA process has proven very successful, and serves as a model of broad stakeholder influence in priority setting. Most recently, the second phase of the process has encouraged the National Institutes for Health and other federal agencies to join NIOSH in sponsoring a number of focused research programs directly relevant to workplace health and safety.

Pacific NW Agricultural Safety & Health Center

An early aim of the Pacific Northwest Agricultural Safety and Health Center (PNASH) is to identify and prioritize health and safety hazards in the region. Starting with farming, we turned to the NORA process for guidance. Our process, like NORA, was designed to elicit the perspectives of producers, labor, health care professionals, academicians, public agency officials, and others familiar with the region's farming health and safety issues. We hoped to find common ground among these groups in the identification of significant hazards, for which new research could make a difference at a regional level. The following discussion summarizes the process used to create an occupational research agenda relevant to Northwest farming.

Table 1. NIOSH NORA Priority Research Areas

Category	Priority Research Areas
Disease & Injury	Allergic and Irritant Dermatitis
	Asthma and Chronic Obstructive Pulmonary Disease
	Fertility and Pregnancy Abnormalities
	Hearing Loss
	Infectious Diseases
	Low Back Disorders
	Musculoskeletal Disorders of the Upper Extremities
	Traumatic Injuries
Work Environment & Workforce	Emerging Technologies
	Indoor Environment
	Mixed Exposures
	Organization of Work
	Special Populations at Risk
Research Tools & Approaches	Cancer Research Methods
	Control Technology and Personal Protective Equipment
	Exposure Assessment Methods
	Health Services Research
	Intervention Effectiveness Research
	Risk Assessment Methods
	Social & Economic Consequences of Workplace Illness & Injury
	Surveillance Research Methods

Setting a Research Agenda for Northwest Farming

The Occupational Research Agenda for Northwest Farming is a multi-phase process, the first phase of which culminated in the Farm Summit. PNASH staff began planning the Agenda process in July 1997. The aims included:

- Obtain information on health and safety concerns in regional farming, including technical, social, and economic dimensions.
- Involve stakeholders in identifying issues that could be addressed by occupational safety and health research.
- Establish a priority list, or agenda, of occupational safety and health research topics relevant to Northwest farming.
- Assemble a technical advisory panel for PNASH.

Staff identified and contacted a wide range of individuals throughout the region who had farming health and safety experience. Included in this group were representatives of

producers, labor, academic institutions, public agencies, health care organizations, child advocacy groups, insurance agencies, pesticide applicator associations, and farm machinery dealerships. Participants were not presented with a preselected group of research categories, but were encouraged to identify agricultural health and safety concerns and corresponding research opportunities without limits on content.

PNASH staff members conducted telephone interviews with 116 constituents between November 1997 and February 1998 (Appendix 2). The telephone interview consisted of eight questions. Respondents were first asked to name the most significant agricultural health and safety hazards in the region. They were then asked to state which of those hazards were most serious in terms of people injured and seriousness of risk. The interview also included questions about types of research, training, and other interventions that would identify and help reduce the risks, as well as sources of health and safety information. In addition, each respondent was asked for suggestions of other individuals to question and the majority of those people were contacted and interviewed.

The Farm Summit

The selection of participants at the Farm Summit was shaped by PNASH's aim to have an equal representation of constituent groups from the Northwest. An invitation list was compiled from individuals recommended during the telephone interviews and suggestions of PNASH researchers and staff. Of the 38 people invited to the Farm Summit, 30 attended the event–eight academicians, nine public agency officials, two labor representatives, four producers, three child health and safety advocates (who were also farm owners), one health care professional, and three private consultants (Appendix 3).

It was emphasized during the Farm Summit that the aim was to develop a research agenda for the region, not specifically for PNASH. The Farm Summit was led by professional facilitators from the University of Washington Programs for Healthy Communities. PNASH staff provided support services and group facilitation.

The day-long workshop consisted of both plenary and break-out sessions. In the morning session, participants attended small groups divided into constituencies (producer, labor, public agency, academic institution, and child advocacy). Because many Farm Summit attendees have multiple roles in the agricultural community (e.g., a producer who is also involved in child safety and health), participants were encouraged to select their own groups. In the morning session, constituency groups developed a list of the priority safety and health problems in farming. Participants also recommended individuals to serve on a technical advisory panel for PNASH.

Each group submitted a priority list of health and safety hazards to the facilitators at the end of the first break-out meeting. At the conclusion of the morning session, all attendees convened to report the most significant problems selected by their group as well as nominations of members to an advisory panel. A list of the 21 recommended problems was presented to the full group. Each participant was provided with five votes to prioritize the problems that are the most significant to the region's farming communities. After the voting process was complete, the top nine safety and health problems from the full list were selected for further discussion in the afternoon session.

When participants reconvened, constituency-mixed small groups were assembled to discuss the nine problem areas identified in the morning. Participants in these small groups were asked to develop solutions and research opportunities for the priority issues. The results of the afternoon session were shared with all participants at the conclusion of the Farm Summit.

The information gathered in the telephone interviews and Farm Summit was combined to determine the region's agricultural safety and health research priorities. Upon review of these topics, it became apparent to PNASH staff that the NIOSH NORA categories provided an excellent starting point to organize the results. The following summary discusses the selection of these research priorities in more detail.

Research Priority Areas for Northwest Farming

Twelve research priorities for the Occupational Research Agenda for Northwest Farming were selected based on the telephone interviews and Farm Summit results. The three major NIOSH NORA categories, *Disease and Injury*, *Work Environment and Work Force*, and *Research Tools and Approaches*, were retained as a useful framework for organizing the priorities. Each category included four research priorities, as presented in Table 2.

The first category, *Disease and Injury*, included Musculoskeletal Disorders, Respiratory Disease, Skin Disease, and Traumatic Injuries as research priority areas. The second category, *Work Environment and Work Force*, included Chemical Exposures, Risk Communication Barriers, Social and Economic Foundations of Workplace Safety, and Special Populations at Risk. The third category, *Research Tools and Approaches*, included Diagnostic Approaches, Hazard Control Technology, Intervention Effectiveness, and Surveillance Research Methods.

The Occupational Research Agenda for Northwest Farming priorities are not ranked. However, certain topics surfaced more frequently in the telephone interviews and Farm Summit discussions. These included Traumatic Injuries, Special Populations

at Risk, Chemical Exposures, and Intervention Effectiveness. The remainder of this document provides a brief overview of the 12 research priorities. Each overview reviews the importance of the priority to Northwest agriculture, and presents examples of research ideas provided by telephone interview respondents and Farm Summit attendees. We have also included a limited list of resources for additional information.

Table 2. Occupational Research Agenda for NW Farming: Priority Research Areas

Category	Priority Research Areas
Disease & Injury	Musculoskeletal Disorders
	Respiratory Disease
	Skin Disease
	Traumatic Injuries
Work Environment & Workforce	Chemical Exposures
	Special Populations at Risk
	Social & Economic Foundations of Workplace Safety
	Risk Communication Barriers
Research Tools & Approaches	Diagnostic Approaches
	Hazard Control Technology
	Intervention Effectiveness
	Surveillance Research Methods

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Deep-South Agricultural Health and Safety Center homepage: *http://hsc.usf.edu/publichealth/eoh/agcenter/*

Eastern Washington University Center for Farm Health and Safety homepage: *http://www.farm.ewu.edu/*

Great Plains Center for Agricultural Health homepage: *http://www.public-health.uiowa.edu/gpcah/*

High Plains Intermountain Center for Agricultural Health and Safety homepage: *http://www.bernardino.colostate.edu/hicahs/*

Midwest Center for Agricultural Disease and Injury Research, Education and Prevention homepage: *http://www.marshfieldclinic.org/nfmc/projects/default.htm*

National Institute for Occupational Safety and Health National Occupational Research Agenda homepage: *http://www.cdc.gov/niosh/nora.html*

National Institute for Occupational Safety and Health Regional Agricultural Safety and Health Center homepage: *http://www.cdc.gov/niosh/agctrhom.html*

Northeast Center for Agricultural and Occupational Health homepage: *http://www.bassetthealthcare.org/nycamh/index.html#NIOSH*

Pacific Northwest Agricultural Safety and Health Center homepage: *http://depts.washington.edu/pnash*

Southwest Center for Agricultural Health, Injury Prevention and Education homepage: *http://swcenter.uthct.edu/*

University of California Davis Agricultural Health and Safety Center homepage: *http://agcenter.ucdavis.edu/agcenter/*

Priority Research Areas for NW Farming

Disease & Injury

- Musculoskeletal Disorders
- Respiratory Disease
- Skin Disease
- Traumatic Injuries

Work Environment & Workforce

- Chemical Exposures
- Special Populations at Risk
- Social & Economic Foundations of Workplace Safety
- Risk Communication Barriers

Research Tools & Approaches

- Hazard Control Technology
- Diagnostic Approaches
- Intervention Effectiveness
- Surveillance Research Methods

Disease & Injury

Musculoskeletal Disorders

Respiratory Disease

Skin Disease

Traumatic Injuries

The majority of topics raised during telephone interviews and at the Farm Summit fell into the category of Disease and Injury, with certain issues emerging as the most commonly mentioned research priorities.

Both Farm Summit and telephone respondents mentioned problems that fit into the subtopic, Musculoskeletal Disorders. Issues included back injuries, and stresses and strains with lifting and repetitive motion as possible causes. Asthma and pulmonary problems were concerns under the subcategory Respiratory Disease. Telephone interview respondents listed potential causes of Respiratory Disease as exposure to dust, silica, diesel exhaust, and matter from field burning. Both groups of respondents identified Skin Disease as an important subtopic for further research. Included among their concerns were dermatitis, exposure to poison oak, and insufficient protection against the sun. Traumatic Injuries encompassed the most frequently mentioned concern of telephone respondents and Farm Summit participants. The injuries identified were falls, slips, trips, and cuts. Causes included tractor rollovers, improper operation of machinery, livestock, and ladders.

Musculoskeletal Disorders

Work-related musculoskeletal disorders of the upper extremities and the low back are common and costly. Workers' compensation costs undoubtedly underestimate the actual magnitude of these disorders. The causes for such disorders are complex. Existing scientific evidence identifies some work activities and awkward postures as significant contributors to the problem. The prevalence of back injuries among agricultural workers appears high in the region. Tasks that require lifting or repetitive motion are of particular concern in Northwest farming. Interventions should be based on current scientific knowledge, but new research efforts are needed to characterize exposure, understand basic pathophysiologic mechanisms, and assure that these work-related disorders are successfully prevented and treated.

[NIOSH NORA: Lower Back Disorders, Musculoskeletal Disorders of the Upper Extremities]

Importance

Low back disorders are among the most serious and costly types of musculoskeletal disorders in the workplace. It is estimated that claims associated with back pain cost more than twice the average compensable claim. Yet in many industries, including farming, workers are asked to carry out assignments that require high-risk activities. A similar pattern is seen for musculoskeletal disorders of the upper extremities, where the cumulative effects of repeated trauma are particularly important. Many of these disorders can be prevented through proper design of the work environment, redesign of tools, and appropriate worker training.

In Northwest farming, occupational activities that may contribute to these disorders include heavy lifting, carrying, forward bending, kneeling, and excessively fast-paced work. National health surveys conducted in the 1980s documented that farm workers have a higher prevalence of arthritis than do white collar, blue collar, service, or all workers combined. Also, musculoskeletal conditions are the most commonly reported ailments among farmers and farm managers. According to the Oregon Characteristics of Work Injuries and Illnesses for 1997, the most frequent types of injuries and illnesses among agriculture, forestry, and fishing workers are sprains and strains (36.2%).[10] The highest rate of disabling claims by occupation in Oregon in 1996 for agricultural workers were for sprains, strains, and tears. Claims for these injuries were almost four times the amount of claims for other injuries, such as dislocation, fracture, amputation, cuts, bruises, and burns, among others.[11]

Farm Summit and telephone interview participants identified lifting, repetitive motion, and shouldering the weight of bags during picking tasks as problems in this region.

Research Opportunities

- Improve tool design with an emphasis on the relationship between anthropomorphy and work and variations among gender and age groups
- Review agricultural ergonomic research conducted in other countries
- Examine successful agriculture design solutions (e.g., Easter Seals, Hood River ladder redesign project, Oregon OSHA worksite)
- Develop injury prevention methods, including greater mechanization of harvesting methods and job rotation
- Understand the primary causes of sprains and strains
- Evaluate existing interventions
- Identify alternatives to high-risk work practices
- Improve training in safer work practices
- Involve workers in identifying work practices that could lead to musculoskeletal disorders

Additional Information

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Respiratory Disease

Occupationally related airway diseases, including asthma and chronic obstructive pulmonary disease (COPD), are of concern in Northwest farming, and are of major public health importance. Nearly 30% of COPD and adult asthma nationwide may be attributable to occupational exposures. Research is needed to: clarify prevalence, risk factors, and exposure-disease relationships; refine techniques for monitoring worker health and the job environment; and develop effective and practical means for preventing work-related airway diseases in at-risk workers.

[NIOSH NORA: Asthma and Chronic Obstructive Pulmonary Disease]

Importance

Over the past two decades, the prevalence and mortality rates for asthma have been increasing in the United States. In Washington state, asthma deaths increased from 1980 to 1989.[12] Consistent with national trends, asthma is also a significant problem in Oregon.[13] One quarter to one-third of these cases are probably linked to occupational risk factors. Asthma and bronchitis have been carefully studied in only a few agricultural occupations, such as animal confinement workers. Grain farmers have been found to be at increased risk for broncho-spastic disease. Some pesticides have been linked to asthma, as have molds and airborne organic dusts from plant decomposition and microbial sources. Recent studies in California suggest that symptoms of respiratory illness are associated with duration of farm work and certain hand-labor tasks.

Farm Summit participants and those interviewed expressed general concern about respiratory diseases among farmers, farm workers, and the surrounding communities. Pulmonary problems, work-related asthma, and allergies were cited as priority farming health hazards in the region. Participants suggested that exposure to silica, dust, diesel exhaust, and particulates and chemicals resulting from field burning were important causes of respiratory disease among the region's agricultural workers and communities.

Research Opportunities

- Investigate the health effects and mechanisms of respiratory disease
- Characterize the prevalence of asthma in farming communities
- Evaluate the effects of dust and pesticides on asthma
- Determine the risk factors for asthma with preventive measures as the end goal

Additional Information

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Skin Disease

Contact with plants, animals, and some agricultural chemicals can produce allergic and irritant dermatitis (contact dermatitis). Contact dermatitis is the most important cause of occupational skin diseases nationally, and accounts for 15–20% of all reported occupational diseases. Research is needed to better identify the prevalence and causes of this condition, and to improve exposure assessment and diagnostic methods.

[NIOSH NORA: Allergic and Irritant Dermatitis]

Importance

Occupational skin disorders are the most commonly reported types of occupational illnesses not resulting from acute or cumulative trauma, with an estimated 64,200 cases recorded in the 1995 Bureau of Labor Statistics Annual Survey of Occupational Injuries and Illness. Agriculture consistently demonstrates the highest rate of occupational dermatitis among the major industrial sectors. In Washington state, the high rates of skin disorders in the agricultural industry prompted further investigation by the Washington State Department of Labor and Industries Safety and Health Assessment and Research for Prevention team. The overall rate for the industrial category Agriculture, Forestry, and Fishing is two claims per 1,000 FTE years. The highest rate of skin disorders seen within agriculture is in the fruits and tree nuts industry with a rate of 2.7 claims per 1,000 FTE years. The majority of workers filing claims had the occupational title of Farm Worker.[14]

Skin-related hazards in farming are numerous, and include plant materials, ultraviolet radiation, and chemicals–such as fertilizers and pesticides. Frequent skin contact with moisture, chemicals, friction, or dirt–all of which are common in farming–have each been previously associated with an increased risk of hand eczema and contact dermatitis.

Farm Summit and telephone interview participants identified skin disease, specifically dermatitis, as a significant health and safety hazard in the region's farming industry. Causes of skin disease included exposure to the sun and poison oak. One respondent noted that it was common for farm workers with skin disease to be diagnosed as having a rash, and provided with topical steroids. This diagnosis and treatment approach did not lead to prevention, as the cause of the rash, either allergic, contact, plant irritation, pesticide, or fertilizer exposure, was not determined.

Research Opportunities

- Improve information dissemination about protective clothing
- Design better protective clothing
- Develop more effective topical lotions to prevent poison oak exposure
- Develop surveillance systems to track the prevalence of diseases such as skin cancer and dermatitis
- Develop a more accurate definition of dermatitis and its etiologies as it relates to agriculture
- Design engineering innovations to reduce the level of skin exposure
- Conduct an epidemiologic study to determine the extent of skin diseases in the region's farm labor community
- Investigate ways to manage environmental factors that affect the prevalence of skin diseases, for example, weed control and placement of hygiene stations

Training Opportunities

- Develop methods and curriculum to better educate medical personnel regarding occupational skin disease specific to agricultural workers
- Improve medical protocols for the treatment of agricultural-related skin disease
- Train workers in the prevention of skin diseases, for example, the benefits of using hygiene stations located at the work site
- Educate farmers and farm workers in plant recognition

Additional Information

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TRAUMATIC INJURIES

Injury takes a huge toll in many US workplaces, including farms. Multiple factors contribute to traumatic injuries, such as the characteristics of the workforce, job design, work organization, economics, and other social factors. Fatalities and traumatic injuries resulting from human contact with machinery, livestock, equipment, and electricity are common in farming. Overexertion, stress, fatigue, lack of training, and operator attitude can all serve as precursors for incidents. Research should focus on leading causes and high-risk groups. Development of effective interventions may require collaboration among different academic disciplines and cooperation among many organizations.

[NIOSH NORA: Traumatic Injuries]

IMPORTANCE

More than 77,000 US workers died as a result of work-related injuries from 1980 through 1992. This represents a rate of 16 fatal injuries each day. Agriculture, mining, construction, and transportation are the four industries with the highest occupational fatality rates. A major cause of death within agriculture is machine-related incidents. Nonfatal injuries are also common in agriculture and, in many instances, result in lost work time and expensive medical treatment. Washington state recorded more than 10,000 compensable claims from 1991–1994, or an average of more than 2,500 claims per year. The total cost of work-related injuries and fatalities for all industries is estimated to be greater than $121 billion annually. Costs associated with agriculture are a significant contributor to this total.

In 1997, fractures, multiple injuries and cuts, lacerations, and punctures represented three of the four most frequently accepted disabling claim categories reported in Oregon. According to Oregon's Workers' Compensation Claim Characteristics for 1996, 23% of claims for those working in agriculture, forestry, and fishing resulted from falls and 22% occurred when objects struck workers. A large number of the claims were for lacerations (10%) and contusions (6%); and because of the above-average percentage of falls, there were numerous fractures (11% of the Division's claims).[15]

Between 1979 and 1997, in Idaho, the most frequent cause for fatalities among agricultural workers was due to machinery. Tractors were the most frequently reported cause of all fatalities (47%), followed by general machinery (12%) and trucks (10%). Overturns resulted in the highest number of deaths among tractor fatalities (44%). Tractors

were also a leading cause of fatal incidents among children under 18. Additional causes of fatalities during these years were contact with livestock, primarily horses, and irrigation.[16]

Traumatic injuries in the region's farming industry were the most frequently identified hazards in the telephone interviews, and represented a top priority for all of the constituency groups at the Farm Summit. Types of injuries included cuts, scrapes, slips, and falls. The majority of respondents stated that the leading cause was improper operation of machinery, most often tractors. Other traumatic incidents among the region's farm owners, operators, and workers were attributed to livestock, ladders, and electricity. Stress and fatigue were also noted as potential predispositions of farming-related injuries.

Research Opportunities

- Identify the specific cause of traumatic injury on the farm
- Determine the severity of the injury by types of work
- Correlate incidents and operator stress levels
- Interview victims and determine the circumstances that lead up to their injury, then identify common causes
- Evaluate injury prevention training and retrofitting compliance

Additional Information

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Work Environment & Workforce

Chemical Exposures

Special Populations at Risk

Social and Economic Foundations of Workplace Health and Safety

Risk Communication Barriers

The subtopics in this category reflect hazards in the agricultural work environment, the populations who make up the majority of the workforce, and factors, which may, directly or indirectly, affect health and safety risks. Research is needed to understand the complex interactions between traditional risk factors and the various social and economic forces that operate in farming. The organization of work is increasingly recognized as an important component in promoting health and safety, but insufficient research is available to provide guidance to managers, producers, and employees. Effective communication is essential to the successful implementation of workplace changes designed to prevent injury and illness.

CHEMICAL EXPOSURES

Agricultural chemical exposure is common on most farms in the Northwest, affecting both producers and farm workers. Most concerns have focused on pesticides, but exposure to fertilizers and air contaminants, such as carbon monoxide and diesel exhaust, may also carry health risks. Chemical exposures among children living on or near farms has also become a public health concern. Research is needed to better characterize exposure pathways and levels, estimate acute and chronic health risks, understand the effects of mixed chemical exposures, and design effective interventions to reduce potentially harmful exposures. There is a clear need for worker training and risk communication that is multilingual and culturally specific.

[NIOSH NORA: Mixed Exposures]

IMPORTANCE

Agricultural pesticide exposure has been a concern among Northwest producers, workers, and public health scientists for most of this century. Early use of lead arsenate insecticides in the tree fruit industry stimulated epidemiological research on pesticide applicators in the 1930s. The introduction of organophosphate insecticides and other modern pest control products in the 1940s and 1950s led to extensive workplace investigations designed to prevent pesticide poisonings. This research continues today, and the focus has expanded to include the families of agricultural workers and communities in farming regions. Periodic illness outbreaks, such as the acute poisoning of pesticide applicators by phosdrin, incidents related to pesticide drift, and carbon monoxide poisoning inside packing houses, maintain the public's attention on farming as a hazardous industry. The role of pesticides and other agri-chemicals in producing chronic health effects remains a complex field of study, and the subject of much public debate. As one university extension agent pointed out, "Accidents make news and increase awareness, but pesticides go unnoticed or unknown. [Workers] don't know [if] they have been exposed or [are] handling [them] wrong, [they become] sick later and don't know the cause." Research can provide a better understanding of the health hazards of these chemicals, which can lead to new methods for educating workers and the general public.

RESEARCH OPPORTUNITIES

- Improve chemical exposure monitoring through baseline testing
- Involve manufacturers in developing systems and programs

- Research adverse reactions to chemicals and gases in the agricultural industry and the appropriate personal protective equipment to guard against these exposures
- Address exposure assessment, biological markers, and general and long-term effects
- Document the need for chemical exposure awareness and the prevalence and specific use of agri-chemicals
- Explore engineering methods to reduce hazards or eliminate them by the use of less hazardous materials
- Perform genetic research to develop biological controls for insect and plant disease to reduce the amount of chemical handling and disposal
- Identify chemical exposure data specific to the Northwest region
- Investigate the extent of pesticide exposure from spray and drift
- Research take-home exposures
- Investigate cholinesterase levels
- Assess the impact of using expiration dates on agri-chemicals
- Investigate poisoning outbreaks

Training Opportunities

- Improve pesticide training
- Conduct chemical safety training
- Improve information dissemination concerning high-risk behaviors
- Employ stricter licensing requirements for applicators and mixer loaders
- Provide training on pesticide use reduction

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ExToxNet–Extension Toxicology Network at Oregon State University homepage: *http://ace.orst.edu/info/extoxnet*

National Pesticide Telecommunications Network: Oregon State University and the US Environmental Protection Agency homepage: *http://ace.orst.edu/info/nptn*

Washington State Pesticide homepage*:* *http://pep.wsu.edu/*

Special Populations at Risk

Many types of people participate in Northwest farming. Occupational hazards are known to be distributed differentially across populations, and workers with specific biological, social, or economic characteristics are more likely to have increased risks of certain work-related diseases and injuries. Some of these populations have been underserved in the past, such as migrant and seasonal workers and children of agricultural families. Particular concerns in farming include exposure to chemicals, traumatic injuries, substandard housing, and lack of adequate training, education, and skills. Loss of employment is a risk factor of special importance for the farm worker population. Research is needed to define the nature and magnitude of risks for well-defined subgroups within the worker population, and to develop appropriate intervention and communication strategies.

[NIOSH NORA: Special Populations at Risk]

Importance

Participants frequently mentioned concern about the health and safety risks of special populations in Northwest agriculture. Issues related to migrant workers, Hispanics, and children extended across many research priority categories. For example, participants noted the importance of exposure to pesticides, and traumatic injury among children.

The needs and abilities of non-English speaking workers were raised, and in a few cases respondents specifically noted the importance of training for non-English-speaking pesticide workers. An extension agent noted that training methods should be improved for migrant workers. She stated that, in Idaho, migrant workers were at increased risk for injuries because they were not properly trained to handle equipment. In addition, because they were not from the region, migratory workers may not be aware of how best to maneuver farming machinery over different types of terrain.

The Northwest relies on a large seasonal and migratory worker population, primarily Hispanic, for agricultural activities. Farm workers in this region face a number of health and safety issues, which are compounded by low wages and the seasonal nature of agricultural work. Due to the dangers inherent in many agricultural jobs, farm workers are at risk for cumulative trauma, musculoskeletal problems, respiratory disease, dermatoses, and noise-induced hearing loss. Farm workers and their families are also at elevated risk for chemical exposures. Lack of adequate housing and sanitation facilities may exacerbate these health and safety problems.

Children who live on or near farms are also at risk. It is estimated that 300 children and adolescents die each year from farm injuries in the US, and that 23,500 suffer nonfatal trauma. A recent National Academy of Sciences report on the health and safety implications of child labor recommended that "current distinctions between hazardous orders [regulations] in agriculture and nonagricultural industries should be eliminated from child labor laws." A broad coalition on childhood agricultural injuries has successfully raised this issue at the national level, and Congress recently appropriated funds to NIOSH for research and intervention aimed at injury prevention.

Children suffer injuries when performing agricultural work, and these injuries are often severe. Minors under the age of 15 employed on farms in Washington state were overrepresented in the number of claims filed by all minors.[17] Reports from Oregon also reflect the dangerous nature of agriculture for children and youth as workers or bystanders on the farm. Between 1986 and 1995, agriculture ranked third, following retail and the service industry, in accepted disabling claims for workers aged 17 and under.[18] Surveillance mechanisms for certain injuries are inadequate as children working on family farms and as short-term laborers may not be covered under workers' compensation.

Research Opportunities

- Investigate compliance with child labor laws
- Research children's susceptibility to chemical exposures
- Study the effectiveness of disseminating information through Hispanic media
- Characterize the hazards of migrant labor
- Investigate the incidence of child injury

Training Opportunities

- Develop effective farming health and safety teaching tools for children with auditory, tactile, and visual materials and bring safe equipment operation instruction into junior high and high school classrooms
- Employ multilingual and culturally specific training methods through theater and non-formal education techniques to reach a non-English speaking audience

Additional Information

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Migrant Clinicians Network homepage: *http://migrantclinician.org/*

National Center for Farmworkers' Health homepage: *http://www.ncfh.org/*

Social and Economic Foundations of Workplace Health and Safety

Health protection in the workplace includes the provision of basic public health services, such as sound nutrition, clean water, adequate and safe housing, and access to health care. For some farm workers, however, the existence of these basic services cannot be taken for granted. Additional social and economic aspects of farm worker life that affect health include lack of sanitary facilities, poor prenatal care, lack of day-care facilities, and alcohol and drug use. Concerns for producers include economic pressure on farmers, production stress, fatigue induced by a mix of factors including short growing seasons, and fluctuating markets.

[NIOSH NORA: Not included in the NORA document]

Importance

Workplace health and safety issues in farming are inextricably linked to broader social and economic factors, particularly for farm workers. A recent study conducted by the California Research Bureau for that state's legislature identified ethnic diversity, low income, housing, sanitation, health care access, and education as key aspects of farm worker health. The report compared farm work with the other major occupational categories in the state, and noted that farming had the highest percentage of workers living below the poverty line, working the longest hours, and having the lowest proportion of health insurance coverage, and the lowest educational level. The report also included data on the implementation of the 1986 OSHA Sanitation Standard, indicating that about 60% of farms surveyed in California were out of compliance with the standard.[19]

In the Northwest, there has been recent focus on farm-worker housing and field sanitation, and several initiatives are underway to improve these basic needs. The US EPA Worker Protection Standard is now in effect, and is leading to more diligent efforts to reduce pesticide exposures. Research is needed to evaluate these efforts, and to identify effective means of improving public health services in rural communities.

Among farm operators, economic uncertainty and long working hours can produce stress. Stress has long been considered a "fact of life" in farming communities, but has more recently been recognized as an important risk factor for injuries and chronic diseases. New research has helped define the various components of farm stress, allowing the design of interventions. Further efforts in this area are likely to improve the quality of life for farmers and reduce the risks of injury and illness.

Research Opportunities

- Investigate the costs and benefits of safety and health interventions
- Study stresses of farming life among farmers and farm families
- Assess the variation in health status among farm workers living in on- and off-site housing
- Investigate the impact of piece work vs. hourly pay on safety and health
- Determine the adequacy of day-care use in the farm-worker community

Additional Information

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RISK COMMUNICATION BARRIERS

Many occupational and environmental health problems are characterized by substantial scientific uncertainty. Our understanding of disease in humans may be derived from animal models, or the duration and magnitude of exposures may not be well known. Under these circumstances, effective risk communication is particularly challenging. Some of the barriers to risk communication in Northwest farming include a lack of interest in health and safety issues among farmers and workers, and tension between producers and employees. Government programs have not always been effective in reaching the proper audiences, or in providing meaningful risk information to the community. Communication is difficult with a non-English-speaking workforce and among those with minimal education. Research is needed to better characterize these barriers, and to translate scientific discussions of risk into messages relevant to farming communities.

[NIOSH NORA: Not included in the NORA document]

IMPORTANCE

Producers, workers, and the general public receive many messages about health risks in farming. Public and private interest groups, government agencies, health-care providers, and the media are all sources of information. What information is essential? How can conflicting messages be resolved? Research over the past 15 years has demonstrated that effective risk communication is an important part of risk management, and without it even the most detailed and exhaustive risk assessments have little impact on public policy.

Participants in the Farm Summit and those interviewed by telephone were supportive of identifying risk communication as a key priority in farming. Most comments emphasized the problems with risk communication. In some cases, relatively small risks seem to be blown out of proportion, and communities may be alarmed unnecessarily. On the other hand, serious risks are often ignored either because of economic concerns or due to a sense of fatalism that can pervade farming and rural communities.

It was agreed that further efforts were needed to improve communication among scientists, educators, the farm community, and the general public about heath and safety issues in agriculture. Language and cultural and educational differences were identified as potential barriers in the farm worker population. Interpersonal relations were also viewed as crucial to effective communication. Consistent with evidence from numerous industries

across the nation, participants raised concern about the lack of communication, animosity between employers and employees, and fear of losing one's job for reporting health and safety violations.

Several extension agents noted the farming labor community's lack of interest in agricultural health and safety information. A producer commented that many farmers and ranchers believe they know all about safety and are, therefore, not interested in the topic. A number of participants commented that the importance of safety information didn't seem relevant until somebody close to them was killed or injured.

Some participants provided recommendations to improve risk communication. The information could be combined with topics of greater interest to farmers, managers, and labor, such as how to maintain, use, or make equipment. The training should be provided at the local level, as the intended audience wasn't willing to travel very far. Since time was valuable and "people get tired of talkers," bulletins and reading materials sent to the farmer's home may have more of an effect than sponsoring safety meetings. Radio programs for migrant and seasonal labor workers was noted as an effective medium. A public agency representative recommended videos or training that would include testimonies of accident victims and their families.

Research Opportunities

- Develop more effective training techniques, bilingual teaching and information, improved language training, and incorporate cultural differences
- Identify specific cultural differences and how they affect perception of risk
- Evaluate new teaching formats (such as Foto Novelas)
- Describe the farm worker population in terms of different ethnicities and languages
- Investigate the use of economic incentives to increase the number of workers willing to learn English
- Explore the impact of solid research, case studies, incentive programs, family members, and agricultural organizations on attitudes and behaviors
- Investigate the economic benefits of safety programs
- Examine farm workers' fears about reporting incidents

Additional Information

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Research Tools & Approaches

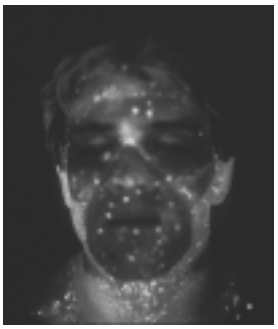
Hazard Control Technology

Diagnostic Approaches

Intervention Effectiveness

Surveillance Research Methods

The final category includes four subtopics that address how occupational health and safety research can have a positive impact on farming. New production techniques require novel methods for controlling exposure to physical and chemical agents, and for reducing risk of injuries. The ability to provide accurate and timely diagnosis plays an important role in the prevention of agricultural-related occupational illnesses, and can help properly classify disease as work-related. Evaluation of the strengths and weaknesses of interventions can provide valuable information for those working in and serving the farming community. Finally, surveillance programs are a cornerstone of public health practice in areas such as infectious disease control, but have yet to be established systematically for diseases related to agriculture. Basic demographic, incidence, and prevalence data are needed to inform research and intervention programs. Creative effort will be needed to make such programs successful and cost-effective for Northwest farming.



Hazard Control Technology

A variety of engineering, administrative, and worker protection techniques can be used to manage health and safety hazards. These may include design changes to equipment, modifications to training efforts, or the design and proper use of personal protective equipment. Important concerns in Northwest farming include tractor rollover protection, mitigation of pesticide drift and applicator exposure, chemical product substitution, and improved techniques for livestock management. Basic and applied research is needed to identify, evaluate, and develop both health-effective and cost-effective control strategies for specific hazards, and to assure their wide dissemination in the farming community.

[NIOSH NORA: Control Technology and Personal Protective Equipment]

Importance

Workplace health and safety hazards are normally mitigated by a hierarchy of control techniques, with engineering controls, administrative controls, and personal protection employed where appropriate. Engineering controls offer an opportunity to design a hazard out of the production process. The replacement of a hazardous insecticide with a less hazardous product, for example, can reduce risk for many workers across an entire industry. Technologies that reduce equipment noise or minimize human contact with hazardous chemicals can have an immediate impact on illness rates. Guard devices on equipment can prevent injuries and save lives. Administrative controls focus on proper management of the workplace. For instance, some Farm Summit participants felt that emphasis on wage-based labor rather than piecework could prevent many serious injuries. Finally, personal protective equipment, and training in its proper maintenance and use, is often the last resort for reducing hazardous exposures. The use of chemical protective gloves during pesticide handling is known to be an effective means of reducing skin exposure, but care must be taken to ensure that the glove material is chemical-resistant and that the gloves do not interfere with efficient work practices.

Opportunities for research cited at the Farm Summit and during telephone interviews included personal protective equipment, bioengineering, machinery design, livestock management, and labor activities. Several Farm Summit participants noted the high number of accidents due to machinery, particularly with respect to tractor rollovers. The need for improved machinery design, proper maintenance, and safe use of machin-

ery and equipment was emphasized during discussions. Recommended solutions included installing rollover protection (ROPs) devices, collaborating with manufacturers to develop innovative designs, developing feedback loops to manufacturers, and improving readability of warning stickers.

Participants also noted the importance of new training methods. Specific topics included financial management for farmers, stress management, consistent safety materials, hazard recognition, translation of rules and requirements into action, proper ways to handle accident victims, and a safety and health resource catalog for the Northwest.

A public agency official suggested a new form of training for medical professionals. He recommended using telemedicine for one-on-one consultations with rural physicians. New computer technologies could provide valuable tools for rural medical practice and increased occupational health and safety training of primary care providers.

A private health and safety consultant also suggested standardized training for farm workers and managers. He said that uniform training, similar to other industries, should be available. This training should focus on good practices and bring information to those working in the agricultural field. He noted that basic safety training that could apply to various jobs would be a useful foundation. Employers would know that workers had some fundamental health and safety training. Another training recommendation was to bring the information directly to workers in the field. One example was employing a school bus equipped with audiovisual aids and encouraging hands-on instruction.

Research Opportunities

- Use computer simulations to design safer agricultural machinery
- Develop design standards
- Assess existing solutions
- Identify methods that encourage adoption of existing agricultural safety solutions by industry
- Document hazards specific to commodity groups

Additional Information

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A Guide to Agricultural Tractor Rollover Protective Structures: *http://www.marshmed.org/nfmc/rops/default.htm*

Diagnostic Approaches

Accurate and timely diagnosis of work-related illness and injury is essential for proper treatment. Many diseases can be caused by a combination of workplace exposures, nonworkplace exposures, and preexisting conditions. Research is needed to develop new methods of diagnosis, and to link diagnoses with specific workplace exposures. Rural health care professionals need further training in this area, particularly in the identification and treatment of dermatitis, heat stress, and pesticide exposure.

[NIOSH NORA: Not included in the NIOSH NORA document]

Importance

Proper diagnosis of work-related illness and injury in agriculture can be difficult for the clinician. Many patients present with nonspecific symptoms, such that a specific cause is difficult to pinpoint. A disease may be the result of preexisting conditions and of recent exposure. Workers who have recently arrived to the Northwest may not have medical records for the clinician to review. And it is often not possible for a diagnosis to be informed by a detailed understanding of work processes and workplace conditions. All of these factors make accurate diagnosis extremely challenging. Many Farm Summit and telephone interview participants recommended further advancement in diagnostic approaches in the field of agricultural health and safety and the need for new methods to identify agricultural-related occupational illnesses. Health care providers also need to be better informed and motivated to learn diagnostic methods specific to agricultural work.

Specific areas for improved diagnostic approaches were identified as heat stress, pesticide exposure, and dermatitis.

Research Opportunities

- Improve the means for identifying agricultural-related disease and injury for the Northwest medical community
- Provide cross-cultural training to health care professionals performing diagnoses

Additional Information

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Intervention Effectiveness

Various health and safety interventions can prevent workplace illnesses and injury. These methods can include control technologies, guidelines and regulations, worker participation programs, and training. Interventions in current use could be improved by research evaluating their effectiveness. Such interventions include government regulations, enforcement procedures, improved chemicals, and educational programs for children.

[NIOSH NORA: Intervention Effectiveness Research]

Importance

Changes are often introduced into agricultural production with the intent of preventing or reducing illness and injury. Yet in many cases, the effectiveness of these changes remains unknown. Evaluation of interventions is a relatively new area of research in occupational health and safety. Such investigations can be expensive, and may seem unnecessary, particularly in cases where the intervention is relatively straightforward. In many other cases, however, there may be several intervention options, and their relative impact is an open question. Intervention effectiveness prompted much discussion among Farm Summit and telephone interview participants. Topics included a range of issues that could be subject to evaluation.

Participants frequently questioned the effectiveness of enforcement agencies. Suggested areas for change included:

- Improve communication between agencies.
- Make regulations more relevant.
- Provide better training to inspectors and agents that would address differences in languages and cultures.
- Include technical assistance and training to induce compliance, and use punitive measures, e.g., public list, if compliance is not met.
- Write rules in an understandable format.

Participants also suggested improved health and safety training methods for various audiences, including farmers, physicians, legislators, farm workers, and child laborers.

Farm Summit attendees and telephone interview participants recommended assessing the effectiveness of agricultural equipment and techniques. An extension agent said that personal protective equipment and respirators are not comfortable to wear during the summer months. He suggested a project to improve the comfort and ease of personal protective equipment and measure the subsequent change in workers' use of these devices.

Research Opportunities

- Improve enforcement processes
- Measure the effectiveness of voluntary protection programs
- Review and identify factors affecting enforcement effectiveness, e.g., agency resources, politics, bilingual/cultural investigators
- Evaluate safety and health information dissemination
- Assess the validity of cholinesterase field measurements kits
- Investigate the impact of safety interventions
- Evaluate personal protective equipment
- Explore the effectiveness of safety equipment
- Evaluate Farm Safety Day Camps
- Evaluate the ability of material safety data sheets to convey information to agricultural workers

Additional Information

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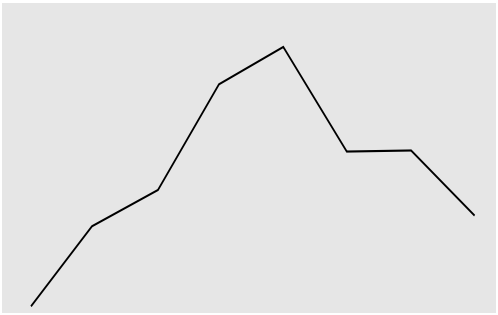

Surveillance Research Methods

Surveillance systems are an important foundation for setting research priorities as they find answers to the questions, "who, what, why, where, and how." The public health community relies on surveillance information to set research and prevention priorities, but gaps in many existing systems limit their usefulness. Surveillance systems in farming need to be updated and expanded, and new methodologies for data collection and evaluation need to be developed.

[NIOSH NORA: Surveillance Research Methods]

Importance

Public health surveillance is central to the process of disease prevention. Modern disease prevention and health promotion programs are based on meaningful data systems. Repeated surveys using common definitions of illness or injury can lead to an understanding of trends in communities or worker groups. Data from such a surveillance system can be used to identify unusual patterns of disease, or can serve to evaluate the effectiveness of interventions. Few surveillance systems exist for illness and injury related to agricultural production. New methods are need to address the unique characteristics of rural populations and agricultural workers.

Research Opportunities

- Develop a number of different database systems. Examples included a database tracking the use of chemicals used in agriculture and prevalence of occupational skin disease
- Identify the location and trends of injuries and fatalities
- Study health and safety attitudes prevalent in farming communities

Additional Information

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