Using History and Accomplishments to Plan for the Future

A Summary of 15 Years in Agricultural Safety and Health, and Action Steps for Future Directions

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Foreword

The inspiration for this document arose out of general conversations among various individuals, specifically in discussions occurring at the annual meeting of the Agricultural Safety and Health Network (ASH-NET) in 1998. This discussion centered on the process and efforts a decade earlier that led to the publication of *Agriculture at Risk: A Report to the Nation* (Merchant et al. 1989) and the contribution that document made in increasing investments and national efforts related to the safety and health of the nation's family farms.

Discussions soon focused on the notable absence of a similar but current comprehensive document that looked at production agriculture and farmers, farmworkers, and their families. The passage of time and the changes within agriculture, and agricultural safety and health, since the publication of *Agriculture at Risk* called for another effort. Individuals' thoughts then turned to the possible uses to which a document relating current overall perceptions of the status of agricultural safety and health, and concrete recommendations on future research and program needs, could be put. Such a document could provide policymakers, public and private funding agencies, and the general public with a convenient and realistic summary of recent progress in, the current status of, and informed projections on issues of concern within agricultural safety and health.

With these discussions and thoughts fresh in their minds, the participants in ASH-NET undertook to serve as the coordinating body for a proposed project. This three-year project "Using History and Accomplishments to Plan for the Future: A Summary of 15 Years in Agricultural Safety and Health, and Action Steps for Future Directions" would pull together the different elements and technical expertise needed to produce a document aimed at refocusing attention on agricultural safety and health concerns.

These elements and expertise included agricultural safety and health researchers, educators, and program personnel; agriculture manufacturer and insurance association representatives; federal, state, and local government agency personnel; local medical, health, and emergency service providers; and practicing farmworkers and farmers. Although considerable research to access and better understand the views of farmers and farmworkers toward specific agricultural safety and health topics has occurred, it was equally important to access these viewpoints in real time.

I am profoundly grateful to all those whose contributions made this document a reality. Their expertise, time, energy, and forgone work opportunities all contributed to the fundamental roles they served. All of us sincerely hope that this endeavor will make a meaningful contribution in furthering the safety and health needs of the farmers, farmworkers, and their families involved in production agriculture, upon whom we are critically dependent.

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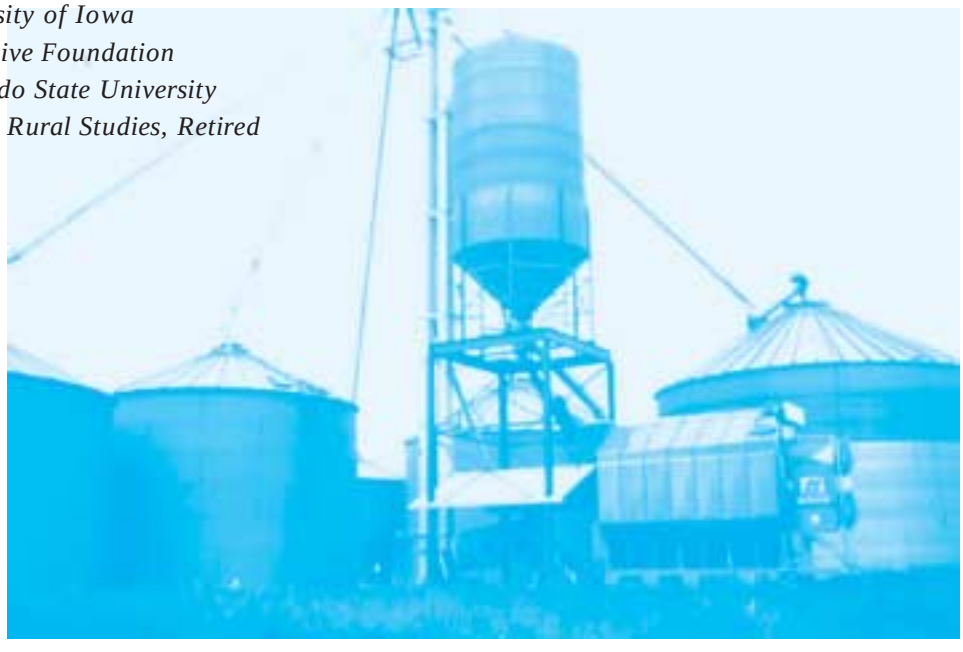

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Executive Summary: Recommendations and Strategies

Funding Recommendation

The U.S. Congress should provide funding to the several federal agencies referenced—through reallocation, redistribution, or additional, and as needed—for implementing both the research and nonresearch components of this report.

The impact of the many local, regional, state, and national private-sector contributions are recognized and most significant to the cause of agricultural safety and health, and those will continue. The magnitude and importance of the recommendations and strategies identified are mostly national in scope and require national resource assistance, the better to serve as a foundation and partner to those private-sector contributions.

RECOMMENDATION 1

Develop a specific federal research and surveillance agenda with measurable goals and objectives to reduce agriculture-related injuries, illness, and disease.

Strategies

A NIOSH should fund the development of goals and measurable objectives for agriculture producers, workers, and their families. Following a model similar to Healthy People 2010, a task force representing various agricultural health and safety disciplines would direct this initiative.

B Associated with Strategy A would be the development of an agriculture-specific National Occupational Research Agenda (NORA) within Centers for Disease Control and Prevention/NIOSH.

C Federal agencies and the land grant universities should develop strategies to implement the *National Land Grant Research and Extension Agenda for Agricultural Safety and Health 2003*.

D Include occupational injury and illness reporting, with location of injury, as a supplement to the annual National Health Interview Survey as an interim step until a mechanism to offset data omissions within current Bureau of Labor Statistics–based surveys can be implemented.

E DOL and NIOSH should coordinate the development, a comprehensive national nonfatal injury surveillance system comparable to the Census of Fatal Occupational Injuries (CFOI) that would be directed at women, older farmers, immigrant and minority workers (by race/ethnicity), the disabled, adult full- and part-time workers (both paid and unpaid), and cultural minorities for delineation of the extent of specific problems related to each of these populations.

Recommendation 2

Current funding for research and programming for special populations at risk within agriculture should be continued.

Strategies

A USDA should continue funding through its Cooperative State Research, Education, and Extension Service (CSREES) for National AgrAbility and associated state programs as a conduit to collect and disseminate information on injury, illness, and disease effects within agriculture and successful accommodation of those disabling conditions.

B Implement the specific recommendations relating to childhood agriculture injury prevention as produced by the National Children's Center for Rural and Agricultural Health and Safety (Lee et al. 2002).

C Implement the specific recommendations relating to improving the working conditions of migrant and seasonal adolescent farmworkers as produced by the National Adolescent Farmworker Occupational Health and Safety Advisory Committee (Vela Acosta & Lee 2001).

Recommendation 3

Strategies to improve the living and working environment of migrant and seasonal farmworkers should be implemented.

Strategies

A Federal funding for migrant health clinics should be maintained with expanded assistance to those clinics to assist in compiling surveillance data on diagnosis and treatment.

B Increase enforcement of current regulations relating to the current EPA Worker Protection Standard (WPS) and the Certification of Pesticide Applicators Standard (CAS).

C Evaluate components of the current EPA Worker Protection Standard (WPS) and the Certification of Pesticide Applicators Standard (CAS), in conjunction with local/regional farmworkers, to ensure that such training adequately reflects the actual conditions experienced by the workers.

D Evaluate the current protocols related to reporting agricultural chemicals, in conjunction with local/regional farmworkers, to ensure that the procedures are readily available to farmworkers and conducted in a manner that farmworkers find effective.

E Federal agencies funding research and services for migrant and seasonal farmworkers should require that those workers, both men and women or their designated representatives, be actively engaged in the planning and implementation of proposal objectives as a criterion for funding.

Recommendation 4

Model agricultural safety and health programs related to health care services, professional training, educating, and conducting applied research in community settings should be replicated and evaluated to determine their effectiveness in other agricultural communities.

Strategies

A USDA should target the development of information, assessment, and assistance programs that address underserved populations in ways that are culturally sensitive to the differences among populations and base such programs on the successes learned with the National AgrAbility program.

B NIOSH should revitalize the Agricultural Health Promotion System (AHPS) funding stream. Such funding could focus on combining lessons learned from previous (AHPS) funding with new findings from successful models of community-directed interventions.

C NIOSH should target specific funding within the Centers for Agricultural Disease and Injury Research, Education, and Prevention (Ag Research Centers) to form advisory committees of farmers and farmworkers to develop protocols for using community assets to collaboratively conduct technical, anthropological, and social science research within the agricultural communities.

RECOMMENDATION 5

Enhance collaborative efforts between professionals working in agricultural safety and health and professionals working in primary health care.

Strategies

A USDA should be allocated additional funds to designate a full-time national program leader for agricultural safety and health within the Cooperative State Research, Education, and Extension Service. Such a designation is not intended to supersede or replace currently delegated DOL, EPA, or OSHA oversight.

B In each state, USDA should fund a full-time state extension specialist in agricultural safety and health with matching operating funds from the state. This position would collaborate with the health specialist identified in strategy C below.

C In each state, NIOSH, HHS, or USDA should fund a full-time faculty position at a corresponding state university providing health professionals with matching operating funds from the state. Utilizing the agromedicine model, this position would deal primarily with rural primary care and would work in collaboration with the state extension specialist in agricultural safety and health.

D USDA through the university-based extension system should facilitate collaboration of professional organizations to provide for the continuing professional development of agricultural safety and health professionals and primary care providers and other health care providers on current issues related to the agricultural environment.

Recommendation 6

Increase the capacity to provide rural emergency medical services, agricultural occupational health services, mental health care, rehabilitation services, and education to the agricultural community.

Federal Strategies

A An interagency agreement between Department of Transportation/National Highway Traffic Safety Administration, Department of Homeland Security, Department of Health and Human Services, and United States Department of Agriculture should be developed to designate a single site with specific authority for administration and funding to ensure that rural emergency services remain an integral part of national emergency service capabilities.

B The Rural Emergency Medical Service Training and Equipment Assistance Program, authorized in the Health Care Safety Net Amendments of 2001 (P.L. 107-251), should receive funding appropriations as designated through the U.S. Department of Health and Human Services and administered by the Health Services Resources Administration.

C The National Institute of Mental Health/Office of Rural Mental Health Research and the National Advisory Committee on Rural Health and Human Services/Office of Rural Health Policy/Health Resources and Services Administration should work collaboratively in developing a National Center for Agricultural Behavioral Health to facilitate the interface of research and service delivery relating to addictions, mental health, and social psychological distress found in the agricultural setting.

D Target musculoskeletal disorders for CDC/NIOSH funding and support for expanded field intervention and prevention in cooperative partnerships with farmers and farmworkers.

State Strategy

E State university–based Cooperative Extension offices should establish formal relationships with state Public Health Departments and state Environmental Protection Agency offices to facilitate the formation of a task force to provide pesticide prevention programs for farmers, migrant/seasonal farmworkers, and their families, as well as rural residents.

Local Strategy

F Recruitment and retention of rural emergency volunteers should be the topic of in-depth research at the community/squad level in order to understand the problem. Subsequent planning and action should be based on the findings of that research.

Recommendation 7

Enhance determinant research that examines how various risks and protective factors affect the health of the agricultural community.

Strategies

A NIOSH, NIEHS, and EPA should continue funding investigations related to improved assessments of indoor air exposure for confinement workers and better define Recommended Exposure Limits (RELs, NIOSH) and associated Permissible Exposure Limits (PELs, OSHA) to reflect any dose-response relationship found.

B The EPA should target additional technical, epidemiological, and exposure assessments to define the emission elements responsible for specific community effects found with large confinement animal production.

C BLS and NIOSH should collaborate to allocate funding, similar to NIOSH Sentinel Event Notification System for Occupational Risks (SENSOR) projects, toward protocols to improve the delivery of standard medical surveillance to agricultural workers, including improved reporting and tracking of occupational injury and illness.

D NIOSH and privately and publicly owned corporations should increase efforts toward the standardization and improvement of biomarker assessments relating to agricultural illness and disease.

E EPA and privately and publicly owned corporations should target funding for research to establish causal linkages or dose-response relationships between chronic illness and pesticide exposure; critically important is research into potential endocrine disruptor effects of pesticides.

F The National Cancer Institute should target funding for long-term research on the possible association of nitrate in drinking water with cancer risks that addresses the inherent weaknesses of currently available case-control and ecological studies.

Recommendation 8

Apply to the fullest extent current advances in engineering and application technology to reduce fatalities, injuries, illness, and disease in the agricultural community.

Strategies

A Continue dissemination and evaluation of the recommendations to reduce tractor-related injuries and deaths produced at the Tractor Risk Abatement and Control policy conference (Donham et al. 1997), particularly with those audiences whose collaboration will be needed to enact said recommendations.

B USDA, through the Cooperative State Research, Education, and Extension Service (CSREES) and the university-based extension system, should take the lead in facilitating the application of industry-wide, low-cost ergonomic interventions and commodity-specific standardization of improved ergonomic tools, using successes such as those in the NIOSH publication *Simple Solutions: Ergonomics for Farm Workers* as a model.

C American Society of Agricultural Engineers and Society of Automotive Engineers, through voluntary standards, should facilitate the use of universal design concepts to foster the development of high-quality and task-specific materials for use in safety and health equipment for the disabled.

Recommendation 9

Investigate the safety and health impacts of the annual exemptions from federal agency enforcement of regulations applied to agriculture.

Strategies

A Form a task force composed of individuals representing farm organizations, farm employer organizations, farmers, farmworkers, appropriate researchers in pertinent fields, agricultural health care providers, and applicable governmental agencies to evaluate the overall impact of two important exemptions now applied to agriculture. NIOSH funds channeled through the Ag Research Centers would cover the travel and lodging of task force representatives. The two exemptions to be evaluated include:

1. "U.S. Department of Labor should exclude from OSHA protection all agricultural workers in agricultural operations employing 10 or fewer non-family workers within the past 12 months, and having no temporary labor camps in the last 12 months. The U.S. Department of Labor has interpreted this to mean that whenever a farm operation has more than 10 workers employed on any 1 day, the operation is subject to OSHA regulation" (Runyan).
2. "Permit Required Confined Spaces (PRCS) and under OSHA's guidelines, can only be entered by developing and following a plan addressing the hazards found in that space. The characteristics of a PRCS, are found under OSHA's Confined Space Standard (29 CFR 1910.146) but family farms are exempted from the PRCS standard" (Steffen).

Prologue

One of the fundamental objectives of this project was the integral inclusion of all of those who actually face the hazards associated with production agriculture on a daily basis. As much as we would have liked to include *all* of the variety of individuals this encompasses, the diversity of the farmers and migrant/seasonal farmworkers who could participate is gratifying, as they represent many of the types of farming and farm work environments found across the United States. These participants tell us that they were informed by the presentations and discussions, and were likewise appreciative of the opportunity to inform and relay their personal experiences to others. The consensus process that followed the conference was necessary to flesh out basic differences in opinion and to reach the degree of understanding that is reflected throughout this document.

Such inclusion served to allow one-on-one and group interactions that are not commonly available, particularly to those working directly in production agriculture. All involved suffer from limited exposure to the difficulties faced by others, though in many cases the difficulties are similar. This unfamiliarity may be due to a lack of previous interaction or little publicity of others' conditions within the groups' separate realms. And for those speaking a language other than English, there are natural communication barriers and transportation difficulties that preclude direct, meaningful interaction. Concerning health and safety in particular, there are many specifics that are common to all involved. However, there are also items unique to each group (farmers or workers), and these need to be noted.

Certain agricultural safety and health concerns were at once seen as common to both farmers and migrant/seasonal farmworkers. An excellent example is the concern about the lack of adequate medical services in rural areas and the high cost of those services that can be found. This problem points to the need for better training of health professionals in common agricultural environments and increased awareness of the lesser-understood migrant/seasonal farmworker health issues.

Other common laments were vulnerability to outside forces for the prices received for goods (commodities) or services (labor) and the high cost and limited availability of health insurance. Both farmers and farmworkers have very little control over the prices they receive. Farmers may use contracting or forward pricing but have little influence on the prices offered. Farmworkers may try organizing, but changes in season and locale, as well as the lack of a legally sanctioned right to organize, make sustaining improvements difficult. Both groups face difficulties in obtaining health insurance at costs that are affordable, even if it is available. Although state or federal programs may be available, many family farms face eligibility problems related to assets while farmworkers face time restrictions within any one location. Farmers or spouses may take off-farm jobs to obtain such insurance, but farmworkers, due to restrictions of movement, language, education, or documentation, lack that option.

Many farmers and farmworkers feel that this lack of control over prices received can have a direct relationship on safety and health and needed services, and they are receiving support. The United States Department of Agriculture in 1997 appointed the National Commission on Small Farms to review the status of small farms and determine a course of action for the USDA. This commission challenged the USDA "to be more cognizant of how we produce an abundant, safe food supply; to recognize the full diversity of contributors to this goal; to ensure that the market accommodates all producers fairly; and to recognize different needs and contributions of the diverse farm operations in this country" (USDA 2000).

The commission report, *A Time to Act*, states:

> "As farm size and absentee ownership increase, social conditions in the local community deteriorate. . . . Communities that are surrounded by farms that are larger than can be operated by a family unit have a bi-modal income distribution, with a few wealthy elites, a majority of poor laborers, and virtually no middle class. The absence of a middle class at the community level has a serious negative effect on both the quality and quantity of social and commercial service" (p. 20).
>
> Thus health and safety issues cannot be separated from the larger political and economic context. Inadequate levels of health and safety for both farmworkers and farmers is but one symptom in an overall agricultural economy in which small producers (the "family farmers") are being squeezed out of the market, and farmworkers' wages and conditions are stagnant or declining. (Mandelbaum)

Other agricultural safety and health issues required some discussion to bring to light the common basis and the unique differences. Many workers on farms, be they full-time or seasonal, accept certain inherent working conditions and responsibilities within the work place and within specific fieldwork because they are the same ones incurred by the farmer/owner/employer. In other cases, even though the worker voluntarily offers his or her services for hire, there is an additional "power" issue involved. Migrant/seasonal farmworkers are by nature temporary in terms of employment and locality. Language barriers, dependence on employer housing and/or transportation, and immigration status may all contribute to the worker having little "power" to control his or her situation. An additional stress is the need to maximize earnings during the short season. The entire season for work in certain areas may be only five or six months. If the farmworker is migrant and is following the work as plants reach a critical stage (e.g., picking fruit), there is even less time in which the worker will be in one location. The short duration of stay makes workers particularly vulnerable not only to natural difficulties such as weather, but also to any forced requirements such as length of workday or hourly pay. Such pressures can increase workers' sense of having little power over their predicament.

This perceived power imbalance can lead to a situation of refraining from complaining about, much less reporting, safety or health violations. These situations can arise either in the formal workplace or in the residences located at or near the workplace. This situation can also lead to a farmworker's continuing to work following an injury or illness because doing otherwise would mean lost wages. There are many conscientious production agriculture employers who seek to meaningfully address this issue. However, we should not use examples of the conscientious in an attempt to mitigate the human impact of those who are not.

Another issue about which meaningful information and personal realities were exchanged related to migrant/seasonal farmworkers' experiences with the H-2A Guestworker visa program [Labor Certification Process for Temporary Agricultural Employment in the United States (H-2A Workers)]. This program allows agricultural employers to fill labor shortages with temporary foreign workers. One of the fundamental concepts in the H-2A Guestworker program is that an employer who applies for permission to hire temporary foreign workers may not offer employment terms that "adversely affect" the wages and working conditions of similarly employed U.S. farmworkers (Mandelbaum; Niedda). Discussion of the H-2A program led directly into the topic of undocumented workers.

The general initial reaction to this issue was "How does this apply to this particular safety and health effort?" It was pointed out that the program is perceived to discriminate against women and older farmworkers by a preference for younger, male workers. Instances occur under the program where women are paid less than men for the same work and older workers receive less as they work more slowly, rather than not work at all. The economic needs of the extended family may lead to children also working for hire. It was noted that children, women, older workers, and minorities have already been designated as "special populations at risk" for occupational health concerns. Combined with the aforementioned "power" issues, language barriers, housing locations, and transportation concerns, this led to acknowledgment that workers contributing to production agriculture under the program face numerous anxieties related to their safety and health. Regardless of personal views on policy, enforcement, or necessity, the farmworkers themselves spoke powerfully on the topic.

This section closes with two submissions: "The Disadvantages of the Undocumented Farmworkers" and "Thoughts from a Family Farmer." Because one of the primary goals of this project was the inclusion of individuals who routinely face agricultural hazards, it naturally followed that space should be provided for representatives of farmworkers and farmers to speak for themselves. Please read their earnest words closely.

The Disadvantages of the Undocumented Farmworkers

Piece written by Aspacio Alcántara (CITA)

Undocumented workers do not have the same legal protections.

They work under the fear and threat of being incarcerated, fined, or deported as if they were criminals.

Their legal status makes them vulnerable to the abuses of crew leaders and growers who threaten to call the INS (immigration).

They are afraid to make complaints or report violations in regard to labor laws, like if they get sick or poisoned from working in a field sprayed with pesticides.

They are denied the opportunity to obtain a driver's license to be able to drive cars, trucks, tractors, or other vehicles that are used in agriculture.

Regarding their health and that of their families, they do not have the opportunity to acquire health insurance or seek the necessary medical attention in case of illness.

They do not qualify for unemployment or disability benefits.

They have many problems in obtaining credit, bank accounts, in order to rent or buy a home where they can live with dignity.

Immigration status directly affects the education of their children, who also do not qualify for higher education.

For lack of immigration documents, many doors are closed for farmworkers, whose only crime is to work to survive poverty and produce wealth for this country. This profoundly affects the self-esteem of these farmworkers, who are treated like third-class workers, very similar to slavery of the past.

All this and much more, like the danger and humiliation of crossing the Border, are the obstacles that our fellow farmworkers confront day after day, doing the work that the citizens of this country do not want to do.

For all these reasons, we consider the theme of health and safety in agriculture in the United States be seen and understood as an integral part of the migratory status of farmworkers.

Farmworker Groups Represented

CATA—El Comité de Apoyo a los Trabajadores Agrícolas
CITA—Centro Independiente de los Trabajadores Agrícolas
FHSI—Farmworker Health and Safety Institute
FWAF—Farmworker Association of Florida
MWUC—Men & Women United in the Community

Thoughts from a Family Farmer

Christine Freehill, Strawn, Illinois

Economic Issues

Farmers want to "do the right thing" for their families, communities, employees, and land; however, the costs are often prohibitive.

It is difficult to include "non-essential" items in a farmer's budget because of the uncertainty of income from year to year.

Operational costs in agriculture rise disproportionately to income, which makes including safety and health expenses difficult if not impossible for many farmers.

Social Issues

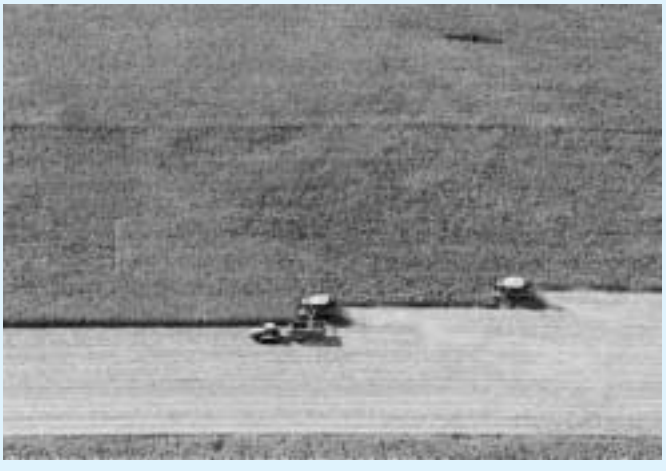
"Farmers" are rapidly becoming several different groups with vastly different interests—older farmers just trying to survive until retirement; young, aggressive farmers utilizing technology to implement agriculture on a large scale; part-time farmers that have full-time off-farm employment; and niche/boutique farmers that produce specialty products on small acreage. Each of these groups has different attitudes about safety and has different needs regarding safety and health.

There is a perception by the non-farming population that farming is a quaint way of life. This is not true. Farming is big business (no matter what the scale of the individual farmer).

Farmers breathe the air, drink the water, and live near the fields they farm. We are as interested in protecting these resources as our non-farming neighbors. The perception that farms are rampaging our natural resources out of greed or laziness is unfair and only serves to widen the rift between agricultural and non-agricultural interests.

Physical/Psychological Issues

Farmers don't want others in their community to know when they are experiencing financial problems for fear of losing leased ground or losing the opportunity to lease more ground if landlords become aware of their problems. This decreases the likelihood they will seek help from outside resources and increases stress levels.



Farmers and farm families suppress feelings of stress and anxiety to avoid appearing weak. This prevents people from realizing they need help until it is too late.

The physical demands and hazardous exposures in agriculture are often unrecognized by primary care providers.

Primary care providers often don't recognize the potential for hazardous exposures in the family members of farmers.

Methods

The project "Using History and Accomplishments to Plan for the Future: A Summary of 15 Years in Agricultural Safety and Health, and Action Steps for Future Directions" was envisioned with three complementary and overlapping phases: a conference in the first year, a work-group process in the second year, and development of a draft document for review and publication of a finalized document in the third year. The effort constitutes a *consensus* process, with the objective of representing as many of the diverse views of agriculture as possible and combining academic rigor and personal, practical perceptions to inform participants in reaching agreement on the recommendations put forth.

The conference, "An Agricultural Safety and Health Conference: Using Past and Present to Map Future Actions," was designed as a forum for those with expertise in the field of agricultural safety and health to present their thoughts, perceptions, and findings on current pertinent topics through presentations and discussions. This expertise included researchers, educators, and program personnel; agriculture industry and organization representatives; federal, state, and local government agency personnel; and practicing farmworkers and farmers. This base of knowledge set the stage for the work-group discussions in the second year.

The consensus work-group process was designed as a mechanism to secure reflective input from individuals representative of the diverse participants in agriculture. Six work groups were formed, each with a designated facilitator (Delbecq et al. 1975), to examine three key questions (Donham et al. 1997; Meyers 2001) that would help guide discussions:

1. What are the current gaps, needs, and oversights in current activities related to agricultural safety and health?
2. What are your suggestions on how to address the current gaps, needs, and oversights in activities related to agricultural safety and health?
3. What do you see as barriers to implementing your suggestions for addressing the current gaps, needs, and oversights in activities related to agricultural safety and health?

The initial work-group sessions were followed by scheduled teleconferences and other interactive formats to provide all participants with summaries from other work groups on which to base additional discussion. This phase concluded with a face-to-face meeting to address unresolved questions and comments that arose during the process.

The draft document developed in the third year used the information and discussions from the conference and the response summary from the work-group process as the content base. After initial review and comment from the project planning committee, the draft document was circulated to all conference participants as well as numerous organizations, agencies, and other interested parties for additional review and comment. The finalized document was then distributed to all for endorsement.

Highlights of Progress in Agricultural Safety and Health

The following is an incomplete compilation of specific initiatives and programs that have originated since the 1989 publication of *Agriculture at Risk: A Report to the Nation** up to the "Using Past and Present to Map Future Action" conference. This selective listing is aimed at showing the breadth of activities, both public and private, that constitute generally acknowledged progress in the realm of agricultural safety and health. Of course, any such partial listing will obscure many other meaningful and worthwhile actions that have taken place. Toward those, no slight is intended.

- Significant, and often underestimated, private-sector and not-for-profit initiatives for funding and provision of in-kind services to assist others in agricultural safety and health programming and in leveraging funds for such programs and research, equipment, materials, and guidance.
- Establishment of the National AgrAbility program to assist disabled farmers and their families with funding provided by the U.S. Department of Agriculture (USDA) through land grant universities working in conjunction with nonprofit disability-related organizations.
- The primary role of the National Institute for Occupational Safety and Health (NIOSH) in focusing intramural and extramural research and education programs related to agricultural safety and health. Extramural funding includes 10 Centers for Agricultural Disease and Injury Research, Education, and Prevention (Ag Research Centers) based at institutions around the country.
- The Environmental Protection Agency's announcement of major revisions in the Worker Protection Standard and subsequent authorization of full implementation of the standard.
- Establishment of the National Children's Center for Rural and Agricultural Health and Safety as a focus of NIOSH extramural agricultural safety and health research and education programming.
- Increased support by NIOSH through selected NIOSH Education and Research Centers (ERCs) for agricultural safety and health academic preparation of students and in-service training of professionals.
- Continuation and expansion of programs such as the South Carolina Agromedicine partnership of health and agricultural professionals and the Iowa Center for Agricultural Safety and Health's Agricultural Occupational Health Training Program for local community health care providers.
- The Pesticides and National Strategies for Health Care Providers initiative, sponsored by the U.S. Environmental Protection Agency (EPA), the U.S. Department of Health and Human Services (HHS), the U.S. Department of Labor (DOL), and the USDA.

*A substantive review of the progress made on specific recommendations in *Agriculture At Risk: A Report to the Nation* by initiative category (Legislative, Research, Occupational Health and Safety Delivery, Education, and Coalition) can be found in a peer-reviewed article in the *Journal of Agricultural Safety and Health* (Donham & Storm 2002) based on their paper prepared as a part of this project (Donham).

- Publication by the American Society of Agricultural Engineers of the *Journal of Agricultural Safety and Health* (*JASH*), which is indexed or abstracted in 12 agricultural, environmental, governmental, medical, and professional sites, including Medline and Agricola; and the Haworth Medical Press publication of the *Journal of Agromedicine* (*JOA*), which is indexed or abstracted in 19 agricultural, environmental, governmental, medical, and professional sites, including Agricola and the Cumulative Index to Nursing & Allied Health Literature.
- NIOSH funding for state surveillance of occupational disease and injuries and the development of model population-based programs targeting farmers, farmworkers, and farm families.
- The Agricultural Health Study, undertaken as a collaborative effort with the National Cancer Institute (NCI), the National Institute for Environmental Health Sciences (NIEHS), and the EPA to follow a cohort of farmers for at least 10 years to document specific outcomes of agricultural exposures.
- Funding by NIOSH, NIEHS, EPA, NCI, and National Institute of Mental Health of programs to enable research into specifics of agricultural chemical toxicity, organic dusts and gases, and associated environmental hazards.
- W. K. Kellogg Foundation funding of the Agricultural Safety and Health initiative, which included 11 demonstration projects involving collaborative efforts between institutions and communities at the local, regional, and state levels.
- Targeted funding sources, such as NIOSH Community Partners for Healthy Farming and NIEHS Environmental Justice: Partners in Communication, to foster the development and evaluation of public/private/not-for-profit community efforts assisting farmers, farmworkers, and their families.
- National initiatives such as Progressive Farmer Farm Safety Day Camps and Farm Safety 4 Just Kids, facilitating and guiding local collaborative efforts to address childhood agricultural safety and health concerns.
- Provision by agribusiness (i.e., equipment, chemical, insurance, seed, feed, grain, insurance, media, health, and medical services) and its local representatives of incentives and assistance with specific activities such as Rollover Protective Structures (ROPS) at cost-of-production prices, personal protective equipment, educational programs, and health screenings.*
- Education and training programs for agricultural safety and health professionals such as the National Institute for Farm Safety's Professional Improvement seminars and courses and the National Safety Council's National Education Center for Agricultural Safety.
- Publication of various agricultural safety and health texts and references addressing the scope and depth of occupational injury, illness, and disease hazards; prevention; treatment; and accommodations for disabling conditions.
- NIOSH establishment and maintenance of the National Agricultural Safety Database as a World Wide Web–based resource.

*A nice summary of private-sector perspectives related to childhood agricultural injury prevention is available from the Purdue University Agricultural Safety and Health Program (Purdue University 1997).

- USDA establishment of the NCR-197 Committee on Agricultural Safety and Health Research and Extension, with the purpose of utilizing the land grant system's research and extension capacity in conjunction with the expertise of those living and working in agriculture to reduce work-related injury, illness, death, and property loss.

An important caveat to this listing of accomplishments is that regardless of progress made, much attention is still needed on all fronts. To this end, the recommendations and strategies that follow represent an effort to provide some direction to continue the progress made and to foster advances in several areas that are in need of further consideration and additional examination.

Current Status of Agricultural Safety and Health in the United States

The conference presentations and attendant discussions provided a snapshot of current perceptions relevant to agricultural safety and health. These presentations and discussions also provided insight into many of the changes that continue to impact production agriculture. The following summary provides a glimpse of the issues noted.

Demographics

The total number of farms is now approximately 2.2 million, and concentration within production agriculture continues. The increasing concentration is evident not only in the growth of the average size of farms, but also in the fact that 20% of the farms enumerated produce almost 100% of the renewable fuels, 90% of the renewable fibers, and 80% of the foods or foodstuffs (Gunderson). This concentration can also be seen in management practices in dairy, cattle, poultry, and especially in swine (Thu). Hispanic farmers represent the fastest-growing category of new farmers (work groups). A recent seven-year average reveals that approximately 2.25 million full-time workers are employed in production agriculture. However, the most recent estimates indicate that the number of full-time workers has fallen below 2 million for the first time (Hard).

The number of women farm operators and mangers continues to increase, with 23.1% of farm operators and managers and 19% of farm workers being female. Overall, the percentage of women participating in agriculture is increasing faster compared with other business segments. The percentage of women farm operators and managers listing agriculture as their primary occupation, 45%, is now nearly the same as the percentage of men, 50.1% (McCoy).

The proportion of farmers age 55 and older continues to rise, now 61%, while the percentage of farmers less than 35 years of age continues to fall, now 8% (Hernandez-Peck). Older farmers continue to be at highest risk in terms of fatalities from tractor overturns (Hard).

Specific emphasis has been made in recent years on increasing the amount and quality of data available on *special populations at risk* (children, women, the elderly, minorities, disabled, selected others) within production agriculture. However, compared with white farm populations, the imbalance in the quantity of data available for these groups is extreme. This is particularly true for racial or ethnic minorities such as African-American, Hispanic, and various populations from Asia and the Caribbean. This imbalance applies also to cultural minorities based on socio-religious beliefs and practices, such as the Amish and the Old Order Mennonites, and to individuals with various physical or mental disabilities (Earle-Richardson; Jones; Field).

The total number of hired farmworkers has decreased but has recently stablized, and the expectation is that the number of hired farmworkers will begin to increase. As opposed to the trend of increasing age found with owners, hired farmworkers tend to be younger males who speak a primary language other than English, though women and families are also prevalent (Mandelbaum; Gunderson; Earle-Richardson). This projected increase is partially due to a decrease in the number of nonpaid agricultural workers, who now comprise the largest percentage of agricultural workers and many of whom are family members (Stallones; Shutske).

It is estimated that there are from 2.2 to 2.5 million farmworkers laboring within production agriculture. The lack of consistent definitions both among federal agencies and between studies and the environment within the work is performed makes precise enumeration difficult (Stallones). This difficulty is aggravated by the grouping of different ethnicities or races within an occupational group (e.g., migrant and seasonal farmworker), thus discounting ethnicity/race as a factor in individual worker health (Earle-Richardson).

The number of farm operators with physical disabilities continues to increase, while the increasing mean age has led to a higher prevalence of disabling due to age-related diseases. The most frequently occurring disabling conditions are spinal cord injuries and amputations (Field). As many as 288,000 agricultural workers between ages of 15 and 79 have a disability that affects their ability to perform one or more essential functions of life (Willkomm).

Emergency and Medical Services

A higher percentage of rural residents are over 65 (18% vs. 15%) and a higher percentage of rural elderly live in poverty (21% vs. 12%) compared with their urban counterparts. At the same time, this rural, elderly, and low-income population is primarily dependent on fire and emergency medical service departments *made up of volunteers,* who provide the only services for 80% of the U.S. geographic area and for fully 25% of the U.S. population (Erisman a). This condition is aggravated by the increased rural population (Gunderson). This situation naturally highlights the increasing scarcity of local medical services of all kinds—primary care providers, emergency rooms, clinics, ambulances, and emergency medical technicians—for *all* rural residents, either farm or nonfarm, but particularly those whose principal language is other than English (Erisman b; Lighthall; Rosmann). A primary concern for those individuals who do volunteer is training. Funding for emergency medical services training, which was established by federal funding, is no longer available through that source (Erisman b).

Behavioral Health

There has been an increased understanding of the unique mental health issues related to agriculture. The risk of psychological injuries, emotional and mental health impairments, relationship issues (including abuse), and substance misuse is similar to the risk of physical health injuries and illnesses: The likelihood of these undesired events increases with age, economic stress, and exposure to multiple distressing events at once. If there is one general conclusion that can be reached, it is that producing food and fiber as a way of life is associated with an increased likelihood of behavioral health perils. One direct indicator of this is the marked difference between the general population and farmers in suicide attempts per successful suicide (the general population has almost twice as many attempts per success). Another indicator is that the difference in negative mental health indicators between farmers and nonfarmers (with farmer indicators more negative) is greater than that found between rural dwellers and urban dwellers. In addition, specific information on behavioral health issues of farmworkers is almost totally lacking (Rosmann).

Fatalities and Injuries

On the nation's farms in 1997 there were 705 work-related fatalities and 50,544 work-related injuries (Runyan). The fatality rate per 100,000 workers in agricultural production is 25.8, compared with an all-industry fatality rate of 5.0. A specific segment of agricultural production, crop production, has an even higher rate at 36.5 (Hard). Research for more accurate fatality data on women in agriculture is slowly occurring (McCoy). More specific research on minority farm owners and farmworkers is occurring especially for African-American farmers in the South and Hispanics in the Southeast and the West. However, most of this research is geared toward men, with little data for women available (Earle-Richardson).

On U.S. farms, 104 individuals less than age 20 die each year. The fatality rate for workers ages 15–19 is the same as that for workers ages 20–54, over twice the average rate for all industries. In terms of specific age categories, 40% of the deaths among males occur between the ages of 15 and 19, while 40% of the deaths among females occur at age 4 or less (Lee; Vela Acosta).

Tractor overturns continue to cause the highest percentage of farm work-related fatalities (Hard). As many as 32% of agricultural deaths are tractor related, amounting to 270 occupational fatalities, 264,651 restricted work days, and 10,939 lost-time injuries per year (Myers). The increased size of machinery combined with the longer public roadway transportation distances due to larger farm size can be correlated to road collisions involving farm equipment, which now ranks as the second highest cause of farm fatalities (Redding).

In terms of nonfatal agricultural injuries overall, 61% occurred to the operator of the farm or to farm family members. The most common source of injuries are machinery and livestock, at 19%, with livestock handling being the specific work activity most frequently performed (28%) (Hard). As for nonfatal agricultural injuries to youth, 32,800 occur each year among workers less than age 20 years. During this same year, males will account for 80% of all injuries, and the majority injured will be white. The most common fatality cause will be "farm machinery including tractor," at 36%. During this same year, specific data for migrant and seasonal youth farm laborers indicate that 3,900 will be injured (Lee; Vela Acosta).

Other injuries also commonly occur on farms. Common, chronic back pain occurs in 26% of farmers and ranchers overall and affects 71% of swine producers. Arthritis of the hips and knees is routinely found in dairy farmers. In California nurseries, 49% of injuries result from sprains and strains, with 46% affecting the back specifically (Kirkhorn). Given the deficiencies in data, it is assumed that injuries in the farmworker population are undercounted. According to available data, the one-year prevalence of back pain in production agriculture is 1/2 times higher than the average in other industries (Chapman).

Illnesses and Diseases

Individuals working in the general agricultural environment face an increased prevalence of several acute and chronic respiratory diseases, with exposures to a wide range of respiratory toxins in concentrations higher than those found in other industries. In addition, though confined animal feeding operations (CAFO) may provide for improved working conditions overall, such facilities can also increase worker exposure to organic dust, bioaerosols, toxic gases, and endotoxins (found in organic dusts) (Kirkhorn; Von Essen). Research also shows that neighbors

of CAFOs report specific symptoms similar to those of workers within the facilities themselves (Thu). Regional differences are also found, with acute and chronic effects of inorganic dust on the respiratory system greater in dry-climate agricultural regions (Kirkhorn).

Several cancers are of concern within the production agricultural setting. Lip cancer, multiple myeloma, non-Hodgkin's lymphoma, and prostate, skin, brain, and soft-tissue sarcomas all have demonstrated associations with farming, but research findings remain inconsistent, with no consensus on causality. Several cancers have been associated with specific exposures to pesticide-related compounds, and those with the most direct exposures, especially farmworkers and pesticide mixers and applicators, may be at higher risk (Kirkhorn).

Non-cancer pesticide-related difficulties may take the form of skin irritation, eye irritation, fatigue, and headaches. However, chronic exposures have been associated with reproductive problems, particularly lymphomas and reproductive organ tumors. The effects in females include miscarriage, preterm delivery, and infertility. Adverse results have also been shown in ecologic studies with males. In addition, acute organophosphate poisonings have well-described effects on the nervous system, with additional burdens found with mixtures of pesticides. Another critical concern is the potential endocrine disruptor effect of pesticides (Kirkhorn; Fuortes).

As with fatality data, a problem with specific data on farmworker illnesses is undercounting. The areas of concentration on illness data are also similar to the case for fatalities. One detailed study indicated that 66% of farmworkers reported musculoskeletal pain in the past year and 22% reported chronic eye irritation. Of those responding, over 30% had never been to a doctor or clinic and 50% had never been to a dentist or an eye care specialist. Most carried a genetic predisposition toward certain diseases such as diabetes and high rates of obesity, increasing long-term risks of heart disease, hypertension, and stroke (Lighthall).

Nitrate contamination of surface water as well as groundwater supplies has been documented in many areas of the United States. This contamination has been found in concentrations exceeding one-half of the 10 parts per million level allowed by the EPA. Exposure to nitrate per se is not of particular concern, but nitrate can be reduced in the body to (*N*-nitroso compounds (NOCs)), which are some of the strongest known carcinogens. While there is concern regarding long-term exposure to higher levels of NOCs, data is lacking to address the possible association of nitrate in drinking water with cancer risk. There are also potential non-cancer health effects from direct nitrate toxicity, such as "blue baby syndrome." Firm relationships between these non-cancer health effects and nitrate are difficult to establish due to many confounding factors (Weyer).

Noise-induced hearing loss can be found in over 50% of the farming population. Many common pieces of equipment such a tractors, vacuum pumps, and feed-unloading machinery are associated with decibel levels above those deemed safe according to OSHA standards (Kirkhorn).

Biotechnology

Biotechnology has been both hailed as a majorscientific breakthrough and condemned as a precursor of dread. While work has been done on risk assessments related to food safety and environmental protection concerning new products of biotechnology, little has been done in relation to the effects of this technology on the workers involved in producing and processing the new organisms. Thus, there are diverging opinions on its use. There are indications that the use

of biotechnology may reduce exposure to traditional risks found in agriculture. The advantages claimed include fewer workers riding bean bars, fewer workers walking beans holding sharp tools, reduced persistency of Round Upcompared with the chemical it replaces, and reduced use of insecticides with the planting of Bt Corn. However, others claim that there is an overall lack of accurate information regarding genetically modified organisms and their consequences for both the consumer and worker, that genetic engineering can lead to "super weeds" that actually require more applications of stronger herbicide to kill them, that new allergens and toxins may unwittingly be produced, and that the true health implications of the genetically engineered organisms are not investigated before approval for use is granted (Shutske; Niedda).

Agricultural Safety and Health Professionals

One of the important movements within agricultural safety and health has been the cross-education and cross-training of safety professionals and medical/health professionals in the broad range of issues, concerns, and perspectives related to agriculture and its workers. Most safety professionals have undergone some exposure to aspects of human health in order to better perform their function in prevention and amelioration of undesirable incidents within the workplace. Medical/health professionals have recently received exposure to safety and prevention considerations outside that provided by public health education to be more informed about the unique exposures found within the agricultural environment. The cross-training movement has provided for more broadly informed and better-educated individuals in the two realms both separately and collectively. However, the ability of the "safety" field to continue to contribute to this cross-training is a matter of concern.

A review of the graduate programs approved by the Accreditation Board for Engineering and Technology, Inc. (ABET), the organization that certifies safety programs, reveals *no Ph.D. programs in safety,* and few master's programs (ABET 2003). A review of academic programs offered by the CDC/NIOSH-funded Education and Research Centers reveals *no safety-specific academic programs* offering safety training related to engineering or occupational health advanced degrees. This is relevant, as the mission of these NIOSH centers includes support of "academic degree programs and research training opportunities in the core areas of industrial hygiene, occupational health nursing, occupational medicine, and occupational safety, plus specialized areas relevant to the occupational safety and health field" (NIOSH 2003c). Reasons for the decline in graduate safety programs include (1) a strong employment market for those with baccalaureate safety degrees, (2) lack of incentives by employers for employees to pursue graduate safety degrees, (3) lack of faculty with advanced safety degrees—particularly Ph.D.s—to staff graduate programs, and (4) the fact that other graduate programs—particularly those that are health related—often integrate nonspecific safety content in their curricula in the belief that it will provide adequate preparation for their graduates. These factors added together are resulting in numbers below the threshold necessary for universities to maintain or initiate programs to produce safety graduates per se with advanced degrees. Thus, a pipeline for people with Ph.D.s—or, to a lesser extent, M.S. degrees—in safety no longer exists.

It is necessary to consider the potential consequences of the loss of a cadre of safety subject matter professionals to work alongside the extension, medical, health, education, and community professionals to address the issues found in the agricultural environment. (work groups).

Recommendations and Strategies with Rationales

Funding Recommendation

The U.S. Congress should provide funding to the several federal agencies referenced—through reallocation, redistribution, or additional, and as needed—for implementing both the research and non-research components of this report.

The impact of the many local, regional, state, and national private-sector contributions are recognized and most significant to the cause of agricultural safety and health, and those will continue. The magnitude and importance of the recommendations and strategies identified are mostly national in scope and require national resource assistance, the better to serve as a foundation and partner to those-private sector contributions.

RECOMMENDATION 1

Develop a specific federal research and surveillance agenda with measurable goals and objectives to reduce agriculture-related injuries, illness, and disease.

Strategies

A NIOSH should fund the development of goals and measurable objectives for agriculture producers, workers, and their families. Following a model similar to Healthy People 2010, a task force representing various agricultural health and safety disciplines would direct this initiative.

B Associated with Strategy A would be the development of an agriculture-specific National Occupational Research Agenda (NORA) within Centers for Disease Control and Prevention/NIOSH.

C Federal agencies and the land grant universities should develop strategies to implement the *National Land Grant Research and Extension Agenda for Agricultural Safety and Health 2003*.

D Include occupational injury and illness reporting, with location of injury, as a supplement to the annual National Health Interview Survey as an interim step until a mechanism to offset data omissions within current Bureau of Labor Statistics–based surveys can be implemented.

E DOL and NIOSH should coordinate the development of a comprehensive national nonfatal injury surveillance system comparable to the Census of Fatal Occupational Injuries (CFOI) that would be directed at women, older farmers, immigrant and minority workers (by race/ethnicity), the disabled, adult full- and part-time workers (both paid and unpaid), and cultural minorities for delineation of the extent of specific problems related to each of these populations.

Strategy

A Much headway has been made in agricultural safety and health, but there remain no stated goals or specific objectives to use in measuring and evaluating progress. Healthy People 2010 is designed to reach two overarching goals (1) to increase the quality and years of healthy life and (2) to eliminate health disparities. Healthy People 2010 outlines 10 leading health indicators, defines 28 focus areas that can apply to any or all of the indicators, and lists 467 specific objectives [see Office of Disease Prevention and Health Promotion (2003) for a listing of indicators and focus areas]. At least 22 of the focus areas can be said to apply directly to agricultural safety and health. However, even given this level of specificity, much information related to agricultural health remains obscure (Donham).

An example of a leading health indicator is *Environmental Quality*. A focus area directly associated with this indicator is *Environmental Health*, which contains 30 specific objectives to use as benchmarks to measure improvement. An example of a specific objective is "8-13. Reduce pesticide exposures that result in visits to a health care facility."

The American Association of Poison Control Centers is the data source for this objective and is said to cover approximately 93% of the population (Office of Disease Prevention and Health Promotion 2003a).

However, given agricultural circumstances such as migrant and seasonal labor with associated language difficulties and power perceptions, use of family member labor, overall lack of health care access, and the many citations of the lack of quality baseline data (Earle-Richardson; Fuortes; Kirkhorn; Lighthall; Mandelbaum; McCarthy; Niedda; Vela Costa; Weyer), it would be expected that agriculture pesticide exposure incidents are underreported. As NIOSH has been given the lead in the Healthy People 2010 *Occupational Safety and Health* focus area and is charged generally with research into agricultural safety and health issues, it is natural for NIOSH to facilitate this group. It is recognized that quality baseline data for measuring progress is scattered or missing, and this will need to be addressed as part of the goal and objective process.

Strategy B

In April 1996 NIOSH and its partners unveiled the National Occupational Research Agenda (NORA), a framework to guide occupational safety and health research—not only for NIOSH but for the entire occupational safety and health community. Before NORA, no national research agenda existed in the field of occupational safety and health, and no research agenda in any field had captured such broad input and consensus. NORA consists of 21 priority areas categorized under three main headings: Disease and Injury (eight priorities), Environment and Workforce (five priorities), and Tools and Approaches (eight priorities). Unfortunately, as is the case with the Healthy People 2010 objectives, many of the priority areas that specifically relate to agricultural safety and health use data that is ill defined, partial and scattered, or missing altogether. It makes sense to coordinate the specific research priorities of an agricultural safety and health NORA with the broader goals and objectives of an agricultural Healthy People initiative.

Strategy C

The NCR-197 Committee on Agricultural Safety and Health Research and Extension was established in 2000 with the goal to make more effective use of "the land grant system's research and extension capacity in cooperation with the expertise of those who live and work in agriculture to reduce work-related injuries, illness, death, and property loss" (NCR-197). This committee of 18 land grant universities selected a subcommittee to develop a draft of research and extension priorities. A series of drafts were prepared and circulated to the full committee and selected administrators for review, comment, and revision. The finalized draft document, including the 12 priority recommendations, was circulated to all land grant institutions and was approved for distribution and implementation by a portion of those institutions.

***National Land Grant Research and Extension Agenda for Agricultural Safety and Health 2003* (NCR-197),**

The research and extension priorities are not intended to be all inclusive of every potential significant topic that could be addressed by the land grant system. Nor should the list of topics be used to restrict ongoing or future research and extension initiatives of individual land grant institutions and their staffs. The list does, however, reflect an effort to identify broad areas of needed research and a modest attempt to prioritize them. It is recognized that additional topics may surface due to the introduction of new production and processing practices and pressure from public opinion.

1. Sensors and Guarding Systems
2. Operating Agricultural Equipment on Public Roads
3. Agricultural Confined Spaces
4. Emerging Technologies
5. Human Factors Engineering and Design
6. Management of Agricultural Emergencies
7. Livestock Handling and Housing Systems
8. Public Policy Issues
9. Capital and Management Intensive vs. Family Labor Intensive Operations
10. Fire Detection and Suppression
11. Agricultural Safety Education and Training
12. Special Populations and Enterprises

Strategy

D The current BLS National Health Interview Survey uses a fairly small sample and would contain wide confidence intervals for specific occupations such as farmers or workers in production agriculture. However, the addition of occupational injury and illness reporting that includes location of injury would add data that is not now collected. And the Bureau of Labor Statistics does not include family farms or farms that employ 10 or fewer people in their injury survey because these farms can not be required to maintain the records for injury/illness reporting. The latter circumstance arises from the annual legislative limitations on enforcement of Occupational Safety and Health Act regulations (Hard; Runyan; work groups). It is necessary to increase the data collected under the current instrument while a better collection apparatus is designed that would more fully describe the actual situation.

Strategy

E The Census of Fatal Occupational Injuries, part of the Bureau of Labor Statistics occupational safety and health statistics program, provides the most complete count of fatal work injuries available. The program uses diverse state and federal data sources to identify, verify, and profile fatal work injuries. Information about each workplace fatality (occupation and other worker characteristics, equipment being used, and circumstances of the event) is obtained by cross-referencing source documents, such as death certificates, worker's compensation records, and reports to federal and state agencies. This method ensures that counts are as complete and accurate as possible (BLS 2003).

As stated previously, gaps in data collection remain. Recognition of these gaps has fostered specific emphasis in recent years on increasing the amount and quality of data available on *special populations at risk* (children, women, the elderly, minorities, the disabled, selected others) within production agriculture. However, compared with white farm populations, the imbalance in the quantity of data available is extreme. This imbalance particularly applies to racial or ethnic minorities such as African-American, Hispanic, and various populations from Asia and the Caribbean. This imbalance applies also to cultural minorities based on socio-religious beliefs and practices, such as the Amish and the Old Order Mennonites, or to those with various physical or mental disabilities (Earle-Richardson; Field; Hernandez-Peck; Jones; McCoy; Rosmann; Willkomm). The recommendation for a more directed CFOI seeks to modify a current effort, even given its deficiencies, until a more complete program can be initiated.

RECOMMENDATION 2

Current funding for research and programming for special populations at risk within agriculture should be continued.

Strategies

A USDA should continue funding through its Cooperative State Research, Education, and Extension Service (CSREES) for National AgrAbility and associated state programs as a conduit to collect and disseminate information on injury, illness, and disease effects within agriculture and successful accommodation of those disabling conditions.

B Implement the specific recommendations relating to childhood agriculture injury prevention as produced by the National Children's Center for Rural and Agricultural Health and Safety (Lee et al. 2002)

C Implement the specific recommendations relating to improving the working conditions of migrant and seasonal adolescent farmworkers as produced by the National Adolescent Farmworker Occupational Health and Safety Advisory Committee (Vela Acosta & Lee 2001).

Strategy

A The AgrAbility project was created to assist people with disabilities employed in agriculture. The project links the Cooperative Extension Service at a land grant university with a private nonprofit disability service organization to provide practical education and assistance that promotes independence in agricultural production and rural living. While the USDA administers the AgrAbility project through CSREES, the project funds both a National AgrAbility program and several state AgrAbility programs. It is estimated that over 250,000 agricultural workers between the ages of 15 and 79 have a disability that affects their ability to perform one or more essential tasks. AgrAbility programs seek to offer assistance while also documenting the scope and needs of this population (Field; Willkomm).

Referring once more to Healthy People 2010, an identified focus area is *Disability and Secondary Conditions.* This focus area contains the specific objective "6-12. (Developmental) Reduce the proportion of people with disabilities reporting environmental barriers to participation in home, school, work, or community activities" (Office of Disease Prevention and Health Promotion 2003b).

The term *Developmental* in objective 6-12 indicates that insufficient data is available to provide a baseline on which to measure progress. Such being the case for the disability population in general, it is not surprising that an estimate is all that is available for those in agriculture. The number of farm operators with physical disabilities continues to increase, while the increasing mean age has led to a higher prevalence of disabling due to age-related diseases. The AgrAbility project should continue its successful state and locally directed efforts in assisting those with disabilities in agriculture.

Strategies B AND C

The prevention of injuries and fatalities to children as a result of agricultural production remains a top priority. With two major broad-based initiatives undertaken to identify the particulars related to childhood agriculture injury prevention, the current project seeks to complement and supplement those initiativess rather than redo their individual efforts. Presentations and work-group process discussions reiterated many details of childhood agriculture injury prevention, such as age-appropriate tasks and developmentally appropriate tasks, as well as confirming the overall goals and strategies identified in those processes and their published documents. A short summary of each project follows.

Strategy B

Childhood Agricultural Injury Prevention: Progress Report and Updated National Action Plan from the 2001 Summit **(Lee et al. 2002)**

Key Points

Numerous discussions were held with core advisors and multiple stakeholders throughout the course of planning, implementing, and completing tasks associated with the 2001 Summit on Childhood Agricultural Injury Prevention. Several key points continued to emerge, warranting special attention since they have applications to all the proposed future strategies.

- When considering childhood agricultural injury prevention strategies, we must acknowledge that education alone is insufficient. A multi-faceted approach, of which education is just one component, is warranted if we are serious about reducing the toll of childhood agricultural injuries.
- Wherever possible, systematic evaluation should be applied to existing and new programs and evaluation results should drive program modifications.
- Innovative strategies should be pursued that reflect agriculture's diversity of farm laborers, commodities, production methods, communities, and external forces, such as today's global economy.
- Concentrated efforts should be made to enable farm families, rural schools, farm and community groups, agribusinesses, and agricultural training programs to plan and implement these recommendations.

- Successes and failures regarding research and program activities should be broadly communicated in order to maximize progress toward achieving our goals.
- There is a continued need for a coordinating center that will keep this momentum moving forward.

Strategy C

***Migrant and Seasonal Hired Adolescent Farmworkers: A Plan to Improve Working Conditions* (Vela Acosta & Lee 2001)**

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.

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.

RECOMMENDATION 3

Strategies to improve the living and working environment of migrant and seasonal farmworkers should be implemented.

Strategies

A Federal funding for migrant health clinics should be maintained with expanded assistance to those clinics to assist in compiling surveillance data on diagnosis and treatment.

B Increase enforcement of current regulations relating to the current EPA Worker Protection Standard (WPS) and the Certification of Pesticide Applicators Standard (CAS).

C Evaluate components of the current EPA Worker Protection Standard (WPS) and the Certification of Pesticide Applicators Standard (CAS), in conjunction with local/regional farmworkers, to ensure that such training adequately reflects the actual conditions experienced by the workers.

D Evaluate the current protocols related to reporting agricultural chemicals, in conjunction with local/regional farmworkers, to ensure that the procedures are readily available to farmworkers and conducted in a manner that farmworkers find effective.

E Federal agencies funding research and services for migrant and seasonal farmworkers should require that those workers, both men and women or their designated representatives, be actively engaged in the planning and implementation of proposal objectives as a criterion for funding.

Strategy

A The lack of consistent definitions among federal agencies, studies conducted, and the environment within the work is performed makes precise enumeration of workers in general difficult. Such difficulty is aggravated by the grouping of different ethnicities or races within an occupational group (e.g., migrant and seasonal farmworker), thus discounting ethnicity/race as a factor in individual worker health (Earle-Richardson; Lighthall; Niedda; Stallones; work groups).

The HHS Health Resources and Services Administration operates through four bureaus. Three of those bureaus and their missions are as follows: The Bureau of Primary Health Care (BPHC) serves to provide *primary health care* to medically underserved people, the Maternal and Child Health Bureau (MCHB) serves *women and children* through state programs, and the Bureau of Health Professionals serves to train a *health workforce* that is both diverse and motivated to work in underserved communities (HRSA 2003). An example of BPHC direct involvement in agricultural safety and health is through migrant health clinics. An example of MCHB direct involvement in agricultural safety and health is through funding for the National Children's Center for Rural and Agricultural Health and Safety. BPHC also provides the majority of funding for both community health clinics and specific migrant health clinics. Funding for such clinics requires the collection of much categorical data on health services' provision and use. However, most of this information is health related and not helpful in meeting occupational, particularly agricultural occupational, data needs. And migrant health clinics in particular have little capacity to assist in research projects that do not include funding for the devoted time of staff to participate. EPA, NIEHS, NIOSH, and NIH should review their funding goals to ensure that specific occupational data not currently being collected is a target for study. In addition, these agencies should include criteria for funding of the time of associated migrant clinic staff dedicated to assist with collecting the data.

Strategy B

One of the EPA administrator's charges is to ensure that the labeling and classification of pesticides protects farmers, farmworkers, and other persons coming in contact with the pesticides or pesticide residues. Among the EPA's attempts to meet this requirement are the Worker Protection Standard (WPS) and the Certification of Pesticide Applicators Standard (CAS), which were issued in 1992.

> The WPS applies to all operators of farms, forests, nurseries, and greenhouses producing agricultural plants (food, feed, and fiber plants, trees, turfgrass, flowers, shrubs, ornamentals, and seedlings); operators who hire or contract for services of workers; and anyone who applies pesticides to agricultural plants and crop advisors on any farm, forest, nursery, or greenhouse. WPS has no small farm exemptions or exemptions based on a minimum number of farm employees. The CAS requires an individual applying restricted-use pesticides to be certified by a certifying agency as competent and thus authorized to use or supervise the use of restricted-use pesticides. (Runyan)

Regulations relating to these standards, such as provision of personal protective equipment, should be enforced as prescribed in the standards.

Strategy C

A major topic in individual presentations or discussions following (Duarte; Lighthall; Mandelbaum; Niedda) and within the work-group process were illustrations of perceived barriers in the ability of workers to lodge complaints in the case of worksite violations. In some cases this amounted to the inability to access the reporting system in a timely manner or being unable to answer specific questions during a report. An example of the former is being taken to a field by a labor contractor, being exposed to aerial pesticide spray, and having no access to a phone with which to report the incident. An example of the latter is being able to report such an incident but being asked questions related to the type of plane, the number on the plane, or the owner of the field—none of which the worker could respond to since (1) the worker's head and face had been covered to limit the amount of exposure, and (2) the labor contractor actually employing the worker had not provided information on whose field they were in.

Strategy

The specific evaluation strategies under this recommendation are intended to facilitate continued and additional involvement of farmworkers or their representatives in enforcement of the current standards. While certainly not a comprehensive search, a review of Web-based information on pesticide regulations and associated worker safety issues in California revealed no obvious specific mention of evaluation components. The California Department of Pesticide Regulation Progress Report 2002 (CDPR 2003a) contains sections on "Protecting People" and "Enforcement in the Field." The latter does identify enforcement targets resulting from recent focus groups, including farmworkers, as "field posting . . . , notification requirements in general, and the hazard communication rules" (p. 15)—all needed, but employer directed. A review of the California Department of Pesticide Regulation Laws & Regulations site leads one to a link for *Food and Agriculture Code, Divisions 6, 7, 13.* A review of the entire posted code reveals no specific mention of evaluation related to measuring code attainment in the 23 divisions listed. And a review of the California Code of Regulations (Title 3, Food and Agriculture) Division 6, Pesticides and Pest Control Operations (a citation in Runyan's conference paper), again reveals no specific mention of evaluation or evaluation components. It is unquestionably possible that worker safety and pesticide evaluation components are listed elsewhere on the CDPR site but were not found during this exercise (CDPR 2003b).

Strategy

Another topic of considerable discussion was the link between worker perceptions of individual or group power and health and safety needs (Lighthall; Mandelbaum; Neidda; work groups). Workers' lack of power at the worksite, as expressed in labor law, median income, short-term employment, language barriers, and dependence on employer housing and/or transportation, to name only a few indicators, is compounded by other factors such as immigration status and can have a profound negative impact on workers' health. One major impediment to workers' more directly addressing their concerns regarding workplace health and safety is their lack of legal protection when filing complaints or expressing those concerns to their employers. In the case of H2A workers, this lack of legal protection is even more pronounced, often keeping workers from taking proactive stances to improve their worksites. Closely aligned with the characteristics described is the quandary of being used for research without participating wholly in the parameters of the investigation. Much funding has gone into studying how to form successful partnerships for both programming and research. One of the major recommendations to researchers is to seek partnerships with existing coalitions (Palermo). It is only logical that those being used to elicit the data should be involved in planning and carrying out the studies for everyone's benefit.

Recommendation 4

Model agricultural safety and health programs related to health care services, professional training, educating, and conducting applied research in community settings should be replicated and evaluated to determine their effectiveness in other agricultural communities.

Strategies

A USDA should target the development of information, assessment, and assistance programs that address underserved populations in ways that are culturally sensitive to the differences among populations and base such programs on the successes learned with the National AgrAbility program.

B NIOSH should revitalize the Agricultural Health Promotion System (AHPS) funding stream. Such funding could focus on combining lessons learned from previous (AHPS) funding with new findings from successful models of community-directed interventions.

C NIOSH should target specific funding within the Centers for Agricultural Disease and Injury Research, Education, and Prevention (Ag Research Centers) to form advisory committees of farmers and farmworkers to develop protocols for using community assets to collaboratively conduct technical, anthropological, and social science research within the agricultural communities.

Strategy

A Stories, peer and family pressure, awareness of and involvement in community-based activities, local and broad-based participation, and personal injury and illness experiences have all been effective in providing the motivation and context for changing risky agricultural safety and health behaviors. Coalitions and partnerships, whether public or private, organization or agency, individual or group, or combinations thereof, have provided the means to successfully use all these sources of motivation and more (Cole; Palermo; work groups). This report is replete with examples of targets that need attention from research, programming, or both. This report

also includes many references to the failure to directly involve specific populations in the planning of research directed at them or the planning of programs directed toward them.

Current funding requirements for research, programming, and program evaluation to include the target population in design, implementation, and evaluation represents an excellent start, and such efforts should be maintained and improved where possible. An example of a model for funding such endeavors, which includes direct participation of the population, provides funding opportunities for a partnership between federal and state agencies and not-for-profit disability organizations, addresses clientele in a culturally sensitive fashion, and includes specific evaluation requirements for continued funding, is the USDA/CSREES AgrAbility program (Field; Willkomm; work groups). Similar endeavors aimed at other underserved populations could elicit much data to fill the gaps currently outlined.

Strategy B

The NIOSH Agricultural Health Promotion System (AHPS) funding stream was previously available to state teams to accomplish specific agricultural safety and health objectives. Some examples of funding targets within specific states are assessment of causative factors leading to injuries (Missouri), development of model safety programs (Arizona), establishment of cooperative relationships with a newly funded NIOSH Ag Center (Iowa), development of safety and health instructional videos (Florida), and research to individualize the dose of pesticides for orchard trees (Washington), among many others (work groups; NIFS 2003b). Another benefit of these projects can be traced to seeds that matured after the three-year funded project. A good example occurred in Wisconsin, where funding from AHPS led to (1) improved networking and program collaboration among state agencies, (2) increased local programs for locally derived concerns, and (3) groundwork laid for state legislation. This Wisconsin legislation, Act 455, mandated and funded a tractor certification program for youth. This certification is necessary for youth to legally operate tractors on public roadways (work groups; Skjolaas 2003). NIOSH should review the long-term outcomes originating from AHPS funding with an eye for renewal during its planning of future funding efforts.

Strategy C

NIOSH criteria for funding proposals for Ag Research Centers contain the following requirements related to community involvement in its four cores:

Administrative and Planning Core

An External Advisory Committee, comprised of at least three members who are recognized leaders in agricultural health and safety and regional agricultural experts, will provide overall guidance and advice to the principal investigator and program investigators on program direction. If not already included in the Agricultural Center, one member should be from the Agriculture Extension community.

Multidisciplinary Research Core
(None)

Prevention/Intervention Core
Mechanisms for establishing communication and active partnerships with local organizations, health care providers, educators, and community leaders;

Education and Outreach Core
Projects should involve regional agricultural stakeholders in addressing educational needs and in the implementation of innovative approaches for meeting those needs. (NIOSH RFA: OH-03-002, 2003)

Specific language was added to include active participation of an advisory committee of farmers and farmworkers in using community assets to conduct joint, collaborative technical, anthropological, and social science research within the communities in their region. Direct involvement, along with additional funds for such activity, will assist the Ag Research Centers in achieving overall goals as well as addressing current data gaps noted in this report (work groups).

RECOMMENDATION 5

Enhance collaborative efforts between professionals working in agricultural safety and health and professionals working in primary health care.

Strategies

A USDA should be allocated additional funds to designate a full-time national program leader for agricultural safety and health within the Cooperative State Research, Education, and Extension Service. Such a designation is not intended to supersede or replace currently delegated DOL, EPA, or OSHA oversight.

B In each state, USDA should fund a full-time state extension specialist in agricultural safety and health with matching operating funds from the state. This position would collaborate with the health specialist identified in strategy C below.

C In each state, NIOSH, HHS, or USDA should fund a full-time faculty position at a corresponding state university providing health professionals with matching operating funds from the state. Utilizing the agromedicine model, this position would deal primarily with rural primary care and would work in collaboration with the state extension specialist in agricultural safety and health.

D USDA through the university-based extension system should facilitate collaboration of professional organizations to provide for the continuing professional development of agricultural safety and health professionals and primary care providers and other health care providers on current issues related to the agricultural environment.

Strategy

A special work group involving designated representatives from the National Institute for Farm Safety (NIFS) and the North American Agromedicine Consortium (NAAC) was formed to discuss and identify particular issues related to collaboration among agricultural safety and health professionals and primary health care professionals. NIFS is a leading organization dedicated to reducing injury and illness incidence in agriculture. NIFS consists of agricultural safety and health professionals and interested organizations and seeks to provide a structure for the development of those professionals. NAAC is devoted to the programmatic teamwork of land grant and medical universities and their partners to promote health and prevent disease among farmers and farmworkers and their families, others in rural communities, and consumers of food and fiber. Due to their experience in agricultural safety and health programming and research, and in collaborations merging safety, health, extension, and medical perspectives, representatives of these organizations were asked to summarize their consensus perspectives on agricultural safety and health issues for review by the other work groups and the project advisory committee.

The Cooperative State Research, Education, and Extension Service (CSREES) of USDA has been given the mission of advancing knowledge of agriculture, the environment, human health and well being, and communities. One of the mechanisms for accomplishing this is partnership with university-based cooperative extension systems within individual states. Most state cooperative extension systems have a state specialist to assist state- and local-level extension personnel with specifics related to agricultural safety and health data, research, and programming. One of the CSREES designated program areas is farm safety. However, at the current time there is no full-time designated leader for farm safety issues. In order for farm safety, and more broadly, agricultural safety and health issues, to receive the proper attention and to facilitate the other strategies under this recommendation, a full-time program leader is needed.

Strategy B

An additional objective is to reestablish full-time state-level agricultural safety and health specialist positions in states where they are needed but in which such positions have been lost, or in which a specialist position is shared with another state. University-based extension systems operate on a formula basis, with resources from federal, state, and local entities. It is apparent that having safety and health specialists available when needed would be beneficial, given the increasing median age of farm operators and the associated increase in age-related afflictions; research indicating the potential hazards of exposure to pesticides and of naturally derived organic and inorganic compounds; environmental and ergonomic factors; the lack of available rural health care; the growing populations of women and the disabled; increasing numbers of migrant and seasonal laborers lacking prior health care access; and specific health hazards associated with production practices in different areas of the country (Chapman; Field; Hernandez-Peck; Kirkhorn; McCoy; Niedda; Willkomm; work groups).

Strategy C

The abovementioned factors also make a case for funding a primary health care specialist to work in conjunction with the agricultural safety and health specialist. It is impossible for a single person to have the time, much less the necessary knowledge, to deal with all the issues surrounding agricultural safety and the health-related components now identified within agriculture. A health specialist with experience in primary health care and some knowledge of agricultural issues would be of great benefit to a specialist experienced in agriculture with some knowledge of health care issues. Funding for such positions would supplement designated funding through specific HHS or NIOSH programs. Since CSREES is already located in USDA, another alternative would be to have the additional funding come through USDA and CSREES as a designated program, as farm safety is now.

Strategy D

Until the implementation of the preceding strategies to help formalize the many contacts and collaborative activities already occurring, USDA through CSREES should continue to facilitate interaction among concerned professionals and their organizations. Agricultural safety and health professional involvement with national and state rural health associations; continuing medical education courses; advanced-degree committees in community health, nursing science, agricultural education, and other disciplines; and oversight of internships and traineeships all contribute to individual participant awareness as well as interdisciplinary interaction on agricultural safety and health issues.

Medical and health professionals likewise can increase their understanding of and professional practice in agricultural safety and health through agriculture-specific programs. Courses such as the Agricultural Occupational Health Training Program at the University of Iowa provide basic information and skills that enable the health care professional to function as a practitioner in the prevention of occupational illnesses and injuries in the farm community (ICASH 2003). Medical education for agricultural health and safety that involves aspects of primary care, rural

community health care, and occupational and environmental medicine is available at agromedicine programs, such as the one at the University of Alabama (Wheat) or through NIOSH-funded Education and Research Centers with agricultural safety and health academic and training programs (work groups).

RECOMMENDATION 6

Increase the capacity to provide rural emergency medical services, agricultural occupational health services, mental health care, rehabilitation services, and education to the agricultural community.

Federal Strategies

An interagency agreement between Department of Transportation/National Highway Traffic Safety Administration, Department of Homeland Security, Department of Health and Human Services, and United States Department of Agriculture should be developed to

designate a single site with specific authority for administration and funding to ensure that rural emergency services remain an integral part of national emergency service capabilities.

B The Rural Emergency Medical Service Training and Equipment Assistance Program, authorized in the Health Care Safety Net Amendments of 2001 (P.L. 107-251), should receive funding appropriations as designated through the U.S. Department of Health and Human Services and administered by the Health Services Resources Administration.

C The National Institute of Mental Health/Office of Rural Mental Health Research and the National Advisory Committee on Rural Health and Human Services/Office of Rural Health Policy/Health Resources and Services Administration should work collaboratively in developing a National Center for Agricultural Behavioral Health to facilitate the interface of research and service delivery relating to addictions, mental health, and social psychological distress found in the agricultural setting.

D Target musculoskeletal disorders for CDC/NIOSH funding and support for expanded field intervention and prevention in cooperative partnerships with farmers and farmworkers.

State Strategy

E State university–based Cooperative Extension offices should establish formal relationships with state Public Health Departments and state Environmental Protection Agency offices to facilitate the formation of a task force to provide pesticide prevention programs for farmers, migrant/seasonal farmworkers, and their families, as well as rural residents.

Local Strategy

F Recruitment and retention of rural emergency volunteers should be the topic of in-depth research at the community/squad level in order to understand the problem. Subsequent planning and action should be based on the findings of that research.

Strategy

A The National Highway Traffic Safety Administration (NHTSA), under the U.S. Department of Transportation, was established by the Highway Safety Act of 1970, as the successor to

the National Highway Safety Bureau, to carry out safety programs under the National Traffic and Motor Vehicle Safety Act of 1966 and the Highway Safety Act of 1966 (HSA). Under the HSA revision of 1998, NHSTA continues to specify the curricula for emergency medical service that must be met by the states for certification of health care providers. Although it is true that NHTSA does not have direct control at the state level (it is up to the states to determine how things get done), it can and does influence state-level decisions (NHTSA 2003b; Erisman a; work groups).

The recently established Department of Homeland Security (DHS) has component agencies directed to protect our critical infrastructure and coordinate the response of our nation to future emergencies. It also makes funding available to state and local public safety and law enforcement personnel to help prevent, prepare for, and respond to terrorism. The passage of the Public Health Security Bioterrorism Preparedness and Response Act of 2002 (2002 Act) has components that are being addressed in a joint fashion by HHS, through CDC, and USDA, through its Animal and Plant Health Inspection Service (APHIS). The 2002 Act contains specifics related both directly and tangentially to agricultural and rural care provision in Section 131, "Grants to Improve State, Local, and Hospital Preparedness for and Response to Bioterrorism and Other Public Health Emergencies." The extension of these agreements to allow for a single designated site with specific authority for administration and funding could ensure that rural emergency services remain an integral part of national emergency service capabilities, along with agricultural and rural population protection (USDHS 2003; USDA APHIS 2003; Erisman b).

Strategy

B The Rural Emergency Medical Service Training and Equipment Assistance Program was authorized in the Health Care Safety Net Amendments of 2001 (P.L. 107-251) in October 2002. The program has been authorized to provide such sums as are necessary for fiscal years

2002 through 2006, and there is a 25% non-federal matching requirement. *This program has an indefinite authorization (no limit), but has never received any appropriation.*

The funds can be used to:

- Recruit emergency and volunteer medical service personnel
- Train emergency medical service personnel in emergency response, injury prevention, safety awareness, and other topics relevant to the delivery of emergency medical services
- Fund specific training to meet federal or state certification requirements
- Develop new ways to educate emergency health care providers through the use of technology-enhanced educational methods (such as distance learning)
- Acquire emergency medical services equipment, including cardiac defibrillators
- Acquire personal protective equipment for emergency medical services personnel
- Educate the public concerning cardiopulmonary resuscitation, first aid, injury prevention, safety awareness, illness prevention, and other emergency preparedness topics

The appropriation of funds through the public law as designated would begin the process of addressing several of the concerns related to the training and equipping of volunteers to meet some of the emergency medical services needs found in rural America (Erisman 2003; work groups).

Strategy

Three current activities within the Department of Health and Human Services offer an opportunity for intergovernmental collaboration to address the current lack of mental health resources in agricultural and rural areas. The National Advisory Committee on Rural Health and Human Services (NACRHHS)/Office of Rural Health Policy/Health Resources and Services Administration is now progressing on its work plan for 2003 and 2004. This plan includes an examination of the integration of behavioral health and primary care in rural settings and access to oral health care services in rural communities. The committee will also focus on issues affecting the rural elderly (NACRHHS 2003).

In addition to this effort, the National Institute of Mental Health/Office of Rural Mental Health Research is charged with the following duties: (1) direct, plan, coordinate, and support research activities and information dissemination on conditions unique to those living in rural areas, including research on the delivery of mental health services in such areas; and (2) coordinate related departmental research activities and related activities of public and nonprofit entities. Also, NIOSH, within the National Occupational Research Agenda (NORA), lists as priority research areas Special Populations at Risk and Health Services Research. However, neither NORA priority area specifically mentions mental health. A National Center for Agricultural Behavioral Health, developed from among the current various offerings, could facilitate the interface of research and service delivery related to addictions, mental health, and social psychological distress found in the agricultural setting (Rosmann; work groups).

Strategy

D Organized surveillance of musculoskeletal disorders in agriculture is virtually nonexistent. And, as with other data outlined, the annual Bureau of Labor statistics are inadequate for determining the extent and severity of musculoskeletal disorders and other work-related health problems within production agriculture. Specific studies such as those of agricultural workers in California report rates of musculoskeletal disorder ranking among the highest in all industries, and many times greater than the rates suggested as industrial targets. Recent research by multidisciplinary teams of researchers and extension staff have organized intervention and prevention programs based on an ergonomics approach to the problems involving specific tools and tasks encountered in agricultural workplaces. These programs have been largely successful in developing low-cost intervention strategies, which have proven acceptable to farmers and farmworkers, and have proven effective at significantly reducing specific risk exposures. NIOSH has published *Simple Solutions*, which highlights many of these agricultural successes and can serve as a guide in structuring further research and programming (Chapman). NIOSH should continue to offer interdisciplinary research grants and cooperative agreements targeting ergonomic issues in agriculture through National Occupational Research Agenda priority areas such as musculoskeletal disorders and control technologies and personal protective equipment (NORA 2003).

Strategy

E The Cooperative State Research, Education, and Extension Service (CSREES) of USDA has been given the mission "to advance knowledge for agriculture, the environment, human health and well-being, and communities" (USDA CSREES 2003). One of the mechanisms for accomplishing this mission is to partner with university-based cooperative extension systems within individual states. Most state environmental protection agencies follow the EPA's general mission to protect human health and to safeguard the natural environment—air, water, and land—upon which life depends (USEPA 2003). In addition, the EPA is given primary national responsibility for maintaining standards related to pesticides and their application (Runyan). The generalized goal of state public health departments is to promote the health of the people through the prevention and control of disease and injury.

As can be seen, there is overlap in the general aims of individual agencies. In many instances there are both formal and informal contacts on many subjects between the state-level agencies already. The recommendation is that state Cooperative Extension offices take the lead in bringing forth the issue of specific programs, either new or reinforced, on potential exposures to pesticides in the residences of farmers, migrant/seasonal farmworkers, and their families, as well as rural residents, in addition to specifics related to pesticides exposure at worksites. Having formal relationships on the issue at the state level will facilitate offering coordinated programs within the local offices affiliated with each individual agency.

Strategy

F The most important issue in rural emergency care is the declining number of emergency caregivers to service rural America. Recruitment and retention are the critical issues that must

be addressed. If caregivers are not available in rural areas, other issues are moot. The evidence shows that:

1. The overwhelming majority of rural America is serviced by unpaid volunteers.
2. Low call volume makes private EMS care providers financially infeasible.
3. Volunteer EMS caregivers are not dollar motivated. As repeatedly established in the literature, the volunteers do not do the job for pay. They have other motives that drive them. (Erisman 2003)

No one suggests that it is feasible to have enough dollars to replace the unpaid volunteer rural caregivers with paid personnel. An example helps establish perspective:

> A township ambulance provides emergency medical services for the township residents and mutual aid to surrounding townships. Last year the cost for personnel (gas money to respond to emergencies, training, clothing) and miscellaneous support equipment (not counting the depreciation on the ambulance) was $15,000. For those dollars all residents and persons traveling through the area received 24-hours-a-day, seven-days-a-week, for 52 weeks, coverage for any medical emergency that might arise. To replace that service with paid personnel would require a minimum $250,000. Paid personnel coverage is simply not a viable economic option. (Erisman 2003; work groups)

Given the low potential for paid personnel coverage, further in-depth research into recruitment and retention will be needed in order to determine how to best address the problem.

The superficial data available is not useful in providing guidance about substantive, effective ideas for resolution. Research must be done at the community/squad/grassroots level to understand the population's perceptions of their problems and ideas for assistance. They hold the answers to questions about what needs to be done. Planning and actions should be based on information provided by the community and the rural squads. Until we get the data needed, we are simply speculating about steps that need to be taken to reverse the trends (Erisman 2003; work groups).

Recommendation 7

Enhance determinant research that examines how various risks and protective factors affect the health of the agricultural community.

Strategies

A NIOSH, NIEHS, and EPA should continue funding investigations related to improved assessments of indoor air exposure for confinement workers and better define Recommended Exposure Limits (RELs, NIOSH) and associated Permissible Exposure Limits (PELs, OSHA) to reflect any dose-response relationship found.

B The EPA should target additional technical, epidemiological, and exposure assessments to define the emission elements responsible for specific community effects found with large confinement animal production.

C BLS and NIOSH should collaborate to allocate funding, similar to NIOSH Sentinel Event Notification System for Occupational Risks (SENSOR) projects, toward protocols to improve the delivery of standard medical surveillance to agricultural workers, including improved reporting and tracking of occupational injury and illness.

D NIOSH and privately and publicly owned corporations should increase efforts toward the standardization and improvement of biomarker assessments relating to agricultural illness and disease.

E EPA and privately and publicly owned corporations should target funding for research to establish causal linkages or dose-response relationships between chronic illness and pesticide exposure; critically important is research into potential endocrine disruptor effects of pesticides.

F The National Cancer Institute should target funding for long-term research on the possible association of nitrate in drinking water with cancer risks that addresses the inherent weaknesses of currently available case-control and ecological studies.

Strategy A

NIOSH develops and periodically revises recommended exposure limits (RELs) for hazardous substances or conditions in the workplace. As identified, these are *recommended* limits, as NIOSH is a research agency, not an enforcement agency. These recommendations are taken into consideration to set the Permissible Exposure Limits (PELs) used by OSHA. A PEL is the amount or concentration of a substance in the air that is permitted by OSHA, an enforcement agency. OSHA uses the PEL to gauge employer compliance or noncompliance with applicable regulations. While much research has been done on and in confined animal feeding operations (CAFOs), much more work needs to be done to properly identify hazardous substances in these environments. This research will aid in verifying the concentrations of these substances that prompt a response from workers and endanger their health (Kirkhorn; Thu; Von Essen; work groups). The respective agencies that are currently involved in the multistep process of deciding RELs and PELs should continue their efforts in this area.

Strategy B

An associated concern with setting appropriate RELs and PELs in CAFOs beyond workers' health needs is the issue of emissions from such operations and the potential impacts on those living around them. Anyone who has passed a large hog production CAFO on a hot, humid day will attest to there being a detectable odor and perhaps even a pervasive atmosphere associated with it. Whether this odor and atmosphere is determined to be pleasant or unpleasant, fragrance or stench, is strictly a personal matter. The perceived harm that might arise from this odor or atmosphere is of importance and would be classified as *pollution.* As the EPA has primary responsibility in the area of pollution, it should subject this situation to the additional research that is needed.

Strategy

C The NIOSH Sentinel Event Notification System for Occupational Risks (SENSOR) has as its mission to provide leadership to prevent work-related illness, injury, and death by gathering information, conducting scientific research, and translating the knowledge gained into products and services (NIOSH 2003d). SENSOR Surveillance Goal 3 is to "strengthen surveillance of high-risk industries and occupations, and of high-risk populations, including special populations." Under Goal 3 is Objective 3.1, to "enhance surveillance of occupational illness, injuries, and hazards in agriculture," and Objective 3.5, to "assess the needs and explore the opportunities for additional surveillance in other occupations and demographic groups that are at high risk of occupational illness and injuries, such as special populations." The implementation of projects to address these objectives should be undertaken with BLS and NIOSH working jointly to establish a mechanism to fill current gaps in data in a manner that would be useful to both agencies.

Strategy

D Biomarkers can be defined as indicators that signal events occurring in biological systems or samples. Molecular biomarkers are the kind used in environmental health, research, and medicine. The three broad categories of molecular biomarkers commonly used are biomarkers of exposure, biomarkers of effect, and biomarkers of susceptibility. Regardless of the category, much basic research is required before the specific use of these biomarkers within occupational settings such as agriculture is possible. NIOSH, having primary federal responsibility for agricultural occupational research, and privately and publicly owned corporations, both benefiting from and contributing to federally funded programs, should continue to concentrate their efforts in the profitable use of biomarkers to protect the health and safety of farmers, farmworkers, their families, and all rural residents (Kirkhorn; Fuortes; Weyer; Wilson & Suk 2002; work groups).

Strategy

E The use of molecular biomarkers, and the many other measures necessary in identifying human health hazards, is directly related to research to establish causal linkages or dose-response relationships between chronic illness and pesticide exposure. Causal linkages are determined by principles that lead to a judgment of whether the available information is of sufficient quantity and quality to establish a sound connection. A dose-response relationship is another way of determining cause; the greater the amount of exposure to a risk factor, the greater the chance of a harmful effect (Woodward 1999). As with most human endeavors, there can be informed opinions that reach different conclusions, and there is much disagreement on whether a specific set of evidence indeed fulfills the requirements for establishing a causal linkage or dose-response relationship (Kirkhorn; Fuortes; Niedda; Von Essen; Weyer; work groups).

This statement applies broadly to the potential relationship between illness and pesticide exposures, and specifically to the area of endocrine disruptors. The endocrine system in humans regulates and integrates the functions of different cells through glands that produce hormones. The endocrine system is responsible for metabolism, growth, maintenance, automatic bodily responses to environmental changes, and reproduction. The term *endocrine disruptor* refers to any substance from outside the body that has a negative effect on the endocrine system, particular the reproductive organs. There are several classifications of endocrine disruptors

(Birkett & Lester 2003). The EPA and private and public corporations should continue the research focus on this important topic.

Strategy

The National Cancer Institute (NCI)/National Institutes of Health "coordinates the National Cancer Program, which conducts and supports research, training, health information dissemination, and other programs with respect to the cause, diagnosis, prevention, and treatment of cancer, rehabilitation from cancer, and the continuing care of cancer patients and the families of cancer patients." A search of the NCI site for research using first "nitrates" and then "pesticides" as the key words found two studies listed for nitrates and 29 listed for pesticides (NCI 2003a, 2003b). Some of these studies involved basic surveillance to assess exposures, and many others were designed using case-control or ecologic studies.

Case-control studies identify a set of individuals with a disease and a set of people without the disease. The two sets are then compared with regard to a risk factor. Such studies can include many risk factors but can study only one disease. They cannot be used to measure the chance of a disease occurring in another person. But these studies are attractive for diseases that take a long time to develop (Woodward 1999). Ecologic studies assume that relationships found in all exposures will apply to any individual. This is an inherent weakness, and much of the previous nitrate data relied on deaths from cancer and used residence at the time of death as the location for the entire lifespan. Associated common weaknesses are failure to account for any delay that occurs before the disease presents itself and failure to account for other possible risk factors for the disease (Weyer). It is essential that long-term research using more robust study methodology be conducted.

Recommendation 8

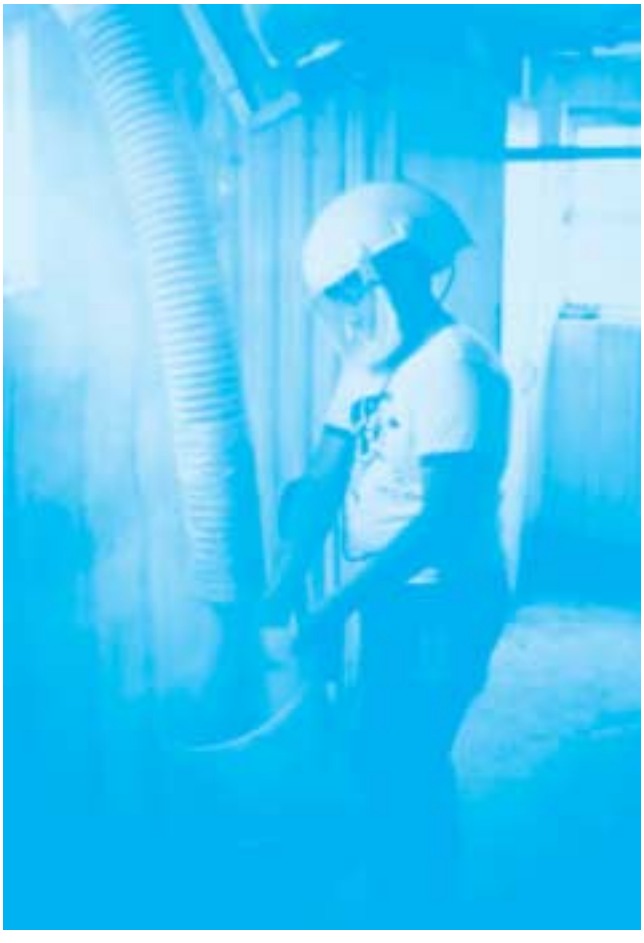
Apply to the fullest extent current advances in engineering and application technology to reduce fatalities, injuries, illness, and disease in the agricultural community.

Strategies

A Continue dissemination and evaluation of the recommendations to reduce tractor-related injuries and deaths produced at the Tractor Risk Abatement and Control policy conference (Donham et al. 1997), particularly with those audiences whose collaboration will be needed to enact said recommendations.

B USDA, through the Cooperative State Research, Education, and Extension Service (CSREES) and the university-based extension system, should take the lead in facilitating the application of industry-wide, low-cost ergonomic interventions and commodity-specific standardization of improved ergonomic tools, using successes such as those in the NIOSH publication *Simple Solutions: Ergonomics for Farm Workers* as a model.

C American Society of Agricultural Engineers and Society of Automotive Engineers, through voluntary standards, should facilitate the use of universal design concepts to foster the development of high-quality and task-specific materials for use in safety and health equipment for the disabled.



Strategy A

The University of Iowa convened a policy conference in 1997 in recognition that little had been accomplished in reducing agricultural fatalities related to the tractor. The Tractor Risk Abatement and Control (TRAC) conference published a report with 25 specific items that, if implemented, would save an estimated 2000 lives by 2015 (Donham et al. 1997; Myers). Recommendations carried various dates of implementation and included developing educational and social marketing programs to change social norms regarding rollover protective structures (ROPSs); requiring that *all tractors sold* be equipped with ROPSs; requiring that *all tractors* be equipped with approved ROPSs; utilizing incentive program to ensure operator knowledge of safe tractor operation; prohibiting the driving of tractors on roads by persons without a valid driver's license; and developing social marketing programs to discourage extra riders; and requiring youths to have formal tractor operator training.

Several of the TRAC recommendations have been addressed in part. Equipment manufacturers have provided incentives to retrofit ROPSs on older tractors. Insurance incentives are being studied in conjunction with agricultural safety and health training and health provision, as in the Certified Safe Farm program. The state of Wisconsin has legislation, Act 455, mandating certification of training for youth to legally drive tractors on public roadways. Agencies and organizations such as NIOSH, the National Children's Center for Rural and Agricultural Safety and Health, National Institute for Farm Safety, National Safety Council, Progressive Farmer Foundation, and Farm Safety 4 Just Kids have all used marketing and offered specific programs to discourage the practice of extra riders on tractors. However, there remains much to be done on specific TRAC recommendations. In addition, many audiences remain to be involved in order to fully reach TRAC objectives. We encourage the dissemination and evaluation of the TRAC document.

Strategy B

A review by the University of California Agricultural Ergonomics Research Center over the past decade cited three general risk factors as both endemic and of highest priority throughout the agricultural industry. They are lifting and carrying heavy loads (over 50 pounds), sustained or repeated full-body bending (stoop), and highly repetitive hand work (e.g., clipping, cutting). Each type of production agriculture has its own unique ergonomic hazards and musculoskeletal injury problems, although some hazards are similar throughout production agriculture in general. It should be noted that while many of the types of hazards reported can be said to be of general industrial concern, most interventions, even those patterned on proven strategies and engineering control concepts, must be individually evaluated. As a result, there are simply now no ready, off-the-shelf tools and technologies for addressing most of the ergonomic hazards found in agricultural workplaces (Chapman).

As an example, well-designed interventions have successfully persuaded some farm managers of fresh market vegetable operations in Minnesota, Wisconsin, Illinois, and Iowa to adopt production practices and labor aids that reduce exposures to musculoskeletal injury hazards. The crucial factor was having a group of research scientists coupled with outreach specialists, pilot farmers, and agricultural specialists all funded to work toward the same purpose: identification, control, and industry-wide prevention (and intervention evaluation) of musculoskeletal disorders in specific agricultural commodity areas. In addition, focusing on the promotion of production

methods and labor aids that were not only safer but also sustained or improved production efficiencies ensured their popularity with farm managers. CSREES has an established network of university-based extension personnel with expertise in translating research into practice. CSREES, with additional targeted funding, could model proposal-based funding similar to its AgrAbility program toward ergonomics and musculoskeletal injuries in production agriculture (Chapman; work groups).

Strategy

Universal design (UD) is an approach to designing all products and environments to be used by as many people as possible regardless of age, ability, or situation. Examples of considerations related to UD include sight, hearing, movement, and thought processes. Specific applications of UD can range from choice of text font, font size, and placement on Web sites or in presentations, to lever-type rather than round handles for doorknobs, to design considerations for interior spaces such as the width of hallways and doorways, to height of light switch placement, to kitchen equipment and cabinet design options. A water cooler may need to be a dual-height model, with both standard and lower spouts and controls. To create a universally usable group toilet room, two types of accessible toilet stalls may need to be installed. A universally usable landscape design may include alternative paths free of steps and stairs. The widespread use in product design of universally usable features such as touch-sensitive controls is bringing the UD approach into the market for consumer items (Universal Design Education Online 2003; Field; work groups).

> In some cases, there is a need to develop new standards or expand existing design standards to provide clear direction to professionals designing and fabricating assistive devices and making modifications to existing equipment such as tractors and combines. Some of these standards would be channeled through existing voluntary standards organizations such as ASAE or SAE that have jurisdiction over much of the technology associated with agricultural workplaces. Design strategies that have become a common part of the "Universal Design" approach should be considered and incorporated into new agricultural production facilities and older facilities as they are remodeled. These design concepts have become widely used to successfully enhance the accessibility and usability of a wide range of facilities and products. (Field; work groups)

Recommendation 9

Investigate the safety and health impacts of the annual exemptions from federal agency enforcement of regulations provided to agriculture.

Strategies

A Form a task force composed of individuals representing farm organizations, farm employer organizations, farmers, farmworkers, appropriate researchers in pertinent fields, agricultural health care providers, and applicable governmental agencies to evaluate the overall impact of two important exemptions now applied to agriculture. NIOSH funds channeled through the Ag Research Centers would cover the travel and lodging of task force representatives. The two exemptions to be evaluated include:

1. "U.S. Department of Labor should exclude from OSHA protection all agricultural workers in agricultural operations employing 10 or fewer non-family workers within the past 12 months, and having no temporary labor camps in the last 12 months. The U.S. Department of Labor has interpreted this to mean that whenever a farm operation has more than 10 workers employed on any 1 day, the operation is subject to OSHA regulation" (Runyan).

2. "Permit Required Confined Spaces (PRCS) and under OSHA's guidelines, can only be entered by developing and following a plan addressing the hazards found in that space. The characteristics of a PRCS, are found under OSHA's Confined Space Standard (29 CFR 1910.146) but family farms are exempted from the PRCS standard" (Steffen).

Strategy

As documented in this initiative, there has been much progress made in agricultural safety and health since the publication of *Agriculture at Risk: A Report to the Nation* (Merchant et al. 1989). The advances and successes that have been made in areas ranging from childhood and youth safety and health; to community coalitions; to improved understanding of the unique mental health issues of farmers; to ergonomics; to injury, illness, and disease prevention and treatment; to techniques shown to enhance safety and health behaviors; and the stories that underlie them must continue to be disseminated as reminders to previous audiences and to new audiences as they become available, aware, and interested.

As has also been documented, much remains to be done. The advances taking place in production agriculture cannot be overemphasized, and current gaps and needs in data, research, and programming are plentiful. The increasing age of farmers, the decreasing number of younger people entering farming, the growing size of farms and equipment, the increasing numbers of women and disabled involved actively in farming, and the growing number of farmworkers from different cultures without English as their primary language all require attention.

The relative stability in the rates of agricultural injuries and fatalities compared with other industries, the lack of health care availability and access in rural areas, the prominence of mental health disorders in agriculture and rural populations, the continuing decline of rural emergency personnel, most of whom are volunteers, all require specific efforts for remediation.

There is a marked lack of good data to use as a guide to target programming and to use as baselines in evaluating our efforts. We do not know enough about specific causes of exposure to common agricultural inputs such as nitrates and pesticides; about respiratory illnesses related to confinement animal feeding operations or dry land farming; about specific health differences based on racial, ethnic, or cultural characteristics; or about how to meet the needs of those populations to address those health and safety hazards that we do have solid information on.

However, in all of these areas, specific questions regarding the overall and direct impact of the two important exemptions cited above are not asked. This is partly due to the nature of research, with its detailed objectives and explicit means. This is also partly due to the coordination that would be needed to cover the many disciplines, agencies, and organizations and the large scale involved.

Truly understanding if and how these exemptions impact the health and safety of farmers, farmworkers, and their families is fraught with difficulties and complexities. Such an effort would necessarily be long term but could provide direction for future funding. The specific recommendations in this report and the several strategies suggested for achieving those recommendations collectively might provide a starting point for investigating possible impacts. And the broad expertise needed to implement the strategies with the direct involvement of local individuals and organizations would provide a nice pool from which to select representatives. Since the NIOSH Ag Research Centers already have regional, state, and local contacts and specific criteria for advisory committees, the task force suggested seems a natural extension.

Some will view the very idea of this recommendation as contentious, arbitrary, and unnecessary. Others will claim that this recommendation does not go nearly far enough and that the exemptions should be removed regardless. Each view has its salient points and each has evidence to justify its position. I simply ask for the suggestion to be pondered and the advantages of being able to truly identify the direct impacts from these exemptions to be weighed.

Public Health Perspectives

Editor's Note: ASH-NET sought the review of and advisement on this document by a public health professional with experience working within the agricultural community. Natalie Roy, MPH, Business and Development Director of the AgriSafe Network, graciously agreed to provide this needed perspective on the document contents along with specific suggestions related to the interface of public health and agricultural issues at the federal, state, and local levels.

Document Applicability

The Institute of Medicine's *Future of Public Health* report has summarized public health practice as involving *three core functions* (IOM 1988):

- *Assessment*—of a community's health and its resources
- *Policy development*—to promote health and solve health problems
- *Assurance*—that access to health care, promotion, and prevention services are available

The recommendations outlined in this document include all three core components and the essential public health services that are included in the core components. Adapted from the *Ten Essential Public Health Services* of the U.S. Department of Health and Human Services (USDHHS 1995), these 10 services are depicted throughout this document and reflect the unique health and safety needs of the agricultural community:

- *Monitoring* health status to identify health problems of the agricultural community
- *Diagnosing* and *investigating* health problems and health hazards in the agricultural community
- *Informing, educating,* and *empowering* farmers about health and safety issues
- *Mobilizing* community partnerships to identify and solve agricultural health and safety problems
- *Developing* policies and plans that support individual and community health efforts
- *Linking* farmers to needed personal health and safety services and ensure the provision of health care when otherwise unavailable
- *Enforcing* laws and regulations that protect health and ensure safety
- *Assuring* a competent public health and personal health workforce with training in the field of agricultural health and safety
- *Evaluating* effectiveness, accessibility, and quality of personal and population-based health and safety services for the agricultural community
- *Researching* for new insights and innovative solutions to health and safety problems

The most effective prevention works at multiple levels—federal, state, and local—simultaneously. Although this document focuses primarily on federal initiatives, success is dependent on the actions of different agencies, researchers, educators, health professionals, and policymakers, each of which is integral to achieving the goal of a healthier and safer agricultural community.

The National Institute for Occupational Safety and Health (NIOSH) and other CDC centers, such as the National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), are focusing on the integration of research findings into public health practice. This document, which was developed by researchers, practitioners, and farmers, outlines recommendations that require an interdependence between those working in the field of research and those providing services. The research priorities listed in this document are based on program needs and direction from the agricultural community. In turn, the service and training priorities listed in this document are based on research findings conducted in the past.

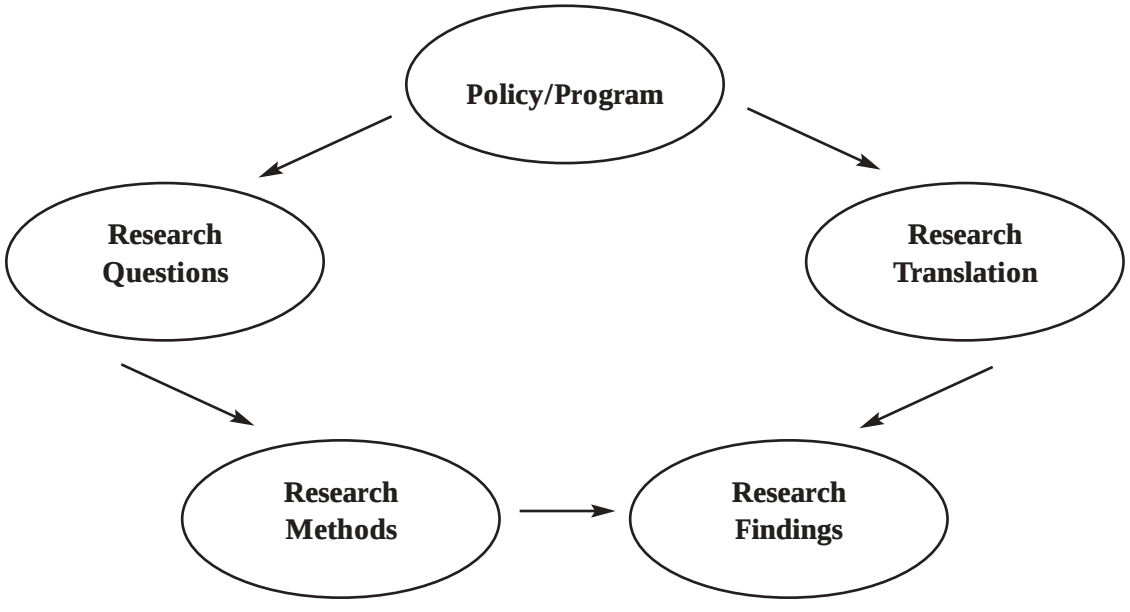


Figure 1 (taken from the research agenda of NCCDPHP) illustrates the positive feedback loop of translating research into practice.

Public Health Interfacing with Agriculture

Centers for Disease Control and Prevention

1. *The Public Health Practice Program Office (PHPPO) within CDC should integrate agricultural health and safety distance learning in the course offerings supported through the Public Health Training Network (a program of PHPPO).* PHPPO provides distance learning courses on a variety of topics with the intention of strengthening the public health workforce. Inclusion of agricultural health and safety distance learning courses would reach a broad audience of public health practitioners. Academic institutions that are leaders in the field of agricultural health and safety could collaborate with PHPPO to develop distance learning courses.

2. *The National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), a center of CDC, should develop and test Behavioral Risk Factor Survey (BRFS) modules that measure the health and safety needs of the agricultural community.* Pretested standard core questions would enable health professionals to make comparisons between states to establish national agricultural health and safety priorities.

State Public Health Professionals and Policymakers

State public health professionals and policymakers working in state offices can have a significant impact in improving the health and safety of the agricultural community. Examples of state agencies that have focused efforts on the farming population include, but are not limited to, Departments of Public Health, Insurance Commissions, Transportation Departments, Departments of Education, and Departments of Agriculture.

1. *Include questions about occupation type and farm-related illnesses and injuries in the Behavioral Risk Factor Survey (BRFS).* The Behavioral Risk Factor Surveillance System (BRFSS) is a telephone survey conducted by all state health departments, the District of Columbia, Puerto Rico, the Virgin Islands, and Guam with assistance from CDC. States use BRFSS data to track critical health problems and to develop and evaluate public health programs. The system is flexible and allows for the addition of questions to meet the needs of each state. States should consider developing and including questions that specifically relate to the health and safety issues of the *agricultural* community. New Hampshire, for example, used BRFSS data to highlight differences between rural and urban health risk behaviors. The report was then used to justify the need for a State Bureau of Rural Health. The same approach could be taken to examine differences in agricultural and nonagricultural risk behaviors.

2. *State-based insurance reform often centers on decreasing the number of citizens who are uninsured. The majority of farmers, however, are considered underinsured, indicating limited coverage and limited access to preventive services.* Health insurance plays a critical role in ensuring that people obtain timely medical care that is appropriate. In an era of high health care costs, individuals' difficulty in affording medical care has made health insurance essential for ensuring that health services are both accessible and affordable. In a 2001 study conducted with farmers in Northwest Iowa, both men and woman with coverage from a self-purchased plan were less likely to receive important preventive services than those farmers covered by an employee-sponsored plan. Particular attention was given to differences found among

employee-sponsored versus self-purchased plans. The importance of this distinction is to highlight the significance of evaluating the *type of coverage* and not merely whether someone has coverage. Too often policies or pilot programs focus on decreasing the number of *uninsured,* with very little emphasis on the *quality* of health coverage. A farmer with an insurance policy that covers only major medical costs is most likely not receiving adequate care compared with those with full coverage.

Health Care Providers and Community Educators

1. *When county need assessments or other types of surveys are conducted in rural areas, occupation type should be captured in order to examine the unique health and safety needs of the farming population.* Initiatives intended to improve rural health often do not address the unique health needs of farmers, seasonal farmworkers, and migrant workers. Collecting data by occupation can define differences in access to care, utilization of care, and health status among the agricultural an non-agricultural community.

2. *To ensure that farmers are not lost in the health care system, local service agencies need to develop strategies to coordinate, enhance, and expand access to health care.* In addition to developing an extensive referral system with health care providers, other entities such as extension services, schools, agribusinesses, commodity groups, religious organizations, and health and human service agencies can assist in the promotion of agricultural health and safety issues. Public awareness programs can be held in conjunction with community activities such as pesticide applicator training sessions and local vocational agricultural classes at community colleges and high schools.

3. *All health professionals working in locations where agriculture is prevalent should receive continuing education in the field of agricultural health and safety.* Farmers are much more apt to value services offered by providers who understand their unique occupational health problems and the nature of their work life on the farm. Valued services, in turn, lead to better understanding of preventive care and adoption of safe work practices. Therefore, the more professionals can learn about the farm work environment, the better equipped they will be in providing services. For example, the Center for Agricultural Safety and Health at the University of Iowa provides intensive continuing education in the field of agricultural health and safety.

4. *Health care providers should take an active role in improving the quality and reducing the cost of health insurance coverage for farm families.* Various health and social service organizations strive to provide care to the farming population without understanding the financial obstacles that can reduce utilization of much-needed care. Local health providers should examine the health insurance problems unique to their community, especially if these problems reduce access to care. In a 2001 study in northwest Iowa, farmers in the lowest income bracket were the most likely to lack health coverage. Interestingly, it is these farmers who would be eligible for either Medicaid or the Children's Insurance program. Health providers can take an active role in promoting the use of government funded programs for those farm families who are eligible.

5. *Health professionals should collaborate with community colleges and universities to access resources, model programs, and technical assistance related to agricultural health and safety*. Health professionals who develop partnerships with academic institutions can obtain important resources to enhance the care they provide to the agricultural community. For example, occupational health histories initially used for research purposes may be beneficial to the clinician in directing patient care.

6. *Include cause of injury (farm related, non–farm related) and occupation when entering admission data at the emergency room.* Important data on the prevalence of agricultural-related injuries is often lost because the appropriate information is not gathered during the emergency room visit. If adequately captured, such information can help health and safety specialists focus efforts and resources on the areas of greatest need.

7. *Engage farmers and farm workers in identifying and improving the health and safety needs of the community.* Too often health care professionals determine the needs of a community or an individual. Establishing a local advisory board with strong representation from actual farmers is a logical approach to ensure that health services are responsive to the community's needs on an ongoing basis. The Public Health Practice Program Office, a department within the CDC, has published a resource guide entitled *Principles of Community Engagement*. Protocols detailed in the guide can be used to engage the agricultural community in the planning process.

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Glossary

Editor's Note: In an effort to provide a modicum of consistency with other publications, as many words as possible retain the definitions used in Lee et al. (2002) and/or Vela Acosta & Lee (2001). The remainder are defined specifically for use in this document.

Accident (*Note:* The term *accident* is not used by injury specialists and thus is not used in this document.) An unexpected and undesirable event that occurs by chance. Injuries are *not* accidents. "If injuries were indeed random, unpredictable acts of God, it would make little sense to talk about preventing them (other than through prayer). But injuries can be scientifically understood and societally controlled by modifying physical agents, environments, and behaviors. Rational counter-measures can be developed . . . injuries are preventable" (Foege WH: Introduction: Injuries Are Not Accidents. *Law, Medicine & Health Care* [17]:5, Spring 1989).

Adolescent For purposes of this document, an individual between the ages of 13 and 17 years.

Adolescent farmworker For this report, an adolescent farmworker is defined as a child from 12 to 17 years old who migrates to work in agriculture in one or more states, or as a child who works locally in seasonal agricultural but does not leave his or her permanent residence.

Age-appropriate work Work activities that are suitable based on physical and cognitive capabilities deemed to be typical of a particular age group. Age-appropriate work standards are required for purposes of labor law enforcement.

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).

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 An 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.

Agriculture The industry that involves the production of crops and livestock (farming) plus related services, forestry (excluding logging), and fishing.

Agromedicine A partnership of health and agricultural professionals that promotes the health and safety of agricultural producers and workers, their families, and consumers of agricultural products. Agromedicine addresses the health and safety concerns of agriculture, including forestry and fisheries, by a combination of the sciences of agriculture and medicine. This approach was established as a collaboration of the colleges of agriculture and schools of medicine and their partners.

The scope of agromedicine reaches all who are part of the universe relating to the practices or agents used by or products of the agricultural, forestry, and fishing industries. This comprehensive approach involves multiple disciplines. Examples of areas of agromedicine include agricultural chemicals (safety, toxicity, oncology, teratology, etc.), noise-induced hearing loss, skin cancer, farm stress, insect-transmitted disease, and other areas of preventive, occupational, and environmental medicine, rural health, and primary care. (NAAC)

Barrier A real or perceived physical, psychological, or environmental factor that hinders or restricts a person's actions. Examples include economic hardship, tradition, cultural beliefs, and weather.

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 an optimal environment in 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 experience with which to search

for and analyze candidate practices, and an adoption process to identify a method for their adaptation and implementation in a specific agricultural context.

Children Individuals in the age range of 1 through 12 years.

Cumulative trauma Bodily injury from mechanical stress that develops gradually over weeks, months, or years from repeated stress on a particular body part.

Developmentally appropriate tasks Tasks that are suitable based on demarcations noting achievement of physical and psychological maturity. Developmentally appropriate task guidelines are applicable outside of enforced work standards.

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

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

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 close proximity to an unprotected physical hazard.

Family farm An operating entity owned and operated by a family or extended family that is directly involved in the work and the necessary decision making for, and that derives a portion of their income from, crop or animal production.

Farm Any place from which $1000 or more of agricultural products were produced and sold, or normally would have been sold, during the census year (standard U.S. 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.

Farm worker A person who is employed by a farm owner to conduct agricultural work. This term includes those who are employed full-time, part-time, or seasonally, and who may or may not migrate. However, these individuals are exclusive of those identified as farmworkers, migrant farmworkers, and seasonal farmworkers.

Farmworkers A diverse population, whose composition varies from region to region. However, it is estimated that 85% of all migrant workers are minorities, of whom most are Hispanic (including Mexican-Americans as well as Mexicans, Puerto Ricans, Cubans, and workers from Central and South America). The migrant population also includes black Americans, Jamaicans, Haitians, Laotians, Thais, and other racial and ethnic minorities. (National Center for Farmworker Health, Inc.)

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

H2A Guestworker Program [Labor Certification Process for Temporary Agricultural Employment in the United States (H-2A Workers)]

20 CFR 655.90—Scope and purpose of subpart B.

Section Number: 655.90, **Section Name:** Scope and purpose of subpart B.

(a) General. This subpart sets out the procedures established by the Secretary of Labor to acquire information sufficient to make factual determinations of:

(1) Whether there are sufficient able, willing, and qualified U.S. workers available to perform the temporary and seasonal agricultural employment for which an employer desires to import nonimmigrant foreign workers (H-2A workers); and

(2) whether the employment of H-2A workers will adversely affect the wages and working conditions of workers in the United States similarly employed. Under the authority of the INA, the Secretary of Labor has promulgated the regulations in this subpart. This subpart sets forth the requirements and procedures

applicable to requests for certification by employers seeking the services of temporary foreign workers in agriculture.

This subpart provides the Secretary's methodology for the twofold determination of availability of domestic workers and of any adverse effect which would be occasioned by the use of foreign workers, for particular temporary and seasonal agricultural jobs in the United States.

(b) The statutory standard. (1) A petitioner for H-2A workers must apply to the Secretary of Labor for a certification that, as stated in the INA (Immigration and Nationality Act, addition for clarification):

(A) there are not sufficient workers who are able, willing, and qualified, and who will be available at the time and place needed, to perform the labor or services involved in the petition, and

(B) the employment of the alien in such labor or services will not adversely affect the wages and working conditions of workers in the United States similarly employed. (U. S. Department of Labor)

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 that 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).

Health disparity A gap in the health status of different groups of people, in which one group is healthier than the other group or groups. Healthy People 2010 has two primary goals: (1) to increase the quality and years of healthy life and (2) to eliminate health disparities. These two goals are supported by 467 objectives in 28 focus areas. (For details, see www.health.gov/healthypeople/document/tableofcontents.htm)

Incentive A reward or punishment that induces action.

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.

Injury control Incorporates multiple activities to reduce severity of injury, including prevention, treatment, and rehabilitation.

Injury prevention Attempts to reduce the incidence of injury, usually by educational, engineering, environmental, and enforcement interventions.

Migrant farmworker A farmworker who is required to be absent overnight from his or her permanent place of residence.

Occupational health An area concerned with health in its relation to work and the working environment; including studies of all factors relating to work, working methods, conditions of work, and the working environment that may cause disease, injury, or deviation from health.

Permissible Exposure Limits (PELs) Guidelines limiting the amount or concentration of a substance in the air. They may also contain a skin designation. PELs are enforceable. OSHA PELs are based on an eight-hour time-weighted average (TWA) exposure. Employers who use regulated substances must control exposures to be below the PELs for those substances. Exposure limits usually represent the maximum amount (concentration) of a chemical that can be present in the air without presenting a health hazard. However, exposure limits may not always be completely protective.

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 forms of PPE in agriculture include hats, long-sleeve shirts, long pants, gloves, safety goggles, sunscreen, ear plugs, and masks.

Primary care providers A term referring to physicians, physician assistants, and nurse practitioners.

Production agriculture A term used to replace *farming* since it has broader application to the wide range of complex machinery, sophisticated crop and livestock management practices, and relationships with associated agricultural businesses.

Recommended Exposure Limits (RELs) Acting under the authority of the Occupational Safety and Health Act of 1970 (29 USC Chapter 15) and the Federal Mine Safety and Health Act of 1977 (30 USC Chapter 22), NIOSH develops and periodically revises RELs for hazardous substances or conditions in the workplace. NIOSH also recommends appropriate preventive measures to reduce or eliminate the adverse health and safety effects of these hazards. To formulate these recommendations, NIOSH evaluates all known and available medical, biological, engineering, chemical, trade, and other information relevant to the hazard. These recommendations are then published and transmitted to OSHA and the Mine Safety and Health Administration (MSHA) for use in promulgating legal standards. (NIOSH)

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

Rural area The Census Bureau's classification of "rural" consists of all territory, population, and housing units located outside of urbanized areas (UAs) and urban clusters (UCs). The rural component contains both place and nonplace territory. Geographic entities, such as census tracts, counties, metropolitan areas, and the territory outside metropolitan areas, often are "split" between urban and rural territory, and the population and housing units they contain often are partly classified as urban and partly classified as rural.

For Census 2000, the Census Bureau classifies as "urban" all territory, population, and housing units located within a UA or UC. It delineates UA and UC boundaries to encompass densely settled territory, which consists of:

- Core census block groups or blocks that have a population density of at least 1000 people per square mile
- Surrounding census blocks that have an overall density of at least 500 people per square mile

In addition, under certain conditions, less densely settled territory may be part of a UA or UC. (United States Census Bureau)

Safe Free 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 workplace.

Seasonal farmworker 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.

Undocumented farmworkers Farmworkers who enter the country illegally; that is, they do not possess the documentation necessary to be admitted to the United States under the following guidelines:

> Under authority granted by the INA, as amended, an immigration inspector may question any person coming into the United States to determine his or her admissibility. In addition, an inspector has authority to search without warrant the person and effects of any person seeking admission, if there is reason to believe that grounds of exclusion exist which may be disclosed by such search. The INA is based on the law of presumption—an applicant for admission is presumed to be an alien until he or she shows evidence of citizenship, and an alien is presumed to be an immigrant until he or she proves that he or she fits into one of the nonimmigrant classifications. (U.S. Department of Justice)

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Healthy People 2010

The *leading health indicators* are:

- Physical Activity
- Overweight and Obesity
- Tobacco Use
- Substance Abuse
- Responsible Sexual Behavior
- Mental Health
- Injury and Violence
- Environmental Quality
- Immunization
- Access to Health Care

The *28 focus areas* are:

1. Access to Quality Health Services
2. Arthritis, Osteoporosis, and Chronic Back Conditions
3. Cancer
4. Chronic Kidney Disease
5. Diabetes
6. Disability and Secondary Conditions
7. Educational and Community-Based Programs
8. Environmental Health
9. Family Planning
10. Food Safety
11. Health Communication
12. Heart Disease and Stroke
13. HIV
14. Immunization and Infectious Diseases
15. Injury and Violence Prevention
16. Maternal, Infant, and Child Health
17. Medical Product Safety
18. Mental Health and Mental Disorders
19. Nutrition and Overweight
20. Occupational Safety and Health
21. Oral Health
22. Physical Activity and Fitness
23. Public Health Infrastructure
24. Respiratory Diseases
25. Sexually Transmitted Diseases
26. Substance Abuse
27. Tobacco Use
28. Vision and Hearing

National Occupational Research Agenda Priority Research Areas

Disease and 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 and Workforce

Emerging Technologies
Indoor Environment
Mixed Exposures
Organization of Work
Special Populations at Risk

Research Tools and Approaches

Cancer Research Methods
Control Technology and Personal Protective Equipment
Exposure Assessment Methods
Health Services Research
Intervention Effectiveness Research
Risk Assessment Methods
Social and Economic Consequences of Workplace Illness and Injury
Surveillance Research Methods

Appendix

Conference Summary

"An Agricultural Safety and Health Conference: Using Past and Present to Map Future Actions" was held in Baltimore, Maryland, on March 2–3, 2001. Specific conference objectives were to:

1. Facilitate the presentation of diverse opinions regarding the current status of agricultural safety and health.
2. Provide a forum for discussions on the future research, education, training, and programming needs of agricultural safety and health.
3. Afford practicing farmers, farmworkers, their families, and their respective organizations an opportunity to give their opinions on and their appraisal of the agricultural safety and health environment in which they work.
4. Foster the development of recommendations on future agricultural safety and health policy by laying a foundation of information and opinion upon which to build those recommendations.

The conference attracted 165 registered participants. These participants included 26 practicing farmers. These farmers represented eight states from across the nation and were approximately 50% female. The participants also included 25 Latino practicing or former farmworkers. These farmworkers represented seven states, the three major migrant streams, and were approximately 50% female. Other participants included federal and state agency personnel, university researchers and programming personnel, agricultural industry representatives, and health professionals of all levels. Simultaneous English to Spanish oral translation was provided for the Spanish-speaking participants as needed. In addition, a Spanish-language version of the program was provided.

Over the 1/2-day conference, 7 presentations were made in the general sessions and 34 presentations were made in the concurrent sessions. These presentations were grouped under the nine arbitrary general topics of:

- Farm Populations (including NORA Special Populations)
- Hired Labor
- Public Policy
- Engineering and Technology
- Community Strategies
- Environmental Health
- Training of Agricultural Safety and Health Specialists
- Human Health (Mental and Physical)
- Agricultural Occupational Health Services and Delivery

Conference speakers were asked for their perceptions of the investments and key activities in agricultural safety and health during the period 1987 through 2001 that corresponded to their specific topic. Conference speakers were also asked to identify current gaps that remain in need of research and intervention. In addition, the speakers were asked to look to the future and anticipate changes that might impact that topic. Finally, speakers were asked for specific recommendations for future programs and policy, based on their presentation content.

As a result of conference presentations and discussions, farmworker participants asked for, and were granted, time during the final session to address the gathering with a general response to specific items brought forward during the concurrent sessions.

Consensus Work-Group Process Summary

The consensus work-group phase began immediately following the end of the conference, with nearly 100 conference participants. Participation in the six work groups included 15 farmers. These farmers were voluntarily spread among the five of the work groups to allow for farmer interaction with safety and health professionals. In addition, 16 farmworkers met as a single group. This was done at their request. The farmworkers felt that meeting as a single group would be less threatening and also that the activity would be more efficient if conducted in Spanish, with no translation needed.

The responses elicited from the on-site work-group participants would serve as the point of departure for teleconferences over the next year. The work-group participants were guided by a facilitator to maintain contact, lead work-group teleconferences, and supply summaries of previous activities. These activities were necessary in order to reach consensus on key questions:

What are the current gaps, needs, and oversights in current activities related to agricultural safety and health?

What are your suggestions on how to address the current gaps, needs, and oversights in activities related to agricultural safety and health?

What do you see as the barriers to implementing your suggestions for addressing the current gaps, needs, and oversights in activities related to agricultural safety and health?

Following the initial consensus meeting held after the Baltimore conference, a series of teleconferences were held by the work groups to augment and refine the work begun at the initial meeting. The work groups remained as constituted during the initial meeting, that is, five work groups made up of a combination of farmers and others, and a sixth work group made up of farmworkers and that also included professionals working in that arena. Again, the farmworkers requested a separate work group to facilitate discussions, held in Spanish, and to preclude any perceived power issues.

A total of 12 facilitated teleconferences were held by the six work groups over the late summer and fall of 2001, with an average participation of six participants per call. Additional contacts with work-group participants were made using U.S mail, electronic mail, and phone calls. Individual members of work groups who were unable to participate in specific teleconferences were provided multiple opportunities to contribute. All work-group participants were supplied with updated response/discussion lists from all the other work groups.

The face-to-face meeting in St. Louis was held on February, 27, 2002. All participants in the work groups were invited to this meeting. A total of 30 people attended the meeting—11 farmworkers, 10 farmers, and 9 "others"—all of whom attended the Baltimore conference. As with the conference, on-site oral English to Spanish and Spanish to English translations were provided along with Spanish translation of all text items.

The initial consensus meeting following the conference and the teleconferences provided the base of information use at the St. Louis meeting. The time was devoted to a final review of responses to the three key questions, with the majority of discussion centering on those items about which there were questions or disagreement. The important items of discussion are summarized as follows:

1. *Focus of document:* Include as many items as possible while concentrating on those items that we think can have an impact.
2. The face-to-face and teleconference meetings produced 13 pages of specific participant thoughts on the gaps and needs, suggestions to address the gaps and needs, and barriers related to current agricultural safety and health issues. The thoughts were organized for review under the nine arbitrary topics used for presentations at the conference.

   a. The majority of the gaps and needs are found within the Hired Workers and Human Health categories.

   b. The majority of suggestions to address the gaps and needs are found under the Farm Populations, Hired Workers, Community Strategies, and Public Policy categories.

   c. The majority of the barriers are found under the Farm Populations, Hired Workers, Community Strategies, and Public Policy categories.

All items contained in the summary listing will be included in the draft document *as they can be within the primary consideration under item 1.*

The following items merited special mention as they were among the items on which there were some questions or disagreement and about which some accommodation was reached.

1. Emphasize that there are many specific agricultural safety and health concerns that overlap between farmers and migrant/seasonal farmworkers but that there are also specific items that are unique to migrant/seasonal farmworkers, and these need to be noted.
2. Form a committee including Chip Petrea and farmworker and advisory committee representatives to develop a mutually acceptable farmer/farmworker identification scheme to include in recommendations.
3. Include piece written by Aspacio Alcantara on disadvantages of being an undocumented farmworker as a central statement of the group's plight.
4. Provide a prominent location, perhaps in a prologue, to state concerns related to the current H2A guest worker visa program.
5. Provide a prominent location for a recognition of the "power" issues, with a short explanation of how these affect both the living and working environment of migrant/seasonal farmworkers.
6. Include of a piece written by a family farm operator describing the perception of the difficulties these individuals face.
7. Recognition that many part-time and seasonal workers on farms accept certain inherent working conditions and responsibilities within the workplace because these are the same ones that apply to the farmer/owner/employer.
8. Emphasize the need for better awareness among and training of health professionals on common migrant/seasonal farmworker health issues.
9. Provide a short explanation of migrant/seasonal farmworker perspectives related to reporting requirements of pesticide exposure incidents.
10. In the Health Professionals section, be specific on the need for more and better education of farmers, migrant/seasonal farmworkers, and their families, as well as rural residents, regarding potential exposures to pesticides in their residences as well as at their worksites.
11. *Disagreement item:* The issue of universal health benefits for *all* workers was discussed. Farmworkers and their representatives favored such, while farmers contended that this was not a benefit routinely provided for any part-time employee or even many full-time employees.
12. Related to item 13 was the potential inclusion within the document of the consensus of concern toward health care costs in general.

An additional work group, consisting of designated board members from the National Institute for Farm Safety (NIFS) and the North American Agromedicine Consortium, has been formed to discuss common issues of concern related to interaction and cross-training of individuals serving in safety specialist/extension/engineer capacities and those serving in the health and medical professions. There is long-standing collaboration between individuals within the two groups, but identification of specific common concerns, identification of potential outcomes, and recommendations related to those concerns is deemed useful. While there were some pertinent items identified in the other work groups, a specific work group on the topic could not only generate potential items for use in the upcoming document but also could contribute to further interaction between the two organizations and their members.