

**Gaps in Knowledge of Infectious Disease:** Particularly a lack of information about infectious diseases in immunosuppressed populations and effects on women of certain infectious diseases was noted as a significant knowledge gap. Needlesticks, associated with the incidental use of injectable antibiotics and veterinary biologicals, have been noted as a problem.

### **Gases, Vapors, and Liquids**

William Pependorf had the topic of gases, vapors, and liquids. He approached it from a rather generic standpoint. He discussed a new paradigm for industrial hygiene in agriculture. He argued that we really have a special type of industrial hygiene, and that is agricultural hygiene.

What is agricultural hygiene? The old paradigm for industrial hygiene was recognition, evaluation and control. But in agriculture here we do not have the typical industrial setting. We cannot do monitoring on a daily basis. So we have to rely on anticipating the problems that may be occurring so that we can target the recognition and evaluation. The key part of this paradigm is anticipation.

The usual paradigm of control is source, pathway, and person. Here we have to concentrate on the source.

It is difficult, often impossible, to control the pathway. It is impossible to ventilate a strawberry field. It is difficult to put a respirator and a rubber suit on somebody who is working in 110°F heat in an orchard.

The third part of the paradigm is emphasizing practice standards rather than performance standards in agriculture. Practice standards emphasize good practice,

such as completely enclosed systems of pesticide handling, whereas performance standards, would stress methods such as daily monitoring of pesticides.

The lack of industrial hygiene services, the variation in the climates, the work practice, seasonality, are all not typical of industrial settings. Therefore, emphasizing practice standards only makes sense.

Gaps in knowledge here include the problem of additive and multiple exposures. We do have a situation in agriculture that is, again, different from industry—always a variety of different exposures in any one given case.

There are additive and synergistic health effects that are unknown. There is a need for more agricultural hygienists. There are precious few in this country that have the particular training and understanding of the agricultural processes and of the socioeconomic and cultural differences between the industry and agriculture approaches, which include cultural implications as well.

### **NEED FOR A COALITION**

Finally, I would like to try to put together the spirit I mentioned earlier and a paradigm of what a national coalition for local action might be. These thoughts came through in our group in various ways.

If you can, envision in Figure 1 at the center of the circle the farm family and farmworker who are the target. They are surrounded by a community, which includes a variety of different services and groups: local extensions, farm groups, the health care system, the public health departments, media, and schools.

Elements of a National Agenda

- Communication
- Community
- Surveillance Evaluation

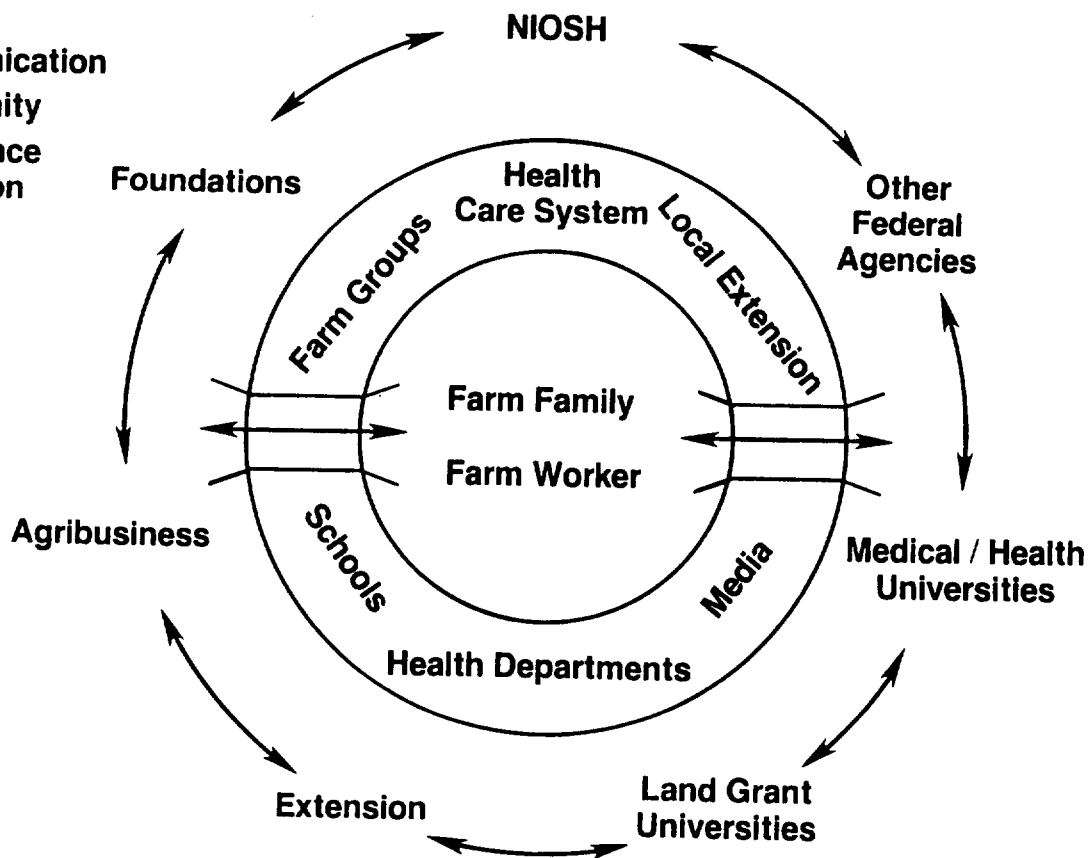


Figure 1. A National Coalition for Local Action.

Surrounding that, yet, are the national resources that we have, including NIOSH, other Federal agencies, medical and health universities, land-grant universities, national extension service, agribusiness, and foundations. There has to be communication within that outer circle and between that outer circle, to coordinate the services that are available.

Also communication is needed directly to that farm family and farmworker so that we are working on the problems that are of concern to them and are real for them and of importance for them. We must also utilize the community in which they live and work to help them solve their own

problems.

That whole communication system has to work. Included in that is the surveillance and evaluation of the programs that are in place to make sure that whatever programs that are in place are modified according to the results of that surveillance and evaluation system.

That is the paradigm that I think can result in a true "National Coalition for Local Action." Hopefully with the spirit of this conference, we can be striving for that. I think this conference has gone a long way in helping to realize that end. □

## RESEARCH - MECHANICAL AND PHYSICAL HAZARDS

By Lorann Stallones, M.P.H., Ph.D.  
Associate Professor, Department of Environmental Health  
Colorado State University

Dr. Richard A. Lemen: Our next speaker will summarize the sessions on *Research - Mechanical and Physical Hazards*. To do that is Dr. Lorann Stallones, who received her bachelor's degree from the University of California in Santa Barbara, and her MPH and her Ph.D. from the University of Texas, School of Public Health, in Houston. Dr. Stallones:

Well, that introduction does not give you a very good idea about why I am up here presenting physical and mechanical hazards when ordinarily these are in the realm of an engineer or an agriculture safety specialist. I would like to acknowledge those people who made a contribution to my being here. One of them is on the platform with me, Dr. David Pratt; one of them, I am sure, is in the audience, Dr. John May. After I finished my Ph.D. in Houston, I went up to Cooperstown, New York, where I worked at the Mary Imogene Bassett Hospital with the two of them.

There are two things that you have to know about David. One of the first things that anybody ever told me about him was that he could sell ice to Eskimos. I think in this case, I was the Eskimo. The ice was that we were in a farming community and really needed to look at what the problems were in that particular community. As public health professionals, I think that really is our obligation—one that we have been remiss in fulfilling the agricultural safety and health area.

The second thing you have to know about David is that someone—the same person, of course—told me that if you sat David down in the middle of a desert he would start to count sand. So, there he was in the center

of an agricultural community, and he started counting. What we wanted to do, because David is a pulmonary physician, is look at pulmonary disease among the farmers—of course a major problem.

So we put together a very detailed survey, and we asked a lot of questions about pulmonary disease. The last day before this questionnaire went into print David said, "I've heard that farmers have a lot of injuries. Don't you think, perhaps, we should ask that question?" So we did.

When the questionnaires came back, about 10 percent of the farmers had had a work-related injury in the past 12 months. We thought that was extremely high and that gave rise to ongoing surveillance where we called this same group of farmers every other month. Much of the data have been reported in national meetings, and I think it was an extremely important step in our development.

From there I went to the University of Kentucky where I met the other side of this whole business. He was Larry Piercy, who is an agricultural safety specialist who has his master's degree from the University of Iowa, and who trained at the Institute of Agricultural Medicine. He and a number of other people work with the Kentucky Farm and Home Safety Council.

My advice to anyone who goes to Kentucky is, if you do not want to become involved, stay away from that group, because they get you involved. You will automatically move through the ranks of going to the meetings and suddenly one day you will find yourself president of the organization. The Kentucky Farm Bureau is very active in that particular organization.

But the person I really want to acknowledge in all this is my uncle, who is a farmer in Idaho whose youngest son decided that after spending quite a number of years being a carpenter, he wanted to go back and work on the farm. Really, the reason we are here is to make sure that those people who want to go back and work on a farm will be able to work in a safe and healthful environment.

### **MACHINERY AND VEHICLE HAZARDS**

We have heard a lot about how important injuries are among children and the elderly, and I would like to introduce Tom Bean's (Ohio State University) general duty clause. The general duty clause that he proposed in our session was that old tractors and old equipment are usually used on the farm for general duty, and the people who are responsible for that general duty are the old and the young.

So that gives rise to a situation where they are at risk of injury because of the age of the equipment that they are dealing with. They also are the most vulnerable of the population in terms of injury risk.

His major recommendations were that we need to continue to aggressively evaluate the safety standards that are developed by the American Society of Agricultural Engineers.

The general duty clause that he proposed in our session was that old tractors and old equipment are usually used on the farm for general duty, and the people who are responsible for that general duty are the old and the young.

One of the problems that has not been looked at and that needs to be addressed is to develop model standards for the transport of farm equipment and self-propelled farm vehicles on the highways and public roads. We may not pick up fatalities related to road use of farm equipment, because the person who dies may be the person who is in the motor vehicle, not on the tractor.

This is a very important area because, for most equipment, there are no highway standards for the transport of farm equipment. In keeping with this, his proposal was also to improve the lighting and the marking of farm equipment. He also believed that it was very important to continue studies on educational techniques that are successful.

### **MUSCULOSKELETAL HAZARDS**

David Cochran is from the U.S. Occupational Safety and Health Administration, and he addressed musculoskeletal hazards. He focused primarily on cumulative trauma disorders, about which we know very little. If you look at the combined influences of stress and heat and the type of work that is done on a farm, there are some areas of research that are pressing.

His major proposal to reduce some of the hazards was to consider packaging of materials to reduce back injuries. Materials

can come to the farm in anywhere from 1-pound bags to 50-pound bags, which will be lifted.

The point of view of the people who are the moving materials around needs to be considered in order to package them in a safer manner. He also thought it was important to identify hazards and create solutions acceptable to the farmers.

### **ELECTRICAL HAZARDS**

Robert McLymore from North Carolina State University discussed electrical power. There were three basic recommendations.

- ▶ One is that inspections of electrical wiring are critical and need to be done on a periodic basis.
- ▶ The second is the need to adhere to the National Electric Codes on the farms, and that is frequently not done. Safety procedures need to be established, particularly when a farmer does the electrical wiring. Inspections should be done upon completion of the work and must be done by a trained electrician.
- ▶ Finally, of course, there is the issue of overhead wires about which we have no good solutions, but farm equipment frequently does come in contact with overhead wires on farms, and this is the agent in many deaths.

### **NOISE**

Matthew Marvel from Oneonta Health Center discussed noise and stress. His primary focus was on noise.

He said that in those few studies that have been done hearing loss is increased greatly among farmers, that the loss of hearing

begins in the early ages, and that one of the critical needs in this area is to improve hearing protection in order to make the equipment more acceptable for people who need to wear it.

### **TECHNOLOGY TRANSFER**

Murray Madsen from Deere Company discussed technology transfer, and he focused on the need for improved sensors, radar systems, systems to anticipate and avoid overturns of tractors and systems to alter collision courses. He believes that there is a great need to incorporate human factors into the engineering design community, and he posed some rather interesting questions, which I would like to read to you.

- ▶ How does safety become a cultural value that permeates all that each of us does?
- ▶ What are the skills needed to excel in hazard recognition in the earliest stages of design?
- ▶ What is the measure of safety improvement at the stage when only conceptual alternatives are being studied?

In order to have better technology transfer, researchers need to participate in safety research and intervention networks.

### **RESEARCH RESPONSIBILITY**

John Crowley from the Farm and Industrial Equipment Manufacturers discussed research and the responsibility of manufacturers for doing research and the public sector responsibility for areas of research. Many of the areas that he touched on were also addressed by surveillance and by the previous speaker, so I will skip over some of those; but I would like to discuss a few

of the things that have not been addressed in great detail.

One of them was improving the handling of agricultural chemicals, including closed systems, improved worker protection, and techniques that will minimize the loss of chemicals so that we can reduce the total amount of chemicals that are being used. He also discussed the need for improved air filtration systems—particularly in tractors and in work environments where you address not just dust levels but also chemical, gas, and vapor exposures.

Loggers are at even a higher risk of injury death than farmers, but many of the risks they encounter, farmers will encounter as well because farmers do logging activities.

He discussed the need for devices to detect hazardous materials, particularly gases and vapors in enclosed, confined spaces. We need to develop effective ways to gain support and cooperation to fund projects.

## FORESTRY

Penn Peters from the U.S. Forest Service discussed the forestry perspective. Deaths among loggers are about 30 times more common than among other occupational groups. Loggers are at even a higher risk of injury death than farmers, but many of the risks they encounter, farmers will encounter as well because farmers do logging activities.

There is a marked lack of awareness of the hazards of logging. Data systems need to be developed to increase the understanding of the circumstances in which the fatalities and injuries occur.

## REGULATION

Thomas Seymour from the Occupational Safety and Health Administration (OSHA) discussed the regulatory perspective and made his three main points.

- ▶ One point was that existing standards need to be fully evaluated.
- ▶ Second, we are in need of better injury data.
- ▶ Third, data-gathering needs to be improved so that we can further understand the problems.

Farmers and ranchers must be involved in the development of standards, because OSHA has had problems in the ways that they have attempted to address safety and health on farms. National policy guidance is needed in order to provide focus for targeting proper areas of research and to define the scope of research to be performed within priority areas. There is a need to address the role of behavior in prevention of injuries and illnesses among farmers.

Finally, some of the comments from the audience that should be addressed were the need for more coalitions, which do more than raise funds for research but also raise awareness, the need to identify the interventions that work, and the need to promulgate those interventions. Probably most important was understanding more about what incentives work so people do the things that we know and we believe are right.□

## INTERVENTION - AGRICULTURAL WORKERS' PROTECTION FROM HAZARDS

By David S. Pratt, M.D.

Director, New York Center for Agricultural Medicine and Health  
Cooperstown, NY

Dr. Richard A. Lemen: Our next subject is to deal with *Intervention - Agricultural Workers' Protection from Hazards*. You have heard a much better introduction of our next presenter by our previous presenter. Dr. Pratt is a physician who trained with his undergraduate degree at the University of New Hampshire, his medical degree from Tuft University, and was also in the U.S. Public Health Service for a period of time. Dr. Pratt:

I would like to also take a moment not only to thank Dr. Stallones, but also to make special note of Jack Parker's contribution to our group. Jack was on the phone with us on a continuing basis and did a wonderful job getting our group organized, and I appreciate his efforts very much.

About the members of my group: it was little bit like Dr. Stallones' experience—here I am a physician. You can see we have lots of engineers here.

I would like just to make a note that we were privileged to have an active farmer, Gary Erisman, in our group. We were also particularly happy to have Dr. Hoglund join us, from Stockholm. You will see some of his materials in just a moment. Let us look to the future. He really showed us what a bright and shining future could look like for American agriculture.

We also had the special expertise of Dr. Konz, who talked to us about application of ergonomics—the notion of how people interact with machines; and he gave some special insights into how ergonomics might help in the future of agriculture. You have already heard about Vector control from Kelley Donham today. We heard from

Robert Pinger about some of the Vector control problems. I will speak more about some of the pest problems that affect farmers and farmworkers. Then, finally, Richard Fenske gave us a very nice discussion approaching personal protective equipment; I will share some of his slides as well.

Then we had responders who brought us back to Earth, told us what it was like in the real world, and what goes on from the perspective of a consulting engineer, Ray Crammond, from the perspective of an extension safety specialist with a wealth of information, Rollin Schneider; and then also from the perspective of an agricultural engineer, L. Dale Baker, who is involved every day in design and in product development.

We entered the deliberations and discussions by recognizing that the American farmer and farm family face unique hazards in this environment. In order to make it safer for these people, we needed to understand the special risks to which they are exposed on an ongoing basis, often recalling that farming and the home environment are a single, contiguous, and shared continuum.

Thus, the children on the farm are at risk for injuries from equipment, from animals, and from chemicals on a frequent and ongoing basis. The farm workforce is older, as we have heard, and often includes family members, part-time help, and migrant workers, presenting a special and unique variety of problems that need to be dealt with.

The evolution of American agriculture as it is today has led to decreasing profit margins and increased levels of stress. Demands on farmers today are very great, indeed. As we have heard previously, they are expected to be meteorologists, economists, agronomists, crop specialists, repairmen, livestock breeders, and personnel experts.

The special health risks and hazards presented by farm equipment, including the ubiquitous tractor range from acute traumatic injuries to chronic musculoskeletal disorders. Farmers and farmworkers also face vector-borne diseases, as I mentioned earlier.

Dr. Donham pointed out that we are seeing cases of encephalitis in the northeast, and in Wisconsin we are seeing an increased amount of Lyme disease; also, interestingly and perplexingly, malaria and dengue fever. Agri-chemicals are also an important issue here, and there are other—in addition to agri-chemicals—toxic exposures that can occur in this work environment. Skin, the major organ systems, and also the lung are at risk from toxins and agri-chemicals.

Now, with that background, our group decided to look at the strategies from the experts that I told you about. What Dr. Parker and I did yesterday afternoon at the conclusion of the deliberations is try to

distill from those presentations the major guiding principles that we gathered.

We also had it emphasized to us that, all players, including the farmer and the farmworker, need to be at the table when we begin to redesign the strategies for intervention.

Those principles include the following: There are major interventions available to us as a community of interested engineers, scientists, physicians, and farmers. These would include three major options.

- ▶ One is the complete elimination of the hazard.
- ▶ Two would be what we call passive controls; that is, the operator would not necessarily have to do anything to be protected.
- ▶ Three is active controls, where volitional choices need to be made.

We also had it emphasized to us that, as Dr. Stallones said, all players, including the farmer and the farmworker, need to be at the table when we begin to redesign the strategies for intervention.

## ELIMINATION OF HAZARDS

Many of the speakers emphasized that one must apply the earliest possible interventions to maximally reduce hazard exposures. The elimination of hazards could include machine redesign, job redesign, and product substitution, or all three.

Now the benefits of redesign include the fact that it would eliminate the problem at the beginning. It is a permanent solution



to what was the problem, and it has—in the nature of the design from the engineers—planned for the potential misuse of that equipment.

I would like to give an example of some extremely innovative product design in the agricultural realm: a Finnish tractor made by the Valmet Company.

It has some unusual and unique features that we were apprised of. First of all, the controls in the cab, including the steering apparatus, can rotate through 180°. A farmer can face backwards with all his controls facing the load that he is lifting.

This tractor also is articulated. The wheels turn independently, and also it has an automatic transmission. So the amount of pressure that would have been needed to depress a clutch is no longer an issue, thereby eliminating some of the left knee problems that had been identified by our Swedish colleagues.

In addition, job redesign was discussed in our group. A Swedish woman was shown working in a dairy barn. She was carrying numerous milking hoses.

It was calculated by the Swedish Farmworkers Health and Safety Association that she would have carried about 270 tons of equipment during the milking year in a 60-cow barn. This caused a lot of shoulder and neck problems.

The engineering job redesign group went out to look at this, and they came up with a solution: an overhead track on which you can hang the milking apparatus and slide it from cow to cow. This reduced, considerably, the workload and also reduced the rate of injury and problems with the shoulders in these workers.

The IPM, as many of you know, often will have a significant reduction in pesticide application and frequently prompts the choice of a less toxic compound in the work environment.

We were also told that the use of integrated pest management (IPM) is a solution that involves product substitution and administrative control. The IPM, as many of you know, often will have a significant reduction in pesticide application and frequently prompts the choice of a less toxic compound in the work environment. Please be mindful of the fact, as was emphasized in our group, that hazard elimination, at times, may need to be driven by legislation or regulation, especially when there are severe hazards and recognized effective interventions are available.

## PASSIVE CONTROLS

The next topic for discussion was passive controls. Our presenters and responders pointed out that in settings where complete hazard elimination is not possible, then passive controls may be applied.

Perhaps the best example of passive controls is roll-over protective structures (ROPS). Now, unfortunately, even if you have a ROPS you should not be opening the back window of an enclosed cab on a tractor and certainly should never have a child back there.

So, the passive systems are only as good as the operator, and in this instance some of the safety features of this cab have been subverted by removing the rear window. This breaks the sound reduction, as well as

the internal environmental controls and, indeed, puts a child at risk.

Other examples of passive controls include special kill-switches on chain saws such that when they buck or kick back they will automatically be turned off.

Finally, another example of passive controls includes what are called closed pesticide loading and mixing systems. Those particular systems allow a completely closed operation from the container into the mixing vats, thereby never exposing the worker.

### ACTIVE CONTROLS

The next group of strategies was termed active controls. Active controls are necessary when full hazard elimination or passive controls are not possible. Active controls require that the worker carry out a protective behavior such as donning personal protective equipment, applying an insect repellent, or reading and heeding warning labels.

The ultimate in personal protective equipment was shown. Astronauts were involved in working outside a space shuttle, which our colleagues at NASA call extravehicular activity. This is a situation where an active control system is absolutely mandatory, since one could not even live in that environment without that kind of gear and garb.

You immediately recognize that that equipment is wonderful, if you are going to be in the cargo bay of a shuttle, but it would be lousy to do your everyday activities, whether at work or at home, in that kind of a get-up. There are significant limitations in personal protective equipment, and they were enumerated in our group as

follows: it is uncomfortable, it may impose ventilatory stress, it certainly would reduce dexterity, and it may lead to heat loading and heat stress on the workers. This is especially true in people who work in warm climates and need to be fully covered.

Another point I should make about the limitations: a pesticide worker was shown wearing a non-woven garment that had a materials failure. The armpit was torn out. There was a gap in the underside of the garment, so that would allow a pesticide to escape onto the individual.

Finally, we heard that warnings, for all the emphasis we put on them, frequently do not work. They are temporary. They can be wiped off, erased, or removed. They have serious limitations. That is not to say that our group completely rejected training, education, and knowledge. In fact, one final thing that is shown here is an attempt to inform, to make sure that the agricultural population of Sweden is an informed population, about tractors that are designed with ergonomics in mind and with safety in mind.

We saw what you might think of as Swedish "Consumer Reports" of tractors that are ergonomically sound. The document was developed by the Swedish Farmers Health and Safety Association.

It was like a Michelin guide for restaurants. Four stars is excellent; three stars is good; and so on and so forth. Such scoring was resisted by the manufacturers in Sweden but has been very popular among the farmers and farmworkers.

Let me conclude by saying that our group decided that intervention strategies are most effective when they are applied early

in the process. Passive controls are less desirable but at times may be life-preserving and life-saving. Active controls are the least desirable interventions because they require forethought, modifications of behavior and, often, discomfort. Intervention strategies should always incorporate the knowledge of the users.

Intervention strategies are most effective when they are applied early in the process.

I am reminded of that little aphorism from Japanese management that says, "The worker has intimate knowledge of the process." In this instance it is the farmer and farmworker who have valuable, intimate knowledge.

Finally, in conclusion, we agreed that serious attention should be paid to using all the options to deal with what we all recognize as a clear and present danger to the American farmer and farmworker.□

## INTERVENTION - SAFE BEHAVIORS AMONG ADULTS AND CHILDREN

By *Walter J. Armbruster, Ph.D.*  
Associate Managing Director, Farm Foundation

Dr. Richard A. Lemen: Our next speaker will look at *Intervention - Safe Behaviors Among Adults and Children*. To do this, we have Dr. Walter J. Armbruster, who received a bachelor's degree and a master's degree in Agricultural Economics from Purdue University, and a doctorate in Agricultural Economics from Oregon State University. Dr. Armbruster:

We know that surveillance and research are, indeed, often precursors to intervention. Some of the discussion groups apparently did more than work on the necessary input to intervention, they even delivered some of our group's ideas for us. Be that as it may, I hope we will not be too repetitive.

The rapporteur for our discussion group, Dr. David Hard, deserves a great deal of credit for helping me put together an overview of what we discussed.

I was admonished by our group not to generalize our discussion to the point that we could have written the report before we arrived. I see some of them in the audience monitoring my reporting.

I hope they recognize our discussion. In some ways, Kelley Donham's diagram of a national coalition for local action could be viewed as the game plan for our whole discussion.

Achieving safe behaviors among adults and children, which we hope to foster through intervention, is an ongoing challenge. We grappled with ideas on how to better intervene to foster such behavior, so that it will avoid unintentional injuries in the agricultural occupations and create a safer and

healthier environment in which to live and work.

Our recommendations consist of a combination of short- and long-term implications or suggested actions that are aimed at immediate as well as future improvement in agricultural safety and health. While our discussion considered short- and long-term differences, the ideas did not lead to that framework very well.

We will introduce the ideas with the intent that some are short-term and some longer term in nature. We need to pay attention to this as we think about how to implement these ideas and recommendations.

### BEHAVIORAL CHANGE

There was rather widespread agreement in our discussion group that our overall goal is to achieve behavioral change that will result in a safer, healthier living and working environment for those engaged in agriculture. We have a good deal of evidence, e.g., from automobile seat belts, that providing education or information is not sufficient, though we feel it is a necessary precursor to achieve behavioral change. What is necessary to change attitudes regarding health and safety.

Mental health is an important aspect of overall health and a necessary ingredient of safe behavior. We had a bit of discussion about that, although we did not focus on it a great deal.

In trying to achieve behavioral change, youth may provide a more readily adaptable audience than some of the older clients that we try to reach. Hence, a focus on youth education and youth intervention may be very effective in changing their behaviors for their lifetime. We also believe that reaching adults through youth is a very effective channel for modifying adult behavior.

Similarly, we had some discussion about the possibility of working with spouses to help them understand the need for behavioral change, to reach the farmer whose behavior we are trying to change. We discussed it generally in terms of the spouses being the wives who would help the husbands change his behavior.

But we all know that there are many women farmers, so I assume that it works the other way also. We had a fair amount of agreement that the husbands listen to the wives; we did not have much discussion about whether it works the other way. So that is a hypothesis on my part. The point is, indirect access for delivery of messages as well as direct access, to our target audiences, may be a very effective strategy for achieving behavioral modification.

## LOCAL EFFORTS

We discussed local and state coalitions for working on agricultural health and safety issues, educational resources, and access to what is available in the various states. The federal role in coalitions is to help coordinate the state efforts, help avoid unneces-

sary duplication, and provide funding for the larger research base, intervention programs and mandated programs.

There was widespread recognition that while local coalitions may be very effective in delivery, they need a lot of help from federal and state levels in achieving or obtaining the resources with which to do their work at the local level. We need to think carefully about funding to make coalitions functional.

At the local level, it was pointed out that even a small amount of money is often quite significant and creates the opportunity for leveraging into significant activities that can have a realistic impact. I think some of the discussion was in the context that there is a lot of federal money and let us get it down to the local level where it will do some good.

As you think about it, the implication may also be that at the local level you may be able to raise the funds within the community to put on some of the educational or intervention activities that may be very effective. Someone suggested that we should not overlook the general businesses in our community as a funding source.

Knowing that more than half of the farmers in the U.S. receive more than half of their income from off-farm sources, there is a very direct stake in agricultural safety and health for those employers who do not necessarily have a direct connection with agriculture. These employees who count on having healthy employees who can be on the job and are not using the insurance benefits from that company's program to recover from injuries because of unsafe practices or unhealthy conditions in their farming operation.

Another point we discussed was the need to find ways to make it easy for individuals to achieve change in behavior. One suggestion was that when a farmer buys a significant amount of chemicals, protective clothing or protective gear needed to safely handle the chemicals could be packaged as part of the total product purchased.

You would not be given just a large can of pesticides, but rather a large can of pesticides with a safety suit attached directly to it. Obviously, there are some cost considerations that would need to be taken into account.

A related point was made about making it easy for farmers and agriculture workers to purchase safety equipment in general. In some cases it is very difficult to locate a local source. The individual may have to find catalogs or go to significant effort to locate the safety equipment needed.

So one of the opportunities or challenges for local or state coalitions might be to somehow assure that at least one source of supply for necessary safety equipment is available locally—a local cooperative or some private outlet. Making sure that those who need to purchase safety materials can find them easily, should they listen to our messages delivered through intervention, ought to be emphasized.

## RESEARCH

Then we turned our discussion to research. There was a strong feeling that we need better research on evaluating the effectiveness of the various intervention programs that are ongoing. I think somebody already made this point: if we are able to measure changes in behavior and sort out the links that they have to various interventions, then we can perhaps identify

which of those interventions are more effective than others. We know that budgets are tight. So that would imply withdrawing funds from programs that are not achieving, in order to obtain funding for those that are successful or for new programs.

The second issue regarding research that we talked about was the need for more basic research on the relationship between behavioral change and intervention alternatives, whether it be education, regulation or automatic protection from agents of injury. We do not know the linkages very well, so it makes it difficult to design new programs or better programs.

There was some feeling that legislation may be needed because education or other forms of intervention are not very successful, but there is also a feeling that legislation alone is unlikely to be effective. We have a lot of evidence, again going back to the seat belt example. Most or all states have seat belt laws now, but that does not mean that we have 100 percent of people buckling up.

We need to motivate individuals and communities, through education, to help modify behavior and accept or take advantage of safety equipment and healthy choices. We have a lot of anecdotal evidence, and I think more than that, of individuals overriding built-in safety features. So we need to use all of our approaches to achieve safe behavior in the agricultural occupations.

## COMMUNICATIONS

Finally, we had some discussion about the important role of communications in achieving behavioral change. We must pay attention to communications and carefully

consider how to deliver intervention in a manner that causes individuals to follow through to implement the desired changes.

We also know that reaching adults through youth is a very effective channel for modifying adult behavior.

We must carefully consider the background of targeted audiences, for example, age-appropriate programs for youth and education-level considerations, which dictate delivery approaches. If you have a farm or agricultural clientele or agricultural workers' group who are not highly educated, you may have to use cartoons, comic books, and posters requiring minimal amounts of reading.

Pictorial images may have to be used to get your point across. People with a low level of education are not going to read a six-page handout with many details related to safe behavior.

Similarly, if you are dealing with various cultures—Hispanic comes to mind—culture is quite important in how messages are normally delivered or more favorably received. Pictorial presentations and comic book kinds of educational materials apparently have a tradition of acceptance and use in Spanish cultures.

A point was made that we need to be careful that we draw on proper expertise—whether we are trying to create age-focused, education, or culturally appropriate materials. A partial understanding by somebody who is an expert in a particular aspect of health or safety, but who knows very little about child development stages,

educational strategies, or cultural differences, or who is not a proficient translator, may do more harm than good. That person may garble the message or weaken the impact of materials that could have much more effect by getting the proper expertise involved.

Another point regarding communications is the use of a range of media, organizations, and people to reach the target audience. Direct as well as indirect approaches, as I indicated earlier, repetitive messages, and varying approaches are needed. Use all the media, program opportunities, and the organizational efforts to repeat messages in various ways.

Finally, in communication, we need to be careful that proper communication takes place not only within coalitions at the local, federal and state levels, but also up and down the line.

We cannot have only top-down approaches. We know they will not work. We cannot have only bottom-up approaches, because we know we will have difficulty achieving access to good materials, etc. We need to make sure that the communications between the coalitions at different levels are fully utilized.

Finally, in closing, let me say that despite the admonition of the participants in our group, which was a large and actively involved group of probably 75 or so, I may have generalized too much in summarizing. A written report will contain some of the richness of discussion that I had to generalize away from this morning. □

## REPORT ON MIGRANT AND SEASONAL FARMWORKERS

By Valerie A. Wilk, M.S.  
Health Specialist, Farmworker Justice Fund, Inc.

Dr. Richard A. Lemen: The last speaker whom we have today will provide a *Report on Migrant and Seasonal Farmworkers*. Valerie A. Wilk received a bachelor's degree from Knox College in Illinois, and a master's degree in preventive medicine and environmental health from the University of Iowa. She is currently a health specialist with the Farmworker Justice Fund in Washington, D.C. I just want to read a couple of things that her organization does, and I am sure she is going to tell you more about this; but, as I see it, they try to make sense out of national and state-level occupational health policy issues facing farmworkers, and they develop strategies to address these issues. They attempt to educate the public, and they attempt to develop coalitions about these issues. Secondly, she also directs the Farmworker Women's Health Project, and she has just returned from a meeting on migrant and seasonal farmworkers. She will tell us about that meeting, and tell you about some of the problems that face these farmworkers. Ms. Wilk:

One of the advantages of speaking absolutely last on a panel is that a lot of the previous speakers said some of the things that I was planning to say, so it makes my job easier.

This is my first chance to attend this conference, because for the last four days I was in Buffalo, New York. During the days of your conference, there was another national agricultural conference—the 1991 National Conference on Migrant and Seasonal Farmworkers. It brought together over 1,300 migrant educators, farmworkers, Migrant Head Start educators and directors, employment training workers, attorneys and health care workers—both clinicians as well as non-clinicians—people like the physicians, nurses, and physician's assistants, as well as environmental specialists, health educators, and outreach workers.

The theme of the conference was "United for Progress." Over the four days, the conference participants had a chance to choose from over 160 workshops and plenary sessions. The sessions were heard in

English, some in Spanish only, and some were bilingual.

I am specifically focusing on the health workshops of the conference. Then what I'd like to do is go over some of the recurring themes and recommendations that came out of that conference and leave you with a couple of my observations from my 11 years of working with farmworker organizations.

### THE NATIONAL CONFERENCE ON MIGRANT AND SEASONAL FARMWORKERS

I know that at least one of the previous speakers on Monday spoke somewhat about farmworkers, but I just want to tell you, when we talk about migrant and seasonal or non-migrant farmworkers, we are talking about hired workers. In a 1990 demographic report, the Federal Office of Migrant Health estimated that there are four million farmworkers and their family members in the United States.



They are predominantly people of color. They are men and women; they are children. They are Hispanic, African-American, Haitian, West Indian, Southeast Asian, or Native American. They pick the fruits and vegetables; work in nurseries, greenhouses, and mushroom sheds. They hoe, weed, thin, and prune crops.

Almost one million farmworkers and their families migrate. Migrant workers travel throughout most of the United States.

The farmworker conference dealt with the issue of child labor; it dealt with farm injuries such as those related to falls from ladders. We focused on issues of disability and injuries from prolonged bending, stooping, heavy lifting, and carrying, and repetitive motion, including the musculoskeletal effects on children and results seen in the elderly.

One of the workshops dealt with workers' compensation and the fact that in about half of the states in the United States farmworkers are not covered at all by workers' compensation. We also dealt with the issue of pesticides, including farmworker poisonings from direct spray, from drift, and from residues on the plants.

We talked about effective methods of educating farmworkers and employers about pesticide use and hazards. We also talked about research projects being done, and about farmworker health status in general.

One of the points that came through, and one of the other speakers on the panel today has mentioned it, is that the workplace and home are one and the same—particularly in terms of migrant workers where migrant labor camps are right in the middle of fields. So when fields are

sprayed, so is the home, so are the children, even if they are not directly working in the fields at that time.

We also dealt with the issue of farm machinery-related injuries, heat disorders, and a major occupational hazard for hired farmworkers, which is transportation-related injuries. Farm labor contractors too often transport workers in unsafe vans and trucks. This unsafe transportation has resulted in deaths and serious injuries of a number of workers.

Most recently, in December 1990, in Florida, four farmworkers were killed and seven were seriously injured when a farm labor contractor's truck was broadsided by a van, and the truck carrying the farmworkers rolled over repeatedly. The farmworkers had been riding in the back of the truck on makeshift benches of planks and cement blocks, which is a violation of the Migrant and Seasonal Agricultural Worker Protection Act.

Farmworker advocates in the area had reported this particular farm labor contractor for violations six months previously, but nothing had been done. Because of this inaction, four workers died and seven were seriously injured.

We also discussed the issue of field sanitation. In 1987 OSHA promulgated regulations to require that drinking water, toilets and hand washing facilities be provided by employers for workers with 11 or more workers on any given day in the fields. The reality is that compliance is very low. There have been a couple of studies in the last year. In 1990, a study done with the North Carolina School of Public Health found that only 4 percent of farms were in complete compliance with the Federal Field Sanitation Standard. There was a

study done in New Jersey in 1990 that showed a figure of 16 percent compliance.

We discussed strategies to improve employer compliance and OSHA enforcement. One of the issues that came out in that workshop was the fact that the threat of employer retaliation is so great. If you have to rely on formal worker complaints, there are very few workers who are willing to risk their job if they know that OSHA may not be out to inspect for a week or two weeks or maybe 30 days. By that time, the labor crew has already left that farm and that work.

Another aspect of the field sanitation standard is drinking water. Common drinking cups are a major problem, as is clean and sanitary drinking water at the worksite.

We also talked about children's health and safety. Children drink and bath in contaminated water—water contaminated with pesticides and fertilizers. We also talked about injuries and about drownings in rivers and irrigation ditches.

Another workshop that attracted a lot of attention had to do with farmworker women and health. In March of this year, the Farmworker Justice Fund sponsored the First National Farmworker Women's Conference. It was the first event of our Farmworker Women's Health Project.

We brought 63 farmworker women and trainers to San Antonio for a three-day conference, and all of the farmworker women were women of color. They were Hispanic, African-American, Haitian, and Southeast Asian.

The meeting was held in three languages: Spanish, English, and Haitian-Creole. We will be publishing proceedings of that mee-

ting later this year. We brought two of the farmworker women, who had been elected by the group in San Antonio, to the Buffalo Conference to present to that conference about the health priorities and recommendations that the women made in San Antonio.

There are a number of health issues specific to women. For example, with regard to field sanitation, urinary tract infections. If there is no privacy or no clean facilities, farmworker women will wait an entire day before going to the bathroom. This is particularly troublesome for women during their menstrual period and for pregnant women.

With regard to farmworker women and their exposure to pesticides, there are consequences of long-term exposure to the reproductive system, such as infertility, as well as the risk of miscarriages and birth defects. In November of 1989, there was a mass poisoning near Ruskin, Florida, and there were about six pregnant women, most of them in their first trimester, who were among the workers who were poisoned.

Of those women, the medical director of the clinic who treated the workers knows of two women—one who miscarried and another who had a baby with birth defects of the face and hand. There was another case, which was unconfirmed, of a still-birth.

Another issue facing farmworker women is sexual harassment, rape, and even sexual slavery in labor camps.

Housing is a major concern and occupied various workshops at the conference—substandard housing, overcrowded housing, or no housing at all.

We have had reports of hundreds of workers in Arizona living in the citrus groves, sleeping under tarps with cardboard on the ground. Also, in southern California there are cases of workers who have been living in holes in the ground in the canyons. I just heard in Buffalo that in at least one case, workers were being charged for rent for the tree that they were sleeping under.

In a number of the workshops there were very concrete examples of groups who had worked in coalition, either within their community or statewide, on particular health and safety issues: workers' compensation or field sanitation.

What I have not shown you in these slides are other occupational hazards that farmworkers face: tuberculosis, involuntary servitude, and employer retaliation. I have heard through my office of a number of situations where farmworkers have gotten fired simply for asking a question about the safety of farm equipment or about the location of field sanitation facilities, or for refusing to return to a recently sprayed field, or for taking action and getting out of a field while it was being sprayed. There are no anti-retaliation protections under the Federal Pesticide Law, and OSHA's anti-retaliation protections are so time-consuming that with the seasonality of farmwork, they offer little protection for farmworkers.

## **THEMES AND RECOMMENDATIONS**

What are some of the recurring themes from the Buffalo conference? First of all, there was the recognition of the importance of service providers, particularly health care providers, being advocates for

farmworkers; and that advocacy to correct occupational and environmental health problems was, indeed, preventive medicine and extremely important. I have been gratified to see over the years that this has been a growing sentiment among migrant health and migrant service providers.

There was a commitment to continued and better coordination and communication among programs to most effectively use the resources available. Related to that was the importance of coalition building within one's community and beyond on farmworker health and safety issues. In a number of the workshops there were very concrete examples of groups who had worked in coalition, either within their community or statewide, on particular health and safety issues: workers' compensation or field sanitation, for example.

Another theme was the importance of the need for and the barriers to getting workplace information, most strikingly the right to know which pesticides are used and when they are applied in the fields. Another theme was the importance of the use of popular education methods to teach farmworkers, that is, getting farmworkers involved in an egalitarian way in training by doing skits and interacting with volunteers from the audience so you are not just doing straight lecturing about health and safety and pesticide safety.

The other thing, which I mentioned earlier, is the extent of farmworker intimidation by employers, and the lack of protection for workers who demand and who question and who actively try to make the workplace safer.

Finally, I would like to leave you with two observations. First of all, a *National Coalition for Local Action, FarmSafe 2000*,

## Elements of a National Agenda

must include migrant and seasonal farmworkers as equal partners.

Not only must farmworker family occupational safety and health issues be considered as seriously and as fully as farm family health and safety issues—because so many of these issues are similar and because farmworkers are important workers within the agriculture industry—but also farmworker leaders, community leaders, and union leaders need to be involved in the coalition as equal and active partners. Farmworker advocacy organizations such as the Farmworker Justice Fund can help identify those farmworker leaders to participate in this process.

Also, when we are talking about coalition building, what struck me earlier with the four components of a coalition, quite frankly, was that two of those partners in a coalition have been some of the biggest

barriers to farmworkers getting a safe and a health workplace. Both industry and government have opposed and have subverted some of the attempts to protect farmworkers, through legislation and regulation.

A safe workplace makes economic sense, and society picks up the tab when we have unsafe workplaces. Action is needed, but actions as have happened in the past cannot continue. We need to look at different ways of working together. We need to convince industry and government that changes need to be made, and we need to support farmworkers in their efforts.

Some of the most cutting edge protection for farmworkers have happened under union contracts. We need to look at all the different models to make sure that farmworkers are equally protected.□

## OUTSTANDING FFA POSTER

By Rice C. Leach, M.D.  
Chief of Staff, Office of the Surgeon General

Dr. Richard A. Lemen: Our next session is going to be chaired by Dr. Rice Leach, who Surgeon General Antonia C. Novello appointed as her Chief of Staff in April 1990. As Chief of Staff, Dr. Leach is responsible for coordinating the activities of the Office of the Surgeon General (OSG). Dr. Leach came to the OSG from the Health Resources and Services Administration, Bureau of Health Care Delivery and Assistance, where he was the Chief of the Public Health Service (PHS) Recruitment Program. He began his PHS career in 1966 as a rotating intern at the PHS Hospital in New Orleans. He has served the Indian Health Service (IHS) in numerous clinical and management assignments including director of an IHS area, manager of the IHS AIDS program and associate director of the IHS Office of Research Development. Dr. Leach has also served in the Bureau of Medical Services. Dr. Leach was born in Lexington, Kentucky and received a B.A. from Amherst College, M.D. from the University of Kentucky, and a Master of Science in Health Services Administration from the Harvard University School of Public Health. He completed his preventive medicine residency at the University of Arizona and an internal medicine residency at Tulane. Dr. Leach has served on the Federal constituency section of the American Hospital Association, the South Dakota Statewide Health Coordinating Council, the Board of the Arizona Hospital Association, and the education committee of the Arizona Medical Association. Dr. Leach:

Dr. Novello would like to be with us today but, as she said earlier, she has other obligations. There is another physician who would love to be here today, too, Dr. J. Donald Millar. He has been detained by some occupational health standards that say something to the effect that "There will be no planes leaving San Francisco with broken radar." He is

grounded in Denver and will be here later this afternoon.

At this point in the program, we are going to the first place award for the best FFA poster presentation. One of the judges who was recently president of an FFA association made the following statement about the posters:

*They were all outstanding. I spent a lot of time talking with the members, and it is obvious that they take a great deal of pride in their programs. To tell the truth, judging is not nearly as easy a task as I had thought. My compliments to NIOSH and the Surgeon General's Conference staff. Thanks for letting me be part of it all. It was exciting to see so many people so fired up about safety.*

Those are the comments of Sheryl Janko, the immediate past president of the Iowa FFA Association.

The group judged to have the best poster is the Amanda Clear Creek FFA Chapter from Amanda, Ohio. Representing that group are Mr. Gary Brumfield, the Safety Program Chair, and Mr. Charles E. Miller, the advisor. □

## OSHA INITIATIVES IN AGRICULTURAL SAFETY AND HEALTH

By *Cynthia Douglass*  
Deputy Assistant Secretary of Labor  
U.S. Occupational Safety and Health Administration

Dr. Rice C. Leach: Our first speaker is Cynthia Douglass, Deputy Assistant Secretary of Labor, Occupational Safety and Health Administration in the United States Department of Labor. Ms. Douglass was appointed Deputy Assistant Secretary of Labor in December 1989. She is responsible to the Assistant Secretary for the external activities of the agency. She works with other Federal and state agencies such as the Congress, the Environmental Protection Agency, labor unions, business, and others to enhance worker safety and health. Prior to her time with the Labor Department, she was Administrator of the Research and Special Programs Administration for the Department of Transportation. Prior to that, she was Special Counsel to the Senate Commerce Committee, which worked on a wide variety of issues including automobile safety, motor carrier safety, economic deregulation, and insurance. We have a very qualified spokesperson. I give you Ms. Douglass:

Thank you very much. I am delighted to be here. I am also delighted to be a participant in the first Surgeon General's Conference on Agricultural Safety and Health and want to thank Surgeon General Novello and Dr. Millar for inviting the Occupational Safety and Health Administration (OSHA) to participate and speak at this important meeting. I assure you that OSHA wholeheartedly supports the Surgeon General's attempts to prevent injury and disease in the agricultural workplace.

My boss, the Assistant Secretary of Labor for OSHA, Jerry Scannell, wanted very much to be here to convey to you his concerns about farmworker safety and health. Unfortunately, as I am sure you all know, there was a catastrophic explosion at a fertilizer plant in Sterlington, Louisiana, two days ago. Eight people were killed in that explosion, and over 100 people were injured.

Mr. Scannell flew there yesterday and could not get a plane out in time to be here this morning. Jerry believes that it is important to personally let the community and the workers know of OSHA's commitment to the workers of that facility. He also believes that it keeps his heart and soul focused on the primary goal of OSHA, which is to assure every man and woman a safe and healthful workplace.

He asked me to come here and talk with you about OSHA's program, and I am delighted to be back in the Midwest. I am from Kansas and went from there to Washington, D.C. in 1976. I would note that I was there in time for the huge farmer protest in Washington, which was in 1977, and I believe again in 1978.

I still have a bumper sticker that was given to me by some Kansas wheat farmers that says: "If you don't like wheat farmers, don't talk with your mouth full." Those are my sentiments exactly.

As I said earlier, agricultural safety and health has been one of Assistant Secretary Scannell's major concerns since becoming Assistant Secretary of Labor for Occupational Safety and Health. I know he will be pleased that this conference has been so successful.

We are all appreciative that the Congress appropriated the funds for this conference and believe that the conference will help further the education and relationships necessary to reduce the shameful accident-rate of farming. OSHA, in particular, wants to develop a good relationship with your community, because together we can make a difference.

The breadth and depth of the subjects that have been covered during the four days of this conference is impressive. So is the fact that there has been participation from members of farm organizations, migrant worker representatives, academic institutions, safety and health professionals, the states, and the government agencies, all of which play an important role in this vital area of agricultural safety and health. This is truly the kind of national coalition and partnership that can make a difference.

OSHA's interest in working with you to reduce the occupational deaths and injuries in American agriculture is evidenced by the fact that we have 17 staff people attending this conference. In addition, a number of the representatives of states, which operate their own OSHA-approved occupational safety and health programs and OSHA-supported state consultation programs, are attending. OSHA is committed to efforts to improve safety and health in agriculture.

## **THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION**

I want to tell you a little bit about OSHA and how it operates. OSHA has jurisdiction over occupational safety and health in more than six million workplaces in America, employing about 90 million workers. We operate on a relatively small budget for that, about \$285 million, with an authorized staff of a little over 2400 people, of whom approximately 1300 are inspectors.

Our mission is to ensure safe and healthful working conditions for working men and women through a variety of means, including regulations dealing with occupational safety and health, education, training, and technical assistance. Of course, we have an enforcement program.

In carrying out this mission, we rely heavily on a partnership that includes labor and management, the states, the Federal government—NIOSH, for example—safety and health professionals, and academia.

Our enforcement jurisdiction in agriculture is limited by law to those farms that employ 11 or more workers. This means that we do not enforce OSHA regulations on the great majority of farms; 86 percent of American farms are smaller, part-time operations. We do have enforcement authority in migrant labor camps.

We are all aware that agriculture is one of the most hazardous of American industries, with 1,300 deaths and 120,000 disabling injuries in 1989, according to National Safety Council figures. Many of those injuries involve children.

Therefore, OSHA has a big responsibility, working within the limitations placed on it by the appropriations language, to seek to reduce these injuries and fatalities in the farming industry. OSHA has the authority to work with small farms. The only prohibition is on enforcement.

For years that appropriation rider was interpreted by OSHA to mean, just stay out of the farm and stay away from the farm community. We do not want OSHA—we do not even want the word spoken in the farm community.

But that is not what the statutory language says. OSHA can give technical assistance to farmers. We can work with your communities.

The answer lies in education, training, and increasing awareness of those hazards and how they can be reduced.

We can help develop materials and training and educational seminars to aid in increasing awareness and knowledge about safety and health problems in agriculture and the actions that may be taken to minimize these problems. In that connection, for example, we might seek the aid of university-based agricultural safety and health centers and other government agencies, such as the extension service, to provide necessary expertise and guidance in training staff members for outreach and consultation activities.

We can also provide OSHA-supported consultation services to small agricultural employers. The consultation program is a

voluntary one and helps develop mutual trust between farmers and OSHA. I might point out that the representatives of OSHA-supported consultation programs recently met in Tucson, Arizona. One of the principal items on their agenda was consultation services in agriculture.

OSHA also reviews existing standards that apply to agriculture, such as the roll-over protective structures (ROPS) standard. We look at whether these standards should be modified to reflect changing conditions in the United States, in the world, and in the industry. We need your help, though, on reviewing and modifying these standards, if we are to have good, common-sense safety standards.

All too often OSHA is only regarded as an enforcement agency. Enforcement is not the principal answer to reducing hazards in America's agricultural worksites. The answer lies in education, training, and increasing awareness of those hazards and how they can be reduced.

My boss, Jerry Scannell, has committed OSHA to developing a positive communication goal. He wants to work with others such as NIOSH and your organizations and believes that if we do that, we can have a significant impact on agricultural safety and health.

During the 1970's, OSHA had an advisory committee on agricultural safety and health. Jerry is considering the re-establishment of this committee.

We have been working to re-establish a number of relationships with government and private organizations, and we hope to



continue this. The message is that OSHA wants to work with all of you to further agricultural safety, education, and awareness.

Farmers, themselves, recognize that they work in a hazardous occupation. The National Coalition for Agricultural Safety and Health (NCASH) conducted a survey of New York and Iowa farmers. More than 70 percent of those farmers who were surveyed said that their occupation was more hazardous than other occupations.

In connection with that, I am gratified to see that one of the concurrent sessions at this conference dealt with behavioral changes among both adults and children working on the farms. Strategies must incorporate new and innovative approaches to behavior modification.

## **AGRICULTURAL SAFETY AND HEALTH**

Let me tell you something about what OSHA has been doing in agricultural safety and health. This is all relatively new, by the way, just in the last 2 years. We have been holding numerous meetings since January of 1990, developing OSHA's plans and initiatives to carry out a program of enhanced awareness of work-related hazards in agriculture and how to cope with them.

OSHA is working closely with NIOSH staff from Dr. Millar's office, meeting with our OSHA executive staff to explain activities and to share ideas. We are doing this on a regular basis.

During a series of conferences on the permissible exposure limits (PEL) for air

contaminants in agriculture, a regulatory initiative, NIOSH joined with OSHA to explain our respective agencies' work to the attendees. This summer we will ask an occupational health nurse intern serving on our staff to further update OSHA staff on the latest research findings of NIOSH in agriculture and to determine how OSHA can best utilize this NIOSH material to maximize its own efforts.

OSHA also has held meetings and discussions with the Rural Safety and Health Committee of the American Farm Bureau; USDA officials; the Office of Rural Health Policy; Agricultural Division of the National Safety Council; and the Farm Safety for "Just Kids" organization. These are a few of the organizations we have met and with whom we have been working.

One of our most successful efforts was production of various news feature material and radio and television spot announcements for distribution to 3,500 rural media during the National Farm Safety Week of the National Safety Council in September. These public service announcements were designed to call attention to the need for improved safety and health measures on the farm. The fact that OSHA is now taking an active role in this area was also communicated.

The radio announcements alone were carried by 249 stations, reaching an estimated 4.5 million homes with over 14 million listeners. We hope to do this again this year.

We have developed a fact sheet on farm safety that points out that most of the deaths and injuries on the farm are pre-