**THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES**
**PUBLIC HEALTH SERVICE**
**CENTERS FOR DISEASE CONTROL AND PREVENTION**
**NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH**

convenes the

TOWN HALL MEETING

# NORA

# NATIONAL OCCUPATIONAL

# RESEARCH AGENDA

The verbatim transcript of the Town Hall Meeting of the National Occupational Research Agenda held in Seattle, Washington, on January 17, 2006.

# C O N T E N T S

January 17, 2006

**TRANSCRIPT LEGEND**

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In the following transcript: a dash (--) indicates an unintentional or purposeful interruption of a sentence. An ellipsis (. . .) indicates halting speech or an unfinished sentence in dialogue or omission(s) of word(s) when reading written material.

-- (sic) denotes an incorrect usage or pronunciation of a word which is transcribed in its original form as reported.

-- (phonetically) indicates a phonetic spelling of the word if no confirmation of the correct spelling is available.

-- "uh-huh" represents an affirmative response, and "uh-uh" represents a negative response.

-- "*" denotes a spelling based on phonetics, without reference available.

-- (inaudible)/ (unintelligible) signifies speaker failure, usually failure to use a microphone.

## TOWN HALL ORGANIZERS

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**P R O C E E D I N G S**

(9:00 a.m.)

**OPENING REMARKS**

**DR. RICHARD FENSKE**

**DR FENSKE:** Good morning, and welcome to the Seattle town hall meeting for the NORA process, the National Occupational Research Agenda. Ten years ago about this time, when the NORA process was initiated by NIOSH, we had a town hall meeting in this very room, and it's nice to be back here in this very nice facility for us. I hope y'all were able to get over here in good time.

We have a full agenda today, but we also have room for people who may not have ended up on the list or want to have comments. I think we'll be able to accommodate most everyone who wants to speak.

My name is Richard Fenske. I'm a faculty member at the School of Public Health and Community Medicine at the University of Washington, and I'm also Director of our NIOSH-funded Agricultural Safety and Health Center, and I'll be hosting the afternoon session.

My colleague, Noah Seixas in the front row

here, who is the Director of our Education and Research Center, which is also a NIOSH-funded training and education program, will be moderating this session.

And just a couple of details about the kind of nuts and bolts, we have a transcription going on. This gentleman here will be recording what's being said so that NIOSH has a full record of this meeting. The basic idea is that NIOSH is here to listen and to find out what you think are the important issues facing occupational safety and health. This morning session is devoted to regional issues in the Northwest in occupational safety and health. We'll have a break and then in the afternoon we're going to be focusing on agriculture, farming, forestry, and fishing.

And we have many people from out of town. This is a national -- the national meeting for that subject. You're certainly welcome to stay if that's not your major interest. Everyone is invited to stay of course to hear what's going to be said.

A couple of details. If you have a cell phone, if you could put it on a vibration mode or some

other mode, or turn it off. It would be very disruptive when people are giving comments to have cell phones going off.

After this morning session people -- for people who registered, we were able to provide lunch. There's no eating facility in this building, but those who registered and signed up for lunch, the lunches will be -- your lunch will be upstairs in this building. For those of you who didn't -- who aren't signed up for lunch, there are places nearby and Noah Seixas will outline those for you.

Okay, I'm going to keep moving along, and I'd like to introduce Max Lum, who will be -- who came from Washington, D.C. -- NIOSH headquarters -- and will be making introductory remarks for NIOSH. Max.

**DR. LUM:** I just, again, welcome you all here. I'm Max Lum. I'm the Communication Director for NIOSH in Washington. John Howard, our Director, couldn't be with you. He's very much under the weather. I wouldn't want to sit next to him a plane coming out here. He really didn't look very well, and he sends you his greetings.

Again, the process that we're going through today, the town hall process, is something that we have been through ten years ago when the NORA concept was really created. The idea then -- I had just started I think at NIOSH at that point and was very much involved in the town hall meeting here and the four or five others that we did around the country. But the idea was that we needed a framework really to organize our research, to have a mechanism really available for partners to have input into our research. Not only partners and stakeholders but -- who also helped us put this meeting together, but the general public, the concerned general public.

So the town hall process really came to us as a way to go around the country this time, respond to some of the criticism that we heard ten years ago that we only our town hall meetings in large cities, and we're going to 13 locations from Lowell, Massachusetts, to Jackson, Mississippi; Los Angeles, Salt Lake -- we're really going to be in every region of the county. This is our third one.

I'd like to say that we brought you good

weather. I'll try not to use the R word today, but it is tempting. But this is the third town hall meeting we had, and the first one we had in Washington, D.C. area, it snowed in early December. The second we had in Chicago. It was one degree I think when we started the meeting, so -- but I did notice -- just before I stepped in here, I actually saw some sun, so that's a -- that's a very encouraging sign.

So NIOSH, again, it -- National Institute for Occupational Safety and Health. Most of you know who we are. We are a center of the Center for Disease Control. I think we like to think of us as "the" center of the Centers for Disease Control, but our focus is primarily -- almost 80 percent of what we do is workplace safety and health. That's where our budget goes. That's -- our primary mission is research, and that's exactly why -- why we're here today, to hear from you and to get input into our new research agenda.

The -- NORA is coming to -- really it's the end of its first ten years, and we need a reinvigoration of input from our stakeholders and partners and the general public. And then

we're going to pull all this together at our symposium, the research symposium in April -- April 18th, 19th, and 20th in Washington, D.C. -- and really begin the next -- the next process, the next ten years. We look at this -- these meetings as a way to provide input and then to integrate it into our -- into our research councils, and Sid and others will be talking a little bit more about the process and what happens to the information and how that gets organized.

So that's why we -- we're really here today. We're very glad that you could be with us and spend some time out of your busy schedules to be here today with us. We want to listen. That is why we're here. Sometimes -- I think generally listening is a difficult thing for government -- government to do sometime. So we're really making an effort through these town hall meetings to listen to what you have to say about our research.

And I can tell you how important they really are and how seriously we do consider the town hall meetings. I remember being in Washington, D.C., 1996, at a town hall meeting, and a group

of nurses came from Philadelphia and they brought a patient with them who provided moving testimony I think on the spot about the issue of latex allergy. And she was a nurse, could not work any more. Just presented a cogent case I think about why NIOSH needed to take this issue on in our research. And I think without waiting a lot of -- you know, in terms of time, I think we did take this issue on, and I think within a year we alerted every hospital I think in the country based on what we could pull together about latex allergy and work with our partners to get that information out. There are other examples like that, but again we do want to hear from you. We're hearing some very interesting things, those two meetings we've had -- one in College Park, Maryland and the other in Chicago. People are telling us things that we haven't heard. One of those particularly to me is this whole issue of nanotechnology. And also another issue that I heard very strongly in a couple of presentations was the importance of NIOSH's international role. That was a surprise to me. And also the importance of better bundling our

data and making it more available to people. We think we do a pretty good job of it, but our partners are really saying well, for different reasons we need to be able to get at your information better.

So we are hearing. These town hall meetings are important. We are listening, and -- I think my father use to say in presenting to an audience like there's three things you have to be, and that's be focused, be clear, and be seated. I think we're at the third part of that now for me. We could move on, and we do want to listen to what you have to say over the next day and tomorrow morning also.

Has Phyllis arrived yet? We have a state's -- is she here? No, she's not here, so do we want to move on, and then we have State Representative Phyllis Kenner (sic) coming, and then we can wait till she -- when she comes in, or we -- is she not going to come?

**UNIDENTIFIED:** (Off microphone) (Unintelligible)

**DR. LUM:** Do you want to -- Matt Keifer. Come on Matt, you know I'm not going to say that. I'll let you be the fall guy.

**REMARKS FROM STATE REPRESENTATIVE PHYLLIS KENNEY (INTRODUCTION BY MATTHEW KEIFER, PACIFIC NW AGRICULTURAL SAFETY & HEALTH CENTER)**

**DR. KEIFER:** Someone among us has a voice mail on their telephone that arrived Friday night telling us that Phyllis Kenney is not coming to talk to us today. Unfortunately, we only found out about it this morning, and I just wanted to tell you a little bit about her even though she won't be here to deliver her messages. She's an interesting individual. She was born in Hardin, Montana to migrant farm workers, and her family moved to Washington state in 1942, and she grew up in Toppenish, Washington and Wapato, Washington in the Yakima Valley. She's now in her fourth term representing the 46th District in Seattle in the State Legislature, and she's made major contributions in education, in the economics of the state, as well as -- particularly emphasizing the access to higher education and the quality of higher education in the state. She's also made major contributions to workplace health and safety. She's really been a true champion of the underprivileged.

Unfortunately, she won't be here to tell you what she has to say today, and I give to you her regrets and regards on her absence. So I think we can go ahead and move on, Max.

**INTRODUCTION TO RESEARCH AGENDA PROCESS**

**SID SODERHOLM, NIOSH**

**DR. SODERHOLM:** Well, my name is Sid Soderholm. I am the NORA Coordinator for NIOSH. One of the things –- one of the lessons we've learned over the last ten years is that while NIOSH is a group activity, it's -- it's -- it's -- while NIOSH is a group activity, it's NIOSH working together with our partners to identify what -- the research that needs to be done and to carry out, that we needed more focus within -- within NIOSH. It was run by committee for the first ten years.

So if you have questions about NORA, my card is on the table. Please feel free to contact me directly, and I can be the point of contact for any questions or issues you have about NORA.

So I'd like to take just a minute to talk a little bit about NORA and why we're here today. NORA is a national partnership effort to define and conduct priority research. And I'll

actually take issue with the way some things have been phrased this morning. It's not a research agenda for NIOSH. It's not what NIOSH needs to do, although we will certainly do those parts that we can. It's a research agenda for the nation, and researchers from around the country will be -- will be involved, and are involved, in accomplishing this research. So we're identifying the priority research, and we're working on it together. The original vision for NORA has certain key elements that are not changing.

We decided not to brand this NORA II for the second decade because it's really a continuation of the same NORA process. We're seeking stakeholder input through the web site -- if you've visited there, and I'll give you that address later -- through town hall meetings, through sending e-mails, and we'll talk about where that input will go in a minute. We'll have a process for identifying research priorities for the nation. We'll work together to address those priorities, and we'll leverage funds.

We look at the NIH budget and drool. We think

wow, if we could just get a little piece of that -- and sometimes we can. Sometimes we can have a joint RFA for grantees to apply for funds where there will be some NIH money and some NIOSH money that will help fund those grants. So we are leveraging funds, and we think we can even do a better job of that.

So those are the main elements of NORA, and they're not changing.

But what is new and different about the second decade of NORA? We're focusing on moving research to practice through sector-based partnerships.

So what are we talking about there? What is our sector-based approach? Well, the idea is that we want to address the most important problems in each sector, and I'll talk a little more later about what those problems are, but they can be a lot of different things. Could be talk-- focusing on the disease, on the exposures, or on systemic failures -- failures in the system. We're talking about a research strategy for each of the major sectors, and we've grouped the North America -- the Census Bureau has a North American Industrial

Classification System where every workplace fits into the classification structure. And there are two-digit codes at the top of that, and it goes down to six-digit codes, and so we have -- and the Census Bureau actually defines 20 or 21 different sectors. But we found that trying to keep track of 21 things at once, which we were doing in the first decade of NORA, was actually difficult. So those have been grouped into eight kind of sectors, eight major sectors for the purposes of NORA. And the one we're talking about this afternoon -- agriculture, forestry, and fishing -- actually is a Census Bureau sector also. It's not a group of their sectors.

So we're talking about having a research strategy for a sector, and the sectors are quite broad sometimes and so there may even be sub-sectors that will have their own research strategy. And so those strategies will be identified. They'll be made available. People will see what they are. They'll be able to see how well their research ideas fit into the priorities that have been set by through the NORA process.

And then -- the first decade of NORA didn't focus on sectors, but it did talk about the matrix, that you have sectors where workers are, and you have cross-sector issues -- musculoskeletal diseases, you know, traumatic injuries, respiratory diseases. Almost every thing crosses across several sectors, if not all the sectors. So there's this matrix of sector and cross-sector issues. We're not losing the cross-sector issues in the second decade of NORA. Those are going to be identified, and it'll be clear where in the sector agendas each of these cross-sector issues appears.

So why are we doing a sector-based approach? Well, people work in sectors. People identify with sectors. Research -- cross-sector issues cross across sectors, but there are many issues of implementation, research problems that are specific to a sector. A sector approach helps us with our focus. We can really focus on the goals, the objectives, the results, and really make sure we've got the right partners because many professional organizations, many trade organizations, many labor organizations

identify with certain sectors. And we can really get their attention and involve them in the process by letting them know we're focusing on their sector. And we think this going to be an efficient approach. In ten years we'll know more about that.

So structurally how is this going to be set up? We're going to have eight sector research councils and these will have a broad membership. They'll be co-led by a NIOSH person and a stakeholder who's outside of NIOSH, and there'll be many members. Probably two-thirds or more of the members will be non-NIOSH people, but we'll certainly have our NIOSH experts there also to learn and to interact. And then the eight sector research councils will communicate with a cross-sector research council, help identify those cross-sector issues and make sure that there's a certain –- where it makes sense, that there's a certain consistency across sectors in the way that we at least talk about and identify the cross-sector issues.

And the NIOSH role is one of stewardship and providing some infrastructure. So the NIOSH --

we know NORA wouldn't happen without NIOSH, but NIOSH –- NORA is not the same as NIOSH. It's a process that involves many of our partners.

So the research councils. The first thing the research councils will do will be to take the stakeholder input that's provided here today that we'll capture through the transcript that Ray Green is preparing, take surveillance data that's available -- that stakeholders will make available to the research councils through the docket or directly, and take the member expertise and go through a priority-setting process and come up with a draft research strategy for their sector or for sub-sectors of the sector. And then that will be posted on the web for comments and it'll be a living document. It can be modified. It can be kept up to date.

The research council will not just stop there with the research agenda -- with the research strategy for the sector. They will then work with partners, try to get partners together, try to leverage the funds, have an implementation plan for this -- for the high priority research to actually be accomplished

and to have the effect on the workplace that it can have.

So, how can you participate? Certainly you're here to provide input or to listen today, and there's also opportunities to volunteer, either through the web site or directly to me. I'm trying to see it on this slide -- there's -- I'll provide the e-mail address I think in a minute. It's noracoordinator@cdc.gov, if that's easiest for you to remember. If you're interested in volunteering for any of these research councils, you'll see some of the leaders of some of them here today. Talk to people you know in NIOSH, but certainly contact me and let me know that you're interested. Whether you know which sector you're interested or not, please let me know what your interest is and we will be taking those volunteers and selecting people -- asking people to actually serve on research councils.

As you can imagine with the busy lives everyone leads, we've had a number of volunteers but we've not been overwhelmed, so there's a very good chance that if you're willing to step up to volunteer to be on a research council -- or

maybe you'd rather say -- be sure to let me know -- I'd like to be a reviewer of documents. I'd like to know when the draft research strategies go up and be able to comment on those. We can also have you involved that way. So, the input -- the input that's provided today will go into the NORA docket. This is a collection of information -- you can see most of it displayed on the web site. If you go to the web site listed cdc.gov/niosh/nora –- if you go to that web site you'll see an opportunity to provide input there. You can provide it as straight text. And after a quick review to make sure it's just not nonsense input from someone, we put that on the web site, so -- and there's a place you can click on that input form that says view comments by others. So you can go and review what others have already in-put. And Christy Forrester here on the front row will be taking the transcript from Ray, parsing it and putting it into the NORA docket on the web site, so it will be come available there.

The docket also accepts information by e-mail and by mail, especially if you have figures and

pictures and so on that don't go into a text box on the web site, and if you have more extensive comments than you are able to go through in your five minutes today -- if you're only able to hit the highlights today -- please identify those, leave a copy if you can or make arrangements to e-mail us a copy, and we will put that on the web site also. So we're interested in your input in any form that you can make it.

That -- the information that goes into the docket will be provided to the sector research council. It will be provided -- the full word -- everything you put in will be made available to them as individual comments. But in addition, we will do some broad grouping so the research councils can see -- kind of index, so the research councils can see where the information and different subjects lies in the docket. So that's what will be provided to the sector research councils by NIOSH.

Your input will also be outlined at the NORA symposium that was mentioned by Max. It's in Washington at the end of April. It's not only the tenth anniversary of NORA, it's the thirty-

fifth anniversary of the Occupational Safety and Health Act -- very, very close to them, and we -- the symposium will -- we will be celebrating those two anniversaries. And the research -- we'll be celebrating the research that's been done. We were hoping for a 100, 110 abstracts to be submitted at least. We thought, you know, we might have to extend the deadline. We might have to really call up our friends. But by the deadline we had almost 200 abstracts for the symposium. People are interested; people are coming. They're going to talk about the work that's been done. And we're going to have a series of workshops where we'll be bringing these researchers together to begin to focus on the sector-based approach. We're going to talk about where the cross-sector issues pop up in the different sectors. So the workshops are really intended to bring the work -- the researchers into the second decade of NORA, into the new structure. So please continue –- consider coming to the symposium. The web site is there, it's that same NORA web site. You can see a link to the symposium information. Registration is now --

now available. Our co-sponsor is the National Safety Council, and they now have a registration process that's available for this symposium. So if you have any questions, let us know. Visit the web site, and please consider coming to the symposium, too.

So let me focus a little bit on what we're going to be doing here today. As was mentioned this morning, we're interested in all topics. We call it regional issues. In the afternoon we're focusing mostly on agriculture, forestry, and fishing. So what are we interested in? We're interested in information on what the problems are -- the diseases, the injuries, exposures, what populations are at risk, and where have the occupational safety and health systems failed. Where are the weaknesses? Where does the system need to be improved? Who are the key partners? Who needs to come together to not only accomplish the research, but to take those research results and have them implemented in the workplace in ways that will actually improve the situation for workers? What kinds of research will make a difference?

So we're interested in brief presentations, just the highlights now. Many of you who have built -- or, you know, your careers are focused on particular, very important issues. And clearly in five minutes you can't do it justice. But give us a sense of the highlights. Give us written comments if you'd like to, or go on to the web site later and add comments. Just because you've got some going into the docket through this process, through the transcript, it does not mean you can't add as much more as you want. We're not worried about getting too much information. We're not worried about hearing the same thing twice. Please feel free to do that.

So we need brief presentations today, probably five minutes. We'll have a timer. Lonnie Bolt has agreed to be the tough person today. She will let you know when you have four minutes -- when you have one minute left, and thank you when your time is up, and then we have a virtual hook that our moderator is authorized to use. So we'll try to keep things moving. We're here to listen. We're here to listen to everyone. We expect there will be chances for

people who did not get on the list to stand up and say their piece. The moderator will be making those decisions when we can -- when we can fit that in. We're not -- we don't need to hear criticism on what other people have presented, but if your view differs, stand up and give us your view, too. That's what we're interested in. So that's basically how things will work.

Some final messages -- to keep up with what's happening in NIOSH, specifically what's happening with NORA, if you haven't already, sign up for the NIOSH e-news. If you have an e-mail address, and who doesn't these days, you can get a newsletter or -- a short newsletter once a month in your mailbox. You can delete it if you're too busy. If you read through it, you'll see 100 or 200-word summaries of many topics going out in NIOSH, including what's happening in NORA. So please sign up for the e-news. You just have to give an e-mail address, and you go to the NIOSH web site as listed to do that.

You can provide additional input on the NORA web site, as I said, and there's the e-mail

address to the NORA coordinator mailbox at the bottom. If you have any questions, issues, volunteer, please -- please join us there. So that's the end of what I have. I'll see if there are any burning questions, any issues that are unclear. I believe Noah will start the moderator process, and while you're moving to the table I believe the people who are listed as the first set of presenters we'd like to move up to the front so we can keep the process moving. So, Noah.

**REGIONAL AND LOCAL SESSION: STAKEHOLDER PRESENTATIONS**

**MODERATOR: NOAH SEIXAS, NORTHWEST CENTER FOR OCCUPATIONAL HEALTH & SAFETY**

**CLOSING: NOAH SEIXAS**

**FINAL REMARKS: SID SODERHOLM**

**DR. SEIXAS:** Good. Thanks very much Sid, and I look forward to hearing from each of the presenters this morning. I am the Director of the Northwest Center for Occupational Health and Safety, the NIOSH-sponsored ERC here in the Pacific Northwest, and one of our greatest challenges is bringing people in from the rather diverse and spread-out region that we encompass, including Alaska, Idaho, Oregon, and

Washington State. So I really appreciate those of you have come in from the hinterlands to join us in making the effort. I also understand that due to the rain the train from Portland was actually washed out. The tracks were washed out so some of our presenters from the South actually weren't able to make it, which is unfortunate, but it is representative of some of the challenges we have in coordinating activities in this region.

So without further ado, I'd like to ask Janet Peterson for the first presentation.

**DR. SODERHOLM:** I'll just take a moment to say if, as a speaker, if you have an extra copy or could spare a copy of your remarks to give to Ray Green, that helps him a lot with the spelling and with accuracy. So he'll certainly go from what was said, but if you have a copy of your remarks he would appreciate it. Either give it to Ray directly or leave it at the front desk. Thank you.

**MS. PETERSON:** Good morning. Thank you for the opportunity to provide comments to NORA. My name is Janet Peterson, and I'm a physical therapist and an ergonomic consultant in the

Seattle area. I also am current board member of the American Physical Therapy Association, or APTA, and a past president of the Physical Therapy Association of Washington.

In looking at future research directions, I'd like to encourage NORA -- and it's really just acknowledging what you are already doing -- to consider an interdisciplinary model when creating research teams. Various disciplines, including engineering, epidemiology, medicine, psychology, physical therapy, and basic scientists working together with the end user of businesses and industry, can produce a more comprehensive outcome than a single discipline working alone.

One example of this is the upcoming collaboration between APTA, the Association of Rehab Nurses, and the American Occupational Therapy Association on a project entitled "Therapeutic Use of Patient Handling Equipment". This is the continuation of a very successful corroboration with the ARN last year when we developed and published a white paper on safe patient handling.

The purpose of the upcoming program is to

develop clinical tools that will assist the clinician in the selection, implementation, and assessment of safe patient handling technologies to reduce the risk of injury for both care givers and patients. Physical therapists are well suited to assisting the research of work-related musculoskeletal disorders. They're educated at the doctoral level now for about 70 percent of the programs across the United States and master's degree level for the remaining, and work in a variety of settings including research -- clinical research, basic research and industry.

There's other presenters already on the docket today that can -- that can show that there's evidence already that repetitive motion, stressful postures, and forceful exertions are associated with a variety of musculoskeletal disorders. The rub with that is that I think there's still a great deal of lack of acceptance of that information out there, especially in the business community.

Where I think that physical therapists may have a special role in NORA or NIOSH-related research is in looking at things like older

workers, those with chronic diseases, obese workers, children, things where you're really looking at specific musculoskeletal issues and chronic disease issues that may have an impact on the kinds of interventions that you're looking at to reduce musculoskeletal disorders. You know, one small thing -- and you mentioned nanotechnology -- that really gets to me as a physical therapist and alarms me is looking at all of the -- how all of our PDA devices and things are getting smaller and smaller and smaller, and our older and older eyes are -- and repetitive issues with thumbs and fingers are problematic, and on the other -- on the other end of the scale, you know, we have -- right here in our area Microsoft is doing basic research on -- and just came out with a new computer keyboard design, and I just saw a presentation from the primary research on that and asked questions like well, did you think about the younger computer user and how the large keyboard is a mismatch with their anthropology -- or anthropometrics? And the response was, well yeah, but the money is driving us elsewhere. And the money is driving

us so that we are not detaching, for example, the numeric pad on the keyboard -- on the new keyboard. If you could detach that you could save a lot of musculoskeletal issues with shoulder, elbow, hand problems on the right side. And computers obviously are -- cross all of the sectors were -- that were listed today because everybody's using computer technology to some extent or another in their work.

So I -- APTA -- on behalf of APTA, and we applaud NORA's efforts to seek further evidence to assess the most effective interventions for decreasing the risk for work-related injuries, and we invite you to include physical therapists in those efforts. Thank you.

**DR. SEIXAS:** Thanks very much. Pat Butterfield is next. While Pat's coming up I just wanted to mention I think it's going to -- in some ways it's a very frustrating format because for each person that gets up the room is probably full of comments and questions and concerns that would be worthy of the whole morning's discussions. We do have a few extra minutes built in. For fairness' sake what I'd like to do is keep to the schedule, have each

of the first block of presenters have their five minutes, and then -- assuming we have a few minutes left over at the end -- we'll have an opportunity for people from the audience to stand and add comments to what we've heard along the way.

Pat Butterfield, Director -- rather Chair of our Department of Psychosocial and Community Medicine in the School of Nursing at the University of Washington.

**MS. BUTTERFIELD:** Thanks. Good morning. I'm Patricia Butterfield. I applaud the inclusion of a cross-sector research council to address issues across the eight proposed sector areas. Many workers living in America's small towns work across sectors holding down two or more part-time jobs. It's essential that the research agenda by NORA address the health and safety needs and the system needs of such workers.

Critical issues faced by rural workers and their employers include rural workers that are employed 40 or more hours a week, but still lack having health insurance. What barriers exist in rural communities? What are the

infrastructure needs? What types of incentives do we need for small employers to offer their workers benefit packages? How does the lack of private or public insurance impact worker injuries and illnesses associated with workers compensation claims? Our pilot work in rural Whatcom County, Washington outside of Bellingham and in Bozeman, Montana and Gallatin County, Montana -- which is not in this region, but is nearby -- our pilot data, 45 percent of our workers did not have private healthcare insurance.

Some of them had two or three different jobs, and they worked not in the service industry, but they might be thinning sugar beets in the spring, working in Burger King in the winter, and then working in construction in the fall, and that's a very common scenario.

Another work -- another issue is what are the needs of rural workers caught up in economic downturns? Economic trends in the inter-mountain and Pacific northwest are changing, with fewer families involved in agriculture and mining and more families employed in service industries. Low income families are frequently

caught up in local economic downturns, which may result in the loss of health benefits, extended periods of un- or underemployment and the loss -- and the economic necessity of multiple part-time jobs. In addition non-urban areas have relatively few employers, and there's very few options in terms of other types of -- of ways to go.

Rural areas experience wide seasonal variations in employment, a phenomenon that Bashier* refers to as a feast or famine economic cycle, which we see in many areas that are gentrified. Whether you're looking at, you know, ski areas or rural areas in central Washington, you see this kind of urban flow. What resources and what types of research do we need to do to really understand this phenomenon in terms of both housing and the experiences of workers?

One of the things we saw in rural Gallatin County was a donut effect where poor workers needed to move out of these areas as they became gentrified and move out into areas where they had no resources, and move out into unincorporated areas of the county.

The last area I want to address in terms of the

theme of rural workers are the lack of occupational health professionals in rural communities, leaving many employers without the requisite information they need to look at risk reduction opportunities. They tend to see illnesses and injuries in workers as a specific event related to a specific worker rather than a pattern of risks that can be assessed and minimized.

What types of things can we do to reach out in meaningful ways through occupational health professionals? I direct the nursing program here. We're well suited to providing nurses in those areas, but a lot of times employers are not able to -- small employers are not able to hire a nurse. Actually I see Karen Bowman in the area. She's one of our graduates that has done consulting work with small companies all over the northwest, including out on the Olympic Peninsula. What research do we need to really look at the feasibility of such types of opportunities to meet the needs of rural employers and workers?

These and many other issues impact the lives of a considerable proportion of the U.S.

workforce. The sustain ability of a rural community depends on the vitality of its local employers. A NORA-supported research agenda needs to address the reality of rural workers and employers across sectors. Thank you for the opportunity to comment this morning. Thank you, Max. Thank you.

**DR. SEIXAS:** Thank you, Pat. Next up is Matt Keifer, Professor of Occupational and Environmental Medicine at the University of Washington.

**DR. KEIFER:** I'm an Associate Professor in the Environmental and Occupational Health Sciences at the University of Washington and a practicing occupational medicine physician. I direct a training grant that provides opportunities for health and safety professionals and scientists from Asia and Latin America to study at the University of Washington that's jointly funded -- leveraged, as you might say; as Sid would say -- between NIOSH and NIHS. My goals to encourage NIOSH to include support for international occupational health and safety training and research in its next -- in its next National Occupational

Research Agenda or the continuation of the former one. It will protect -- in the end protect American workers.

You might ask why should NIOSH fund occupational health and safety and research outside the United States? I'll give you two good reasons, though there are more. The first reason, based on an ethical mandate, is just that we in the United States, as we give economic support to populations struck by natural disasters and epidemic disease, it's also appropriate that we help protect workers and their families from developing countries from the consequences of occupational illness and injury which, where social nets are inadequate or nonexistent, can be as devastating as natural disasters.

A second reason, potentially more in keeping with the mandate of the Occupational Safety and Health Act which brought NIOSH into being, is that approving the occupational health and safety standards for the workers in developing countries through training of health and safety academics and professionals will in fact protect workers in the United States.

And how does this work, you might ask. The lightening fast movement of capital across borders as a result of the neoliberalization of the world economy has made the flight of jobs a painful daily reality for workers in developed -- in developed countries. This mobility of capital in jobs has lead to a bidder's war among developing countries where, in order to attract investment, salaries and benefits must be low, and the workplace environmental regulations must be enticingly unintrusive. The bidder's war cannot be totally ignored by developed countries. In order to compete with developing countries in the new global marketplace and maintain industrial activities in the developed countries, industries there must cut the cost of production at home or decrease the relative cost advantage presently enjoyed by competing countries.

In industries such as agriculture, where land capital is not transferable, survival unquestionably will involve correcting this discrepancy in some way. Several options exist for reducing this cost of production. One of the most obvious is by reducing the costs

related to the workforce. Mechanization of labor is one option that's been particularly the aim of the Washington tree fruit industry as displayed by the technology road map. This is a long-term strategy, as new tools must be developed and tested and deployed.

Another more immediate option is cutting the expenses of employing workers. This includes reducing the cost of salaries and benefits and health and safety standards. The news is full of large companies who have chosen this approach. The arguments for the repeal of the ergonomics initiative, both nationally and in Washington state, were based on this premise. It's evident that the low cost of workers including -- the -- the low cost of the workers, including health and safety, in developing countries is driving the move to limit these costs in the U.S. O'Rourke* and Brown made the point by amending the question posed by the economist Freeman, who had asked whether American wages were set in Beijing, by saying -- asking whether the world's –- world's health and safety standards and conditions are set in coastal China. Morgensen* made the same

point in his chapter on workers' safety under siege, stating that the globalization of the free market economy is eviscerating the sociopolitical framework that assures that workers -- that assures workers the rights to free association and safety and health protection in the United States and around the world.

Industry in the U.S. will no doubt work to level the playing field in one way or another. I would argue that the best way is to increase the standards for worker health and safety in competing developing countries, rather than lowering our own. Lowering our own standards will increase the number of injured and ill workers and their families, requiring support from the existing social -- social safety net. It is a false solution that results in an inefficient covert cross-subsidy of industry by the greater society. I believe the training of occupational and environmental health professionals and researchers in developing countries will lead to a data driven pressure on governments to improve their occupational and environmental safety standards.

My experience as an educator at a world class university with a high quality occupational and environmental training capacity, and my experience internationally, tells me that there are ample developing country professionals and scientists looking for these skills and knowledge who are committed to improving the health and safety of the workforce in their own countries. We need only give them the tools, and they'll do the rest.

In summary, I believe that NIOSH -- that by NIOSH supporting and training occupational and environmental health scientific and professional workforce in developing countries, an important portion of the relative cost of production -- the relative cost of production advantage enjoyed by competing countries will be diminished. This will contribute to a leveling of the playing field and a reduction in the downward pressure on American health and safety regulations. It will in the end help protect the health of American workers. This is clearly not the only solution, but it is an important investment for NIOSH and for America to make. Thank you very much.

**DR. SEIXAS:** Thank you, Matt. Very good. Next up is Claude Golden from the Boeing Company.

**MR. GOLDEN:** Thank you, Noah, and thank you to NIOSH for the opportunity to comment on the research agenda, and also thanks to our friends at the University of Washington for hosting this event.

My name is Claude Golden. I'm here representing the Boeing Company. As most of you know, Boeing is the largest aerospace manufacturing company in the world. We're the number one U.S. exporter. Our products are commercial airplanes, defense projects, and space exploration vehicles. We have over 150,000 employees in 67 countries. Our largest site of operations is here in the greater Seattle area, and the vast majority of our manufacturing occurs in the United States.

Most would agree that the main purpose of occupational safety and health research is to reduce the risk of injury and illness to our workers. The best way to accomplish this goal is to help employers build the most effective safety programs, and to help government adopt the most productive regulations. Effective

research is practical research, and research should be targeted to high risk exposures and high risk industries.

There is a finite pool of resources available to any employer, no matter how small or large. It's very discouraging to be forced to spend those resources on compliance with standards where there is very little risk at your workplace and have fewer resources left over to spend on higher risk areas in your workplace. Research dollars should not be used on esoteric subjects where injury and illness rates do not show high risk. Aerospace and all of the sectors should be targeted for research in those areas where statistics indicate a problem. And manufacturing sectors should also be contrasted and not necessarily pulled together with construction and agriculture in terms of risk analysis where the types of risk can often be very different.

We need much more research on effective mitigation methods of compliance through pilot projects and fit for use and usability testing. We need field testing of different approaches to reduce risk. Oftentimes small pilot

programs are inadequate to address very broad questions of productivity issues. Research the best methods for industry to more easily comply with standards, and you'll really see an improvement in safety.

Toxicology research should always be cross-referenced and combined with epidemiology research. And as we've heard about nanotechnology, that emerging field needs to be researched for methods of monitoring and detection, and for protection methods of workers. Thank you.

**DR. SEIXAS:** Thank you. We are really moving nicely along. At this rate, we'll have a few minutes for added comments at the end.

Ryan Olson from Oregon Health and Science University, Oregon, made it through the mudslide somehow.

**DR. OLSON:** Yeah, they switched us to the bus.

**DR. SEIXAS:** Okay.

**DR. OLSON:** I'm an Assistant Scientist at Oregon Health and Science University in the Center for Research on Occupational and Environmental Toxicology. I'm also an adjunct faculty member with the Portland State

University Occupational Health Psychology Program, which is one of the original eleven NIOSH/APA co-sponsored occupational health psychology programs, which is a very excellent interdisciplinary training effort. I am an industrial organization psychologist and an applied behavior analyst. My research areas are diagnosing the causes of deficiencies or excesses in critical behaviors relevant to health and safety, self-management and motivation.

I'm here to highlight basically the plight of occupational drivers, their health and safety needs, but I also have experience with other transportation populations. The transportation and warehousing sector in 2003 represented seven percent of employment, but 19 percent of illnesses and injuries in the workplace. In 2004 it was the second highest fatality -- number of total fatalities, transportation.

The plight of occupational drivers is highlighted by urban transit operators, where literature reviews have shown that this population has higher rates of hypertension, heart disease, respiratory disease, alcohol

consumption, smoking, and musculoskeletal disorders.

In the state of Oregon, in the trucking industry, our highest number of workers compensation claims are in that industry. In 1999 there were twenty -- nearly 2,500 claims totaling $25.5 million in costs. Our occupational fatality investigation program, Oregon FACE -- we're one of 14 states with a FACE program -- showed that in 2003/2004 nearly half of our fatalities had a transportation component.

A particular trend of interest is that mobile machinery operation fatalities often involve the worker being outside of the vehicle, so behaviors in and around machinery while it's not in transit.

And in general I just would like to emphasize that the trucking industry is the backbone of the economy in many ways. And their health and safety and well-being is a significant public safety concern, especially when hazardous materials are being transported or when large semi trucks are involved in collisions on the highway.

This -- occupational driving is faced with significant constraints. Performance is generally a function of ability plus motivation minus constraints. Constraints for truck drivers include hours of service regulations that give them approximately three hours of discretionary time during the work day. Truck drivers work 1.5 times the hours of a regular 40 hours per week worker annually, and often work 60-70 hours over seven to eight-day periods. They're exposed to vibration and postural constraints for up to 11 hours a day, and are paid by the mile, which encourages driving those 11 hours.

They face serious diet, activity and sleep constraints. They're basically rotating shift workers. Their dietary choices are limited to what's available at truck stops, and we are all aware of the sugar, fat, and salt available at those locations.

They're also constrained by where they can go to be active, and during cold and rainy and wet conditions it's very difficult for drivers to get in activity.

Psychosocial factors relevant to truck drivers

include the isolated nature of the work. Isolated workers like drivers have less exposure to modeling, feedback, social reinforcement, and have less opportunities for assistance from workers in dangerous situations.

Stress is also a psychosocial factor with great concern to this population. Work/life balance, significant time away from family, traffic, and the stresses of sustained vigilance over 11 hours of driving a day; delays with loading and unloading material, which means you're not getting paid for rubber on the road.

Another psychosocial factor relevant to this population are public perceptions of the occupation. The public often views drivers as being at fault for collisions by default. There are stereotypes about drivers and what they are like, and the occupational prestige of the profession sometimes is discriminatory.

We also need to learn more about the characteristics of drivers, their individual differences. The Getting in Gear health promotion program, which is one of the first comprehensive health promotion programs among

drivers, appeared to have significant challenges keeping drivers in the program. They had a nearly 50 percent attrition rate, and drivers failed to use phone consultations, health consultations, or free fitness memberships.

A few final notes about particular interventions that I think are important to study for this population. The first include self-management, feedback from technological monitoring systems, and training interventions. The second area is encouraging involvement, which I've already mentioned, recruiting drivers into health promotion programs and retaining them. The third point is the crossover between safety issues and health issues and driving. I have not yet seen data that a healthy driver is a safe driver, but there's a popular perception that that is the case. And last of all, these critical organization of work issues -- vibration and posture constraints, limits drivers face related to activity and diet, and exposures to such things as diesel exhaust when sleeping in a trailer and in the winter time when engines

are idling.

And that concludes my remarks. Thank you.

**DR. SEIXAS:** Catherine Thomsen, also of the Oregon Health Services -- Oregon Health Services Department.

**MS. THOMSEN:** Which is a different organization from Ryan's.

**DR. SEIXAS:** Okay. Thank you.

**MS. THOMSEN:** Hi, I'm Catherine Thomsen, and I'm with the Oregon Health Services Environmental and Occupational Epidemiology Program. I am the epidemiologist with our occupational health programs, as well as some environmental, because as a small state we kind of try to do as much as we can. I want to thank NIOSH for coming around to as many parts of the country as possible to hear all the different input that there is on the National Occupational Research Agenda, because I think there are a lot of issues that are really critical to all of us.

I am also really excited about the idea of this being a reinvigorated process. I thought that the first ten years of NORA was really interesting and helpful for helping to set the

tone nationally for the kind of focus that there would be on occupational safety and health issues.

Oregon has had a very active state-based occupational safety and health program for about 15 to 20 years now. Although we get almost no state funding, we're reliant almost entirely upon funding from NIOSH, we have been conducting surveillance of different conditions in the state for quite a number of years. And I'd like to make the distinction between surveillance and research because I think that that's a really important point.

We do ongoing data collection in our state, as does the State of Washington, to try to supplement some of the data that we're able to get at the national level. And this is really critical for us to be able to identify the trends, new emerging issues that are occurring, as well as the patterns that are currently existing, so that we are able to better address what the needs are, what the real issues are in worker safety and health in our states. I think that looking forward to the cross -- this new round of NORA, to what used to be called

NORA II but is now the continuation of NORA, is -- one our biggest concerns is how these cross-cutting issues will be addressed.

In the first round of NORA there was the more condition-specific focus, and so a lot of the funding that came to states like mine was for a very particular issue. For example, we had a burn surveillance program. We had a pesticide surveillance program, and we also had a dermatitis program. We've worked in asthma, in the fatality assessments that Ryan was referring to, and we were able to do a fair amount in there. It's very exciting the idea now of being able to look at an individual sector and look at the multiple different factors that are affecting the health of the workers in those areas. But there is still I think the potential problem of any time that you are siloing or looking with one particular structure at the health and safety issues, and so I just want to highlight some of the things that we have done in Oregon and how some of those issues might be needing to be considered by the cross-sector research council or by even some of the individual research councils.

In Oregon we had a project through our dermatitis program looking at latex, and Max had mentioned this morning that that was one of the issues that came up, and they worked very hard at NIOSH to get the word out to healthcare facilities across our nation to limit exposures to latex, if not to completely remove those from a number of healthcare facilities. What we found in Oregon, looking at our data with our ability to partner with a number of different -- number of different healthcare facilities, sentinel data sources, as well as looking at some ongoing data sources, was that the latex gloves were then being diverted into other sectors. It went from healthcare then into a lot of the service sectors, including to child care and to food service. And what we found was that the number of latex-related problems that we were seeing in food service industry rose dramatically in a very short period of time. And we were lucky enough in our state to have very good relations with a number of different agencies, and we actually won a NORA Partner Award -- so another reason why we like NORA so much in our state -- for

our work with the local health departments to do inspections of the restaurants, with the restaurant industry in our state, and also with the labor union that represented, while a minority, still some workers in food service. And we were able to do an education campaign and eventually to have a policy change in our state to remove latex from the restaurants, so it is no longer okay to be a food service establishment and in food preparation to use latex gloves.

But they are still used in a number of other areas, and so to latex, even though it is not an issue now in that sector, could still be moving into another industry sector.

Another one of the areas that we've worked on in Oregon is pesticide poisoning prevention. And we've had mostly national, but also some state funding in that area. We've worked with our state Department of Agriculture. And while agriculture is a very important area for pesticide use and poisoning prevention, we have also in our data in Oregon seen that a number of years we've actually had more occupational pesticide poisoning events reported outside of

agriculture than within agriculture, in office settings and in warehouses in particular. And so again this is not necessarily something that is limited to an individual sector, and something that needs to be addressed across different sectors. So that information -- the outreach and education efforts, the toxicology information -- can be shared across those different industry sectors.

**DR. SEIXAS:** Can you sum up, Catherine?

**MS. THOMSEN:** Yes, I will try to do that very quickly.

Now the other topic that is of great importance to us is special populations. I am a public member on the National Advisory Committee for Occupational Safety and Health and on the committee that is looking special populations. And we're very concerned that both federal -- OSHA as well as NIOSH are working together to really try to address some of these issues. Aging and youth workers are other areas where we feel like it's very important, and so it's important again to share that information, the outreach and education.

So to sum up, in Oregon we think that state-

based surveillance is a really important issue. It's good to have these ongoing data surveillance efforts, and they can't always be pigeonholed into a specific industry or by a specific condition. And so we very much look forward to participating and collaborating on the cross-cutting issues with the research council, nationally as well as regionally. Thank you.

**DR. SEIXAS:** Thank you very much, Catherine. Leslie Hammer from Portland State University was unable to make to make it because of the train washout, but we've got another participant, Jim Denovan, who's a Seattle-based consultant in the biotechnology industry.

**MR. DENOVAN:** Thanks, Noah. My name is Jim Denovan, and I'm President of EIC Environmental Health and Safety, but today I'm here representing HELP, Health safety and Environment Laboratory Professionals. It's a group of health and safety professionals within the biotechnology and biomedical industry, and we meet on a once-every- two-month basis to help the member companies in our organization to solve their joint problems.

I'll tell you a little bit about the biotechnology industry. In the Seattle area, the greater Seattle area -- well, actually in Washington State we have about 190 biotechnology companies. Forty percent of those are R&D therapeutic drug-based companies. About 30 percent are diagnostic products and around five percent are plant, agriculture, and animal research companies. Generally these companies start out in research and development in clinical trials, so mostly laboratory kinds of operations, eventually go to process development -- if they make it. And then if they really make it they get into manufacturing, and they will start manufacturing drugs or what-- or the diagnostic product they are making.

Within Washington State they employ close to 20,000 people. Most of companies employ less than 50, but of course there are several large biotech companies within the Washington State area. We also have many other centers within the U.S. that have large numbers of biotech companies: San Francisco Bay area, San Diego, New Jersey, North Carolina, Boston, Iowa, just

to name a few, and Portland has a few, also. These companies generally are biologically-based or chemically-based or a combination, and so they may be working primarily with human tissues, human blood and fluids, or they may be working with specific organisms -- viruses, bacteria, that sort of thing; we're doing research on those, developing vaccines -- or as chemically-based. They can be working with thousands of different chemicals. One chemical -- one company, excuse me, that I work with has approximately 13,000 different chemicals in their inventory -- a lot of different chemicals.

Now all these companies have very good control, fume hoods, all the latest in laboratory equipment, but they do have a lot of issues that I believe need to be addressed from a research standpoint.

One of them is multi-chemical exposures. A chemist might work with a hundred different chemicals in a day, in a given day. They might be working with multiple carcinogens, mutagens, reproductive toxins, that sort of thing, and of course with mixtures of different chemicals.

And more research is needed on the effects of these small exposures and the effects of the mixture --exposures to mixtures.

Data on glove penetration, especially for these obscure chemicals, is extremely difficult to find out what gloves work for what chemicals, especially when you've got all of these rare chemicals that you're working with.

Compiling Information on infectious agents -- great book put out by NIH/CDC, "Bio-safety in Microbiological and Biomedical Laboratories," but we need more -- we need more information on occupational exposure from infectious agents, laboratory exposures. Health Canada has some great microbiological MSDSs. It would be nice if we had something applicable in the U.S. that gave us more information in one place. Eventually you can find the information, but getting it in one place.

And then developing safer standard analytical processes. There's a lot of different processes that are used by every company to do analysis -- perhaps for proteins, RNA, DNA, that kind of thing. Many of them -- they use radioactive material to do those analyses.

These companies try to figure out other means of doing this with safer types of materials, but so far they haven't been able to do it because they're small. But a larger body that could do the research -- one example is a Western blot which is used for protein analysis, you use sulfur 35 -- there must be a different way to do that to -- that would be a safer process.

And that's basically it.

**DR. SEIXAS:** Thank you very much, Jim.

**MR. DENOVAN:** Thank you.

**DR. SEIXAS:** So this is actually great. Thanks to the speakers for moving quickly. It's great. We have about ten minutes before the scheduled break, so I would welcome anybody in the audience that would like to add to what's been said or to react and discuss any of the issues that have been raised so far. It would be wonderful to get some back-and-forth going. Anybody?

I think it's best, Barbara, if you come down to the podium so everybody can hear you and it gets entered into the record. And anybody else who's interested in following Barbara, could

move in that direction.

**MS. SILVERSTEIN:** Barbara Silverstein, SHARP Program. There are two things that were addressed by earlier speakers that I really would like to support. One is that as NIOSH moves more into the sector-based research, I think it's important to recognize that sectors are pretty critical for intervention research and for dissemination of information in figuring out ways to do that the most effectively. However it should not be done at the expense of basic kinds of research that need to underpin all of our more applied research methods. So I would definitely support NIOSH continuing and even, if possible, expanding some of the basic research that's necessary for the rest of us to be able to move forward.

The second thing is I would like to second what Matt Keifer had to say with respect to the role of NIOSH and NIOSH's occupational health and safety partners in both research and training in the international arena. I think it's particularly important, as the rest of the world is involved in harmonization in terms of

both standards and practices, that we be an integral part of it and help in the research, expertise development, so that we also can learn from others and have a healthier and safer work environment. Thank you.

**DR. SEIXAS:** Excellent. Thank you very much Barbara. Peter Johnson from the University of Washington.

**MR. JOHNSON:** Thanks, Noah. There's just a few other topics I would like to elaborate on, some that have been discussed, some that have not. I think one of the interesting topical areas are our kids as kind of a workforce at risk. Kids are exposed to computers at younger and younger ages now. At age five, 80 percent of kids are using computers either at school or at home.

Another problem is obesity in the United States. Combined with being a kid, and obese kids may be older -- they're 18 when they enter the workforce, but physiologically they may be older due to the greater exposure to repetitive low-force work and their sedentary nature of what it is to be a kid today.

So I think kids are a very important

population, and they may be predisposed or more predisposed than prior populations as far as their physical state entering the workforce.

The other thing I'd like to elaborate on is what Matt Keifer presented, is the need for NIOSH to take on more of an international role. Basically we're outsourcing a lot of our problems to developing countries, and I think we have the knowledge and infrastructure to help these developing countries. And it would be great if NIOSH could leverage with some of the work of the Fogarty Foundation and other international countries to assist in occupational health-related issues.

And the last thing I wanted to talk about is just the focus and the strengths of Region 10, our area. Washington is a self-insured state. There's just a great wealth and depth of resources collected here. And a lot of this is evidenced by the work done by SHARP, Barbara Silverstein and others, as well as Gary Franklin, just looking at the cost of occupation-related entries.

And the final comment I wanted to make was maybe a model. There's an interesting model in

Ohio State, the safety grants program, where they're tying funds to understanding occupational injuries and the costs and benefits. And I think that's been a very interesting and successful model for delineating the cost and benefit of occupational health. Thank you.

**DR. SEIXAS:** Anybody else want to join the crowd here? Okay.

**UNIDENTIFIED:** Thank you, Noah, and to NIOSH for holding this meeting. I'd like to talk a little bit about training. In 1998 an excellent publication came out from NIOSH by Alex Cohen* and Mike Colligan* in which they reviewed the training literature. They concluded that of the several thousand -- I think it was 2,000 to 3,000 locations they reviewed from the peer-reviewed literature -- that 80 -- 80 -- met the basic requirements for a scientific publication that could be evaluated based on basic scientific principles. Recent training research, meta-analyses have been published in the academic literature, almost ignore totally the research on the shop floor -- I mean training research on the shop

floor. And I think it's because they've concluded that it isn't high quality research. Increasingly I think training research -- the thing that probably disturbs me the most is aimed at -- is internet-based and really aimed at what used to be called the MTV generation. It is rapidly moving and aimed at people that are easily distracted. This is not good training for a lar-- a significant section of our population, and the one that worries me the most is the one that's coming from outside the country where we're outsourcing our work and our production to. Some of those people are coming into this country. And in the research we've done with Hispanic workers, which is one of the largest groups that I'm speaking of, they're averagers of education and most in Oregon come from Mexico, are -- is 5.4 to 5.6 years of education.

Now what that means is that half of that group has got less than 5.5 years of education, and many of them have not been to school at all. Those people are not going to learn from internet-based training. And I think primarily one of the biggest problems is the speed of

presentation, but another is the keyboard, which is -- has appeared scary to the people that we've worked with, though we've been working on this issue ourselves.

I think most people abandon the hope of making change happen in the workplace, particularly in the agricultural workplace, if they are not able to change the equipment and sell it to the company. If it involves training, forget it. It just isn't going to happen. I have to make a new piece of equipment that will protect people. And I think they're ignoring training, which is I think a critical and will remain a critical issue for that workforce.

The second issue I'd like to turn to just very briefly is the issue of durability. Most OSHA training requirements are annual or one time only. And yet there's very little training research on durability. How long does the training information that you get -- the information you get in training -- how long does it last? A principle often reminds -- my wife often reminds me of happily is use it or lose it. And I think the fact is we -- if we don't use the information we get in training

fairly quickly, we lose it fairly quickly. In research we've done with kitchen workers on using -- making the correct selection on fire extinguishers to put out fires, you have three or four options from which to chose. We taught them what is the correct option to use for electrical fires, for hot oil fires, and so forth. And when we went back and tested them six months later, they'd completely forgotten that. Now happily they'd not had to put out a fire in that period of time. But if they had, they would not be reaching for the right fire extinguisher. In lab-based research we've done where we've looked -- and that's just cause we only looked at it at six months when they had lost that information. Had we looked at it earlier, we don't know when -- how long they retained it really, but in lab-based research, within weeks, and certainly within a month, people have lost significant amounts of the training -- the information they've learned in training if they don't use it in their occupation.

So, two things I wanted to say, and did I mention my name is Kent Anger* and I'm from

Oregon Health and Science University. Thank you.

**DR. SEIXAS:** Thanks very much Kent. So it's time for a break. I wanted to just make -- reiterate one of the points heard here that I thought was particularly key. Peter Johnson mentioned the importance of maintaining Region 10 on the research agenda, that keeping the dollars flowing through this region is very important.

Thank you. We've got 15 minutes.

**DR. SODERHOLM:** If I could have your attention for just a second -- there may be some confusion about lunch. I believe we'll have a list. Christy Boles I hope has the list at the main table. If you're not sure whether you're on the registration list, please check with her and we'll try to resolve who's been invited to lunch and we'll try to start promptly so we'll be able to have time to eat lunch. Thank you.

(Whereupon, a recess was taken from 10:30 a.m. to 10:50 a.m.)

**DR. SEIXAS:** Take your seats, please, we're going to get started right away. We're already falling behind and losing the opportunity to

hear from the august speakers. The next group of speakers, if you're here, could come down towards the front so we can minimize time in between. The first person up is Rick Neitzel, a research scientist at the University of Washington.

**DR. NEITZEL:** Looks like some people will still be filtering in here as I talk. Thank you very much, Noah. I'm a research scientist at the University of Washington, Department of Environmental and Occupational Health Sciences. I actually want to commend NIOSH for continuing this NORA process and for gathering all this public input. I think that's a very valuable service they're providing. And I for one am enjoying getting everyone's take on where we need to go for the next ten years.

I also want to say I think the sector-specific focus is a very interesting idea, and I'm glad to see there's some infrastructure in place to deal with the cross-sector issues, but I also want to emphasize that I hope cross-sector issues are not in any way downgraded because obviously they impact many, many of these sectors -- essentially all of the eight that

I've seen identified so far.
In fact, one specific issue I'd like to speak on that covers just about every sector, every industry out there, is occupational noise and noise-induced hearing loss. Obviously this is not a new issue by any means. It's no nanotechnology. In fact, we've known for hundreds and hundreds of years that if you're exposed to high enough noise, you will lose your hearing. Nevertheless, this remains a tremendous issue that we face in the area of occupational health and safety, not only in the U.S. but throughout the world. There are literally millions and millions of workers in the U.S. alone who are exposed to potentially hazardous levels of noise, further millions who have already suffered permanent and irreversible noise-induced hearing loss.
That's a pretty heavy disease burden just in the U.S., and if you look globally the numbers are tremendous. In fact, there's an article that just come out in the American Journal of Industrial Medicine that tried to describe the burden of noise-induced hearing loss globally, and the numbers are just staggering. So I do

again want to applaud NIOSH for including hearing loss in the first round of NORA, and I want to emphasize that it really needs to stay there. It's not as if we've fixed this issue by simply having it in the first NORA. Again, despite all the information that we have on noise and noise-induced hearing loss, this remains a tremendous essentially obstacle that we need to face. There's been very little regulatory enforcement on this particular exposure. A lot of industries in the U.S. have acknowledged that they have high noise exposures, but the solution has simply been to hand out hearing protectors. And as I talked to some construction workers last week who described to me having to stick an ear plug in their ear with a pencil as far as they could and then stick a second ear plug on top of that in their ear to just get enough noise, it occurred to me that perhaps hearing protectors alone is not a viable solution in America. In fact, it's a flawed and ineffective approach to depend only on hearing protectors, and I what I'd like to encourage NIOSH to do is emphasize and promote the development and

implementation of effective noise controls in the industry. There also needs to be much more of an emphasis on the behavioral and organizational aspects of preventing noise-induced hearing loss in the workplace because there are myriad issues that present to workers who try to wear hearing protectors. Without this research on noise controls and on organizational and behavioral aspects of hearing conservation, workers will continue to lose their hearing.

I'd also like to put in a plug for continued support of just basic research. We probably know more about noise and noise-induced hearing loss than most other occupational issues. Nevertheless, there are huge gaps in our understanding. There are issues of ototoxics exposures in the workplace, exposures to impulse and impact-type noise. There's also issues about how to properly assess exposures to noise. All these things need to be addressed with continued laboratory and field-based epidemiological studies supported by NIOSH.

I'd also like to put in a plug for basic

research as a way to develop and disseminate information that's very practical for the industry. For example, we've just finished up a prospective study of noise-induced hearing loss among construction apprentices. And from this basic research came seven peer-reviewed manuscripts, eight master's theses, a joint effort to develop a hearing conservation program with the local associated general contractors; a collection of educational materials, some of which are available out at the booth; a web site that offers information for the public, and a variety of other very practical results that have come out of this supported basic research. So I think that basic research definitely needs to have a large and perhaps larger space on NIOSH's funding. And finally I'd also like to put in a plug for NIOSH support of partnerships like the one that NIOSH and the National Hearing Conservation Association have. NIOSH and NHCA have sponsored several workshops that have looked at ototoxics and solvent exposures, and also exposures to impacts and impulses for noise in the workplace. Those workshops have produced

very practical, very usable materials that have benefited hearing conservationists, regulators, academics, and ultimately and most importantly, workers out in the workplace.

So thank you very much for giving me the opportunity to put in my two cents' worth, and let's hear from the next speaker. Thanks.

**DR. SEIXAS:** Thank you very much, Rick. Next is Mary Salazar of our School of Nursing at the University of Washington. Thanks, Mary.

**MS. SALAZAR:** Thank you. I'm really pleased to be here this morning. My name, as Noah said, is Mary Salazar, and I'm a professor in the Department of Psychosocial and Community Health at the University of Washington. And I want to say that these comments reflect not only mine, but also my colleague, Dr. Randall Beaton*, who's a research professor in the School of Nursing as well.

I want to begin by thanking NIOSH for the work that they've done these past years -- really since the first NIOSH priorities were identified in the early 1980s -- in the area of occupational stress. And I'm here to address that issue, an issue that I think has a

profound effect on all of American workers and is in -- present in every workplace in one form or another.

The adverse effects of stress has been well documented in the literature. These effects include an array of psychological conditions such as depression, anxiety, sometime sleep disturbances, as well as physiological conditions, including cardiovascular diseases, gastrointestinal, immunological disorders and so forth. For example, one study found that an exposure to even a month of high levels of stress dramatically increased an individual's susceptibility to upper respiratory infections, and another study identified a direct -- a very direct relationship between workers who had low control on the job and poor health.

Inordinate workplace stress may lead to work performance decrements, decreased attention in concentration, increased distractibility, increased muscle tension, and poor judgment. And of course the results of these things might be things such as low productivity, burnout, and even an increased rate of accidents. In more extreme cases exposure to workplace

stressors may be a work -- or excuse me, a risk factor for violent acts such as suicide, homicide, and other forms of assault on self or others.

Occupational stress is ubiquitous. It's everywhere. Studies suggest that close to half of workers view their jobs as somewhat or extremely stressful, and that the majority feels that their jobs have become more stressful in recent years. In one study about half of the respondents indicated that job stress adversely affected their health, their personal relationships and their job performance.

The causes of stress are multifactorial and they're really difficult to quantify. There are numerous factors that contribute to occupational stress, and these include things like increased workload, declining job satisfaction, unsafe working conditions, and oftentimes management and leadership styles. Workers' stress levels are related to the structure of work, the organizational culture and climate, and interpersonal relationships at work.

And lastly, occupational stress is costly. Claims for stress-related conditions are the most expensive claims in the workers compensation system on a per claim basis. Other costs related to stressful working conditions include increased absenteeism rates, on-the-job injuries, increased health insurance costs, workplace malfeasance and higher turnover.

So what needs to be done? To summarize, it's increasingly clear that although psychosocial hazards may be more nebulous and less tangible than other categories of workplace hazards, they nevertheless exert a pervasive influence on the health and safety of American workers. There are no quick fixes for the multitude of stressors experienced in the workplace. Indeed, recent strategic advances in our understanding of occupational stress, largely supported by NIOSH, must continue and must be accelerated. Despite the number of studies that have effectively documented the cause and adverse effect of occupational stress, there's still a great deal of uncertainty and confusion about the nature and definition of stress, the

evidence linking working conditions to health and safety, and the breadth of problems attributed to stress.

While much has been accomplished since NIOSH first identified occupational stress as one of its top ten priorities, there's still much work to be done. The conditions that lead to adverse health and safety outcomes are deeply embedded in the climate and culture of organizations. And unfortunately, competition and nearsighted economic priorities often lead to unhealthy and unsafe compromises.

Organizations are constantly dealing with competing priorities, and sometimes the choice must be made between short-term profit and worker safety.

We need to continue in our efforts to understand how work-related stress affects workers, and we also need to determine what factors cause the greatest burden. And more importantly, we need to develop and test interventions to ameliorate conditions that lead to adverse stress responses that affect workers, their families, and our communities.

Thank you for the opportunity to share these

comments.

**DR. SEIXAS:** Thanks very much, Mary. Jenny Tsai is going to submit her comments in writing to NIOSH, but I think it would be fine to ask Karen Bowman, another -- a graduate of our School of Nursing here at the University of Washington, to take that five minutes and have an opportunity. Karen.

**MS. BOWMAN:** I'd like to first thank NORA for hosting these town hall meetings. My name is Karen Bowman. I'm the Chief Consultant with Karen Bowman & Associates, an international occupational environmental health firm based in Seattle. I'm also the vice president of the Washington State Association for Occupational Health Nurses, and I am the environmental health consultant for Washington State Nursing Association.

Inappropriate staffing is the number one concern of nurses today, not only because of the effects it has on patient care outcomes, but also because of the detrimental effect it has on health and safety of nurses. Presently research is available that demonstrates the causal relationship between poor staffing

policies and patient care outcomes and safety. Now research is needed using current data that explores the relationship between staffing patterns and on-the-job injuries of nurses. Healthcare is the largest growing industry in the United States, employing over 12 million workers, with nurses constituting the majority. One out of every 100 U.S. citizens is a nurse. There's three million of us. It's a large -- it's the largest group of healthcare providers in the United States. The healthcare industry is expected to grow exceedingly over other industries over the next ten years. It's estimated that, between 1996 and 2008, 14 percent of all new jobs will be in healthcare, adding another 2.8 million new jobs to the United States. With this growth and given that nurses make up that largest portion of those new jobs, it's imperative to identify and eliminate occupational hazards that cause injury and illness to this work group.

A recent Institute of Medicine report, "Keeping Patients Safe, Transforming the Work Environment of Nurses", not only shows the relationship between nurse staffing practices

and increased errors, it also emphasizes that poor working conditions, including poor staffing practices, is not only related to the patients' risk of nosocomial infections, but also to occupational injuries and infections among staff.

In a cross-cut -- excuse me, in a cross-sectional study of more than 1,500 nurses employed on 40 units in 20 hospitals, poor organizational climate and high workloads were associated with 50 to 200 percent increase in the likelihood of needle stick injuries and near misses among hospital personnel and primarily nurses. And needle stick injuries are the principal exposure route for hepatitis B, hepatitis C and HIV.

Emerging new infections such as SARS and avian flu highlight the need for improved health and safety systems for hospital personnel. For example, the SARS outbreak was mostly hospital-based, and in many of the countries where the outbreaks occurs -- occurred, nurses were the largest group that was affected. Nurse staffing issues and organizational problems, along with the lack of appropriate fit-testing

for respirators, are thought to have compromised the containment of SARS in Toronto. And nurse staffing shortages have been identified as major factors in how hospitals will manage future potential biological threats.

Therefore, future research in the global healthcare community is needed addressing staff levels and the risks for healthcare associate infections, occupational injuries, and illnesses. In addition, research findings will assist occupational health professionals determine what's needed for surveillance, work practice changes, and health and safety training of workers.

Poor staffing, increased frequency of schedule changes, and increased shift work for those nurses who are not normally acclimated to those shifts cause circadian rhythm disruptions, leading to a variety of physical and mental health issues, some of which Mary Salazar mentioned -- GI disturbances, depression, exhaustion, increased accidents on the job, and lateral abuse.

Stress manifests differently according to

specialty, nursing specialty and facility. Intensive care unit nurses and hospice nurses perceive an increase in stress directly related to death and dying. Whereas med/surg nurses directly relate it to overwork, and poor staffing and mandatory floating to other units. When you add up all the healthcare industry sick codes, hospitals, nursing homes, home health and residential care, healthcare is the leading industry in the State of Washington for back injuries. Without appropriate staffing, one policy to reduce these injuries is totally eliminated. We do not fully understand the impact staffing has on the magnitude of occupational injury and illnesses in healthcare -- in the healthcare setting, excuse me. Occupational health professionals have an obligation to protect and advocate for nurses, along with other allied healthcare professionals. Further research identifying occupational health hazards related to poor staffing patterns will not only help develop systems to decrease patient errors, but will also improve the health and safety of an endangered profession, as evidenced by the

global nursing shortage. Thank you very much.

**DR. SEIXAS:** Thank you, Karen. As long as we're on healthcare, and this is a sector-based approach, I'm going to go a little bit out of order here if we can. Is Chris Barton here?

**UNIDENTIFIED:** (Off microphone) Yes.

**DR. SEIXAS:** I'm going to ask Chris to come next, representing the Service Employees International Union 1199.

**MS. BARTON:** Thank you. Good morning. My name is Chris Barton, and I'm a registered nurse and the Secretary/Treasurer of District 1199 Northwest, representing 20,000 healthcare workers across Washington State. We're a local union of the Service Employees International Union, representing 1.8 million healthcare workers, building service workers, and public sector workers.

I'm glad to participate today and speak on behalf of my local union and our international union and thank NIOSH for planning this series of town hall meetings. In the limited time before me today, I'd like to briefly touch upon a few more of the significant workplace health and safety issues facing our members, and the

important role that we believe NIOSH can play in addressing them.

However, first we'd like to recognize and support NIOSH's decision in this second round of NORA to move towards an industry-based approach. NIOSH historically has done some of it's best work when this industry-based approach has been taken, as been demonstrated in such sectors as agriculture, construction and firefighting. The service sector is clearly worthy as a separate priority area, as the vast majority of injuries and illnesses now occur in this rapidly growing sector. Furthermore, healthcare and social assistance also deserve their own category, as this growing sector reports a disportionate (sic) share of reported injuries and illnesses, with hospital workers now suffering rates higher than workers in mining, manufacturing, and construction. Nursing home worker rates are substantially higher. In fact, taken as a group, healthcare workers now suffer a higher absolute number of injuries and illnesses than any other industry sector.

We also want to reaffirm our support of NIOSH

focusing their very limited resources on applied or intervention-based research. While some basic research is also necessary, our experience tells us for many of the hazards our members face, the solutions have been known for years, if not decades.

The main problem that workers face is getting these known solutions adopted in the workplace, where the rubber meets the road, so to speak. NIOSH needs to do more to identify the obstacles that prevent known solutions to workplace hazards from being implemented and develop more practical guides, such as NIOSH alerts, to spur the adoption of these controls at the work site level.

Publishing and publicizing studies that highlight pilot intervention programs by progressive and responsible employers is another important avenue to motivate others to adopt similarly protective measures.

NIOSH is to be commented (sic) for its past work for recognizing and addressing hazards facing healthcare workers by issuing alerts on latex allergies, needle-stick injuries, and most recently on hazardous drugs. There's

clearly a need for more NIOSH alerts on the ranges of hazards facing healthcare workers. Such hazards worthy for more NIOSH alerts include an alert on how healthcare worker staffing levels impact the quality of patient and rates of worker injuries and illness rates, as we just heard; an alert on how to best control glucardihide* exposure and the use of substitutes; an alert on controlling technologies for reducing anesthetic gas exposures on both the operating and especially in recovery rooms; and an alert on implementing workplace violence controls in healthcare and mental health settings.

The issue of workplace violence prevention in particular has never gotten the attention by NIOSH that it deserves, based on the very high number of injuries caused by these acts. It was buried within the traumatic injuries NORA category, and we believe has suffered from a lack of leadership commitment and a lack of resources as a result. Last year Marty Smith, a community mental health worker and a member of my local, was violently killed in his client's home. A survey we just completed of

over 300 Washington State community mental health professionals found more that (sic) three out of four workers recorded being assaulted, including one in five being physically assaulted in the past two years. Nearly two out of five workers reported that they felt they did not get sufficient training in workplace violence protection. NIOSH needs to provide more tools for front line mental healthcare workers to avert such attacks in the future.

And finally, perhaps the biggest unaddressed hazard facing healthcare workers that deserves additional attention by NIOSH is the epidemic of neck, back, and shoulder injuries among healthcare workers being caused by inherently dangerous practice of manual patient lifting and transferring. Nurses on average are getting older, while patients on average are getting heavier. This is a recipe for disaster, as such conditions promote a shortage of nurses willing to work in healthcare. In fact, 12 percent of nurses who have already left the profession report the main reason being that they have already suffered one or

more of these preventable, disabling injuries. While at least one NIOSH-funded study has appeared in a peer-review journal showing how the use of mechanical lifting and transfer devices, with or without the use of lift teams, can save backs and bucks, it is clear that what now is needed is a healthcare worker-friendly NIOSH alert -- a tool book, if you will -- on implementing a safe patient handling program. Thank you for your attention and the opportunity to provide these comments.

**DR. SEIXAS:** Terrific. Thank you very much. And I think we'll stay on a role here for a moment and have Barbara Silverstein pick up from where you have left off.

**MS. SILVERSTEIN:** This is quite a role. My name is Barbara Silverstein, and I'm the Research Director for the Safety and Health Assessment and Research for Prevention Program at the Washington State Department of Labor and Industries. At the request of the Washington State House of Representatives' Commerce and Labor Committee, we recently committed -- completed a patient handling task force report with stakeholders from both labor and business

in hospitals, nursing homes, home care, home healthcare, hospice care, and pre-hospital medical services, such as emergency medical services. I'm including in -- what I'm going to hand over to you are the -- a list of suggested approaches for addressing patient handling concerns that were identified by task force members. We also have a final report of the task force that's available upon request if NIOSH would like a copy.

As the last two speakers said, there's an integral relationship between patient and staff safety with respect to increasingly older, heavier, and often sicker patients being cared for by skilled healthcare workers who are getting older, thereby -- therefore, making recruitment and retention of qualified, experienced staff a critical issue in and of itself. The legislative committee requested that the Department of Labor and Industries convene this task force to examine current lifting programs, policies, and associated challenges in Washington state; to examine how the programs work and how they're funded; to review the current literature in the workers

compensation data; and to identify the culture necessary to sustain a successful program. I think these issues have also been touched on by the previous speakers.

Let me briefly say that we did as requested, and I would like to first present some conclusions from the task force and then talk a little bit about some of the issues.

First, all of the hospitals and nursing homes that we visited were working to implement a no-lift program in some form, with the intent of reducing staff and patient injuries. This was less evident in the other sub-sectors of healthcare. The literature review of facilities with no-lift programs clearly shows reduced injuries to patients and staff, reduced time loss, reduced costs, and reduced staff turnover, and there's very little question about that.

A clear barrier to implementing no-lift programs is lack of funding to purchase the mechanical lifting equipment, despite the relatively high return on investment that has already been demonstrated. Home and pre-hospital medical service sectors may present

some unique, but not insurmountable, challenges to minimize manual lifting. Developing and testing these solutions in this sector should be a research focus.

So with the workers compensation analysis that we did in Washington state, musculoskeletal injuries, particularly of the back, continue to be a problem in this industry. In 2003, in the state fund workers compensation program, healthcare employers had 3.9 times the compensable or lost time back injury claims rate as other sectors combined. For the self-insured in 2003, which represent most of the hospitals, the healthcare sector had 1.5 times the compensable back injury claims rate of other sectors combined.

In our literature review and the review of the workers compensation data, we were able to estimate that in Washington state approximately $32.8 million are spent annually in workers compensation claims in hospitals and nursing homes combined. A 53 percent reduction in the claims rates, which is the median reduction that we see from the literature -- all the studies in the literature -- would save

basically in Washington state $17.4 million a year in direct claims costs. So when thinking about the equipment and the difficulty in purchasing it, there's some disconnect. With the site visits, I think it's important to say with the hospitals and nursing homes that they're similar in that their services are provided in facilities that are under their control. However, they are dissimilar in patient acuity, staffing type and level, and financing mechanisms. I think this is important when you're looking at sector-based research to look at sub-sectors as well. Hospitals and nursing homes were different in the stages of moving toward no-lift environments. All of them had some type of mechanical lifting equipment, with most hospitals having at least one ceiling lift. Both management and employees interviewed recognized that while mechanical patient handling equipment was essential, it was not sufficient without an integrated program or process in place. And all recognized the increased challenge presented more obese patients.

The biggest barrier to full implementation of a no-lift program in hospitals and nursing homes was the up-front cost of equipment. For the home sector -- and again this involves home health, home care, and hospice care -- the goals there are to keep the client at home for as long as possible. And this, in and of itself, presents a unique challenge that requires I think more investigation.

**DR. SEIXAS:** Barbara, if you can sum up.

**MS. SILVERSTEIN:** Yep. Homes are often not structured for ease of client-assisted transfers. The home sector workers often work alone. The client handling equipment is not generally portable, and insurance rarely covers any kind of mechanical lifting devices.

With respect to emergency medical services, they have amongst the most difficult tasks in transferring and handling patients. One of them was -- that we identified was as a result of having no-lift programs in nursing homes -- that there is a transfer of risks from the nursing home to the EMS worker who picks up the injured nursing home patient who is on the floor in the nursing home.

The next part of that has to do with government involvement, and let me just say what I think NIOSH should be doing in terms of government involvement. Not only should there be funding for testing and evaluating no-lift approaches in home and pre-medical service sectors, NIOSH should work with federal healthcare agencies, such as Medicare, to determine the costs and benefits of including portable patient handling devices into federally-funded home care. Additional evaluation of ways to reduce physical load in pre-hospital medical services is urgently needed. Thank you.

**DR. SEIXAS:** Thank you very much. Next -- we'll try to get back on track -- Ron Tubby from the Intel Corporation.

**MR. TUBBY:** First I want to thank NIOSH for this opportunity to give input to its research agenda. And I want to thank Noah and the Northwest Occupational Health Center for coordinating this event. My name is Ron Tubby. I am with Intel Corporation. I am the program manager for chemical management with our corporate operations. I'm an alumni of the University of Washington program so it's an

honor to be back here again talking with folks in this setting. I've been with Intel for over 15 years.

Intel as a company has over 16,000 employees in its Portland, Oregon operations, and Portland is by far and away Intel's largest location. We have our significant research and development operations there in Oregon that research the next generation of logic processing devices and memory devices that we introduce into the market. Intel employs about 100,000 employees worldwide. About half of those employees, little bit over half of those employees, reside in the United States. We introduce about $40 billion into the U. S. economy annually. You didn't hear that from me because we're announcing revenues this afternoon, so don't run and call your stockbroker.

The semi-conductor industry sector in the United States represents about 230,000 workers and that's about $100 billion of revenue annually. That's made up of about 90 companies in the United States, and you can generally multiply those numbers again by two if you want

to look at global numbers for the semi-conductor operations worldwide. The semi-conductor industry spends about $14 billion annually on research and development, and our company is a significant contributor to that by over half.

In terms of the people that engage in manufacturing devices that you use in the consumer market. and work in our factories and work with chemicals and work with equipment to manage and process those chemicals, that represents about 50,000 workers for us globally. In the last ten years we have seen a shift of our revenue sources from the North American market, which used to comprise about 60 to 70 percent of our sales, to the Asian market, which now comprises about 60 percent of our sales. Commensurate with that shift in market, we are shifting our manufacturing operations to reflect those markets and manufacture products in those emerging economies. That poses new challenges for us, as it does for many other industries, as I'm sure you're familiar.

For us specifically, we have engineering staff

and technician staff that work inside of our clean rooms inside of our factories that work with chemicals on a daily basis, and process materials through those machines that make the devices that you use. Our top research needs and concerns as an industry and as a company -- first on top of the list is nanomaterials, and we've talked about that several times, several speakers have mentioned that today. In our industry specifically, we will see growth in the next five years in the use of those materials, quantified in terms of the dollars we spend purchasing those materials, from a $50 million market to well over a billion dollar market in the use of those materials to manufacture the devices that we sell. That presents a significant increase in the use and propagation of those materials in our workplaces, and significant challenges to occupational health professionals and industrial hygienists to come up with effective and consistent and matching control strategies to ensure that our workers are safe when they are using those materials.

Likewise, the equipment market that will

process those chemicals will go from what is today a $500 million market to well over a $3 billion market five years from now. That's projections from the Semi-Conductor Industry Association. If you think on what that might look like ten years from now, you can see probably a logarithmic growth in both the use of the materials and the use of the equipment processing those materials. So we need help in research in toxicology, pharmacokinetics, permeation and transport of PPE*. There's some real fundamental industrial hygiene and occupational health questions that we need help getting answers to, and research to back that up.

NNI, ISO, and ANSI* are fully engaged. We need NIOSH to be a player in those conversations in helping us create a safe workplace.

Second on our list of research needs is wireless technology. Many of you today use computers that have wireless LAN devices, and I mean that's transformed the workplace. You can now sit in Starbucks and be as effective in Starbucks as you can in your office setting. What we will see over the next five to ten

years is a evolution of that from a personal 30 to 50 to 300-foot network to a community network, which will pose interesting challenges and interesting benefits to us. But you'll see cell towers -- like cell towers -- projecting broadband wireless signals to the consumer market. You'll be able to access content, instead of through a wired device in your house, through radio signal.

That presents unique risk communication and hazard communication challenges as we have seen with cell phones, as we have seen with WiFi and wireless LAN. What people cannot see, what they cannot feel, what they cannot smell comes with, I think, additional and significant risk communication challenges. And we've seen that frequently in the wireless LAN space in terms of our markets.

Another issue we need help with, and we've seen this over the last -- emerging over the last three years, is help with pandemic and fomite control strategies for businesses. SARS introduced those terms, that language to us. Avian flu is challenging us right now. We're, as a business, trying to develop strategies to

deal with what may happen should we face that kind of outbreak.

Commensurate with the use of nanomaterials, we need help with control strategies when we lack environmental health and safety data.

Increasingly, we are using new and novel materials that don't come with a breadth of toxicological research. That leaves us in the space of having to apply (unintelligible) principles in many cases, and we need help in looking at the use of complex materials in synergistic combinations.

**DR. SEIXAS:** Can you sum up there, Ron?

**MR. TUBBY:** We introduce over 5,000 new chemistries into operations every year. And increasingly a significant percentage of those new materials coming in fit that makeup where we lack basic tox research to support the kinds of control strategies that we have to implement internally to our company.

And I'd like to thank NIOSH and the Northwest Center for the opportunity to provide these comments. Thank you.

**DR. SEIXAS:** We're waiting on another speaker to arrive so I want to go out of order again a

little bit. There's no break scheduled now anyway, so I think we're going to keep moving through. Is that okay, Sid? Is Dave Eaton here?

**DR. EATON:** Well, thank you, Noah. My name is Dave Eaton. I'm a professor of Department of Environmental and Occupational Health Sciences at the University of Washington and Associate Vice Provost for Research at the University of Washington. I'd like to thank NIOSH for the leadership in providing this opportunity for me and other NIOSH stakeholders to provide input into the National Occupational Research Agenda. NIOSH provides a critical component of the national strategy to reduce occupational injury, illness, and disease by supporting both basic and applied research that then provides a scientific foundation for the regulatory polices that protect worker health and safety. I'd like to address to critical areas of research, and this is focused heavily on basic research, that I hope will become a central element of NORA, both of which are technology-driven and represent the applications of new cutting edge science to major occupational

health issues.

The first of these is exposure assessment. The importance of good quantitative measures of actual exposures to occupational hazards, particularly for chemical and physical agents that represent chronic health risks, really cannot be overstated. This is particularly important for occupational epidemiology studies, oftentimes of which serve as the foundation for new insights into disease relationships with exposures, that often relied in the past on crude estimates of exposure to assess occupational risk to chemical and physical hazards, oftentimes crude in the sense of exposure assessment being based on job title, or even more crude measures of actual exposure.

Poor exposure assessment can lead to erroneous conclusions about the hazard or the presumed safety of a chemical or a physical agent in the workplace. I encourage NIOSH to stimulate new innovative approaches to occupational exposure assessment to take advantage of the new tools of genomics, proteomics, and metabolomics that have been developed as an offshoot of the Human

Genome Project. Applications of these tools may identify new molecular bio-markers of exposure that will help to accurately and quantitatively quantify biologically relevant exposures to chemical or physical agents in the workplace on an individual basis.

Although much work remains to be done in the development and application of these tools to occupational exposure assessment, the time is now for NIOSH to recognize the promise of these approaches and to invest in basic research that will ultimately lead to accurate quantitative bio-markers of exposure, some of which may even allow retrospective assessment of past exposures. Better exposure assessment will reduce exposure misclassification in occupational epidemiology studies, thereby increasing both the power and the accuracy of such studies to identify real associations between exposure and illness or disease.

The second area I'd like to address is for the application of new technologies to occupational illnesses and diseases is in the area of genetic susceptibility, also an offshoot of the Human Genome Project. OSHA as you know is

mandated by law to protect even the most sensitive individuals from workplace hazards. It's now becoming evident that the same exposure to a chemical or physical agent may affect one individual but not another, based largely on subtle genetic differences. For example, it's now well established that chronic lung disease from occupational exposure to beryllium is largely confined to a relatively small portion of the workplace population that carries a genetic disposition to the disease. Although the recognition of this poses huge ethical challenges in how such personal information is used, it is critical to understand the magnitude of variability and sensitivity to workplace hazards if one is to establish workplace standards that are both cost effective and adequately protect sensitive individuals.

Such information is also useful in understanding the etiology of disease. Another example of where genetic sensitivity has been shown to be important in occupation diseases is perhaps worth illustrating. A colleague of mine, Dr. Martin Smith at the University of

California Berkley, recently published an article in Science Magazine about a year ago that demonstrated that a subset of workers with specific genetic variance demonstrated a measurable decline in white blood cell counts and other markers of blood or hematotoxicity following occupational exposure to benzene at workplace concentrations at or below the current standard of one part per million. And this is a study done in an international circumstance in a workplace population in China. Although the long-term biological significance of the effects that he measured is not certain, it clearly demonstrates that the current tools of genomics can help to identify susceptible populations to occupational hazards and help to quantify the range of human variability. And I would add that in addition to using interesting genetic bio-markers of susceptibility, Dr. Smith utilized some really cutting edge exposure assessment tools. So he combined the best of new technologies in exposure assessment with genetic susceptibility.

As I stated previously, there are many ethical,

legal, and social implications of using genetic susceptibility information in workplace hazard assessment and policy. NIOSH should support both the basic research necessary to increase our understanding of individual susceptibility, and policy research to ensure that such information is used in a socially responsible manner.

So as NIOSH goes forward with their next ten-year research agenda, it's important that the advances in basic science and technology be built into the research agenda and future funding priorities.

Thank you again for the opportunity to comment on the NIOSH NORA. Thank you.

**DR. SEIXAS:** Thanks very much, Dave. So I think we're going to skip a couple of speakers and try to get back to them if they arrive because they have related talks. So I'm going to move on, and we're going to slowly start to segue at this point into the agriculture sector.

Is Jerry Dzugan here?

**MR. DZUGAN:** Yes. Thank you, and thank you for having me. I've always wanted to say this in

front of a group. I'm from the fishing industry; I'm here to help you -- since I never get to say I'm from the government, I'm here to help you -- so I did it. I don't need to say that anymore. It's gone.

I want to focus on fishing vessel safety, and just before I even begin, say this is -- I understand this is a really hard industry to study because it's so dynamic. I mean it's -- basically you're studying an environment in which the place people are sitting and standing on works in all cardinal directions, and the environment is exposed to weather and it's just -- it's not a controlled laboratory. It's very difficult.

So I have five points I want to make that I think are worthy of NORA to look at in terms of research.

One is traumatic injuries. I was doing a drill once on a boat in Petersburg. It was the -- 90 percent of the ownership of Icicle Seafoods, these old Norwegians in their 70's. I had six of them all in one class together, and all their hands were on the table. And I was debriefing the drill with them, I realized

there wasn't a complete set of fingers on that boat. You know, there should have been 60 fingers there; there was only about 48. And it's just endemic in the industry, and we don't have good statistics on that due to a number of things.

Everybody is collecting the data differently so it's even hard to get a handle on it when you don't know what injuries are happening with what frequency. So if nothing else, just that collection of data would be good and that's going to -- but that will be a challenge. A lot of it's hard to collect due to liability and privacy issues and the Jones Act and many other things, but it's very worthy to try to do something about.

The second issue -- it's closely related -- is ergonomics. How many people here have bad backs? If this was a group of fisherman it would have been 90 percent would have raised their hand. It's totally endemic to the industry. You can tell experienced crew members and fishermen because they have scars on their wrists that go this way. Not this way, that might be due to something else. But

they go this way because of -- they've been getting the operations to open up their carpal tendon sheathes so that nerves don't -- when they get inflamed, can -- won't bother them so much. And many, many other things. The work that Don Bloswick* has done out at the University of Utah is a great beginning on that, looking at ergonomics and developing procedures and practices for fishermen to use. The challenge of course on that one is getting people to change their work habits.

The third issue, which is related to the first two -- again, all of these are related -- is fatigue, fatigue on vessels. There's been some work done on that in fisheries in Australia and at IFISH II. At the IFISH II Conference, the Australian women working on that were interested in working with the UK and Alaska fleet to began to study that a bit. And the challenge and problem there is the management and work regimes may not be compatible with any of the guidelines they could develop for this. Developing a work schedule on a fishing boat -- when you're on literally 24/7, weeks on end, when in the middle of the night, when it's not

your watch, you've got to get up to haul gear, to tie up to the dock, to do other necessary work is going to be a really hard one to do. Fourth issue, which is again very endemic, and not much work has been done with it that I know about, is hearing loss. Any fisherman that's been around boats for 10, 20, 30, 50 years especially has -- many of them have hearing aids, and it's very difficult for them to hear, which means that they can't hear alarms on boats. They can't hear things on the radio with other machinery noises going on, so -- and they just can't hear communications between -- between crews, so it would be good to develop some data on the long-term effects of hearing loss on fishing vessels, if nothing else except just to develop some awareness that this is a problem.

And the fifth issue -- I'm glad Ken brought this one up. Thank you, Ken. I thanked him during the break -- was we are involved with training fishermen in how to survive major casualties at sea. And as a result of this training, we train them to be drill instructors and do skills once a month so that in a

casualty at sea they'll be able to put on their immersion suits in 60 seconds, fight a fire efficiently, et cetera, et cetera. But what's the -- I think the term Ken used was the training durability of this -- what type of refresher training needs to happen and how often should these skills be reinforced. Obstensibly (sic), they're supposed to be reinforced once a month during the drills, but the only data we know about says that about only 18 percent of the boats at best, overall, are doing drills once a month. The training they may get just might happen when they get their once-in-a-lifetime drill training. So it's important I think to study the digression of the -- of those skills over time.

And this is important not just to look at that to see what that retention skill rate is, but as a lot of your work goes into -- it's not just facts and figures you're dealing with, but it's going to be used to set policy also, and I think it's really important when you're looking at some of these things to remember that. People are going to be using this information to set policy and regulations and other things,

so that's it. I'll just conclude with saying that the research that's going to be taking place in this -- hopefully in fishing vessel safety is not going to take place in a sterile lab. It's a very dynamic environment and lots of challenges in that, but it's very, very worthwhile. It's the -- always been the number one and two loss rate in industry so it'll be great to have your attention. Thank you.

**DR. SEIXAS:** Thanks, Jerry. Thanks for coming down from Alaska.

Chris Woodley from the Coast Guard?

**MR. LAWRENCE:** Good morning. My name is Ken Lawrence, and I don't know where Chris is. I didn't even know Chris was supposed to be here. I came up from Portland. I'm with the Coast Guard -- what used to be the Marine Safety Office down there. Now we're something called the sector, to more properly recognize a more multi-mission organization. I'm the commercial fishing vessel safety coordinator down in Portland, and my representation along the coast is the Oregon and coastal Washington small fishing communities. Basically, we have about 2,000 vessels with crew size varying between

one and five, so we're talking about small organizations. We're talking about family businesses, that sort of a smaller organization.

Jerry has eloquently addressed a lot of the issues that I have. I'm going to go and repeat, for -- just so that I can stay with my notes, a little bit of that. But basically what we've seen with small fishing vessel casualties and fatalities at those rates, although the numbers are small, the rates are unacceptably high, somewhere between 70 and 300 fatalities per 100,000 workers, depending on what specific fisheries. And almost all of those are directly attributable to human factor causes and lack of safety and survival training.

The exposures that commercial fishermen have to deal with -- it's a very dynamic environment. You've got the physical marine environment, and especially during the winter off the Pacific northwest that seems to concentrate the fatalities and the vessel losses that we're used to seeing. There's a very highly competitive and complex, market-driven economic

forces that influence all of this behavior. There's very complex and often risk-promoting fishery management that drive a lot of those economic forces, as well as a long tradition of risk tolerance and avoidance of regulation within the industry, either the government or self-industry.

There's a lot of lip service lately that's been paid to safety, but when we get down to it there's not always a lot of action. The population that we're dealing with -- this is one of the great unknowns as far as the Coast Guard is concerned. We've got a very diverse, mobile, disaffected and seasonal employee base. We've got people that will one season fish in Oregon, and then they're down to California, then they're out to the south Pacific. These folks are moving all over the place.

There's a lot of data out there, but there's very little rational denominator information out there that I've been able to cull that allows us to go ahead and get a more quantitative idea of some of those risks, especially by specific fisheries. A lot of the conclusions that we end up coming to when we

start playing with numbers -- there's lots of swag, wild-ass guesses, and it's very rarely more than a broad brush across the entire industry, which makes a specific fishery intervention very difficult to develop or justify.

Some of the failures in the systems that we've seen is the commercial fishing industry, for the most part, lacks OSHA jurisdiction and the regulations from the Coast Guard have had, in my opinion, a poor prevention-based result history. And there's very poor injury tracking, although there are some specific areas -- Alaska, for example -- where they are very good at tracking the injury rates and some of those data. But the communication and the applicability to other fishery sectors can be ambiguous, complicated at the least.

As far as our key partnerships, I've enjoyed a long working relationship with the NIOSH Alaska Field Station, and I want to thank them for their research and support over the years in the fields of crab vessel safety, deck safety, training studies, PFD usage studies, those sorts of things. It's very specific research

and development that's allowed the Coast Guard to partner with industry and to make some very specific, effective interventions to try to minimize some of those fatality rates.

The other NIOSH sponsorship that's I think benefited the Coast Guard quite a bit is the sponsorship of the IFISH Conferences, the International Fish Industry Safety and Health Conference. The first two, in Woods Hole and in -- I'm sorry was it Woods Hole or Newfoundland? Woods Hole, and the second one in Sitka. The third one is coming up here in Chennai, India in another couple of weeks -- has provided us a really valuable forum to get the -- some of these key players together to start concentrating and figure out where some of the vacuums and the holes in the data and the information are so that we can go ahead and start to fill in some of that collective knowledge that we have.

Some of the future research that I'm looking forward to working with my NIOSH colleagues, as well as Jerry Dzugan, for example, the Alaska Marine Safety Education Association, the areas of crew training and crew competence, which are

going to help us get a handle on some of those human factor accident causation, as well as a better idea of injury prevention. Generally, the Coast Guard is very attuned to an accident when somebody dies because those numbers are hard to hide. But injuries become almost transparent given the population group. We really don't have any handle on injury prevention.

And, lastly, looking forward to using some of this to make improvements in risk-based government and industry interventions and policy and regulations. So I want to thank NIOSH for a chance to make this input.

**DR. SEIXAS:** Thank you very much. John Garland, Oregon State University, Forest Engineering Department. John.

**MR. GARLAND:** My name is John Garland. I'm a professor and timber harvesting extension specialist in the Forest Engineering Department at Oregon State. I should point out the remarks are my own and not those of the university.

For the past 32 years I have been providing problem-solving education, research

implementation, and technology transference in building of human capacity for the forestry sector in Oregon and the region nationally and to some degree internationally. I'm the ergonomics research leader for the International Union of Forestry Research Organizations which deals with international cooperation on forestry research.

The emphasis in my career has been on selection training, motivation, and safety and health for the forestry workforce. Over the years I've participated in three revisions of Oregon's safety code over ten year cycles, and have seen the efforts to improve safety in that sector advance through those revisions.

I don't need to tell you that forestry work is dangerous. The news media does it for us regularly, in that it's among the top industries and has been for the past 30 years. I think what I would tell you, though, is that there have been improvements, and Oregon has seen a reduction in fatalities in the logging workforce that are significant over the years, going from fatalities in the 40 person per year range down to less than ten and some years just

one or two. So there have been changes that do work.

However, logging workers are aging faster than the general male population. I mean that for the entire group. More than 45 percent of the workers are over 45 years of age, and that isn't the way it was in the past, so that workforce is aging substantially. Firms themselves are becoming smaller, so their ability to do management and oversight to improve safety is becoming less and less. In addition, recruitment among the forestry sector is reduced because of comparative losses in relative wages compared to other industries. So forestry workers are losing ground compared to other opportunities.

There have been increases in the Hispanic population of all western states that I'm aware of, but in Oregon we've grown from four percent in 1990 to about -- over ten percent right now. And that means that that Hispanic workforce is also finding its way into the sectors. Some firms have Hispanic crews entirely, with separate gringo crews, and others are mixing the cultures, with some interesting

complications in language problems. We'll see Hispanic populations make up more and more of the forestry services sector.

Mechanization continues in the forestry sector and improves safety, but it changes the kinds of hazards related mostly to maintenance kinds of injuries and sometimes injuries from thrown objects, let's say from the machines themselves. Operators suffer cumulative trauma from the work that they do in long hours and restricted positions, and that's been noted in other countries.

In recent years I've worked with synthetic rope to replace wire rope in logging as a tool to reduce workloads, but it really needs to be done on a system-wide basis rather than a rather isolated research projects.

New technologies able to monitor workers status by the clothing they wear would give us some good insights as to what the workloads are and what the fatigue factors might be for workers, and this relates to the nanotechnologies listed earlier.

Training is crucial to forestry workers, but effective approaches and evaluation of

materials hasn't been done along the same lines. We don't have materials that can be used within the individual firms themselves. Sometimes the training schools do quite well, but are not sustainable once the grants run out.

Oregon's landmark revision of the Forest Activities Code changed it from a prescriptive code of do this/don't do that sort of an approach to more of a safety and health management where workers are asked to be competent for the work that they do. And the training and supervision and oversight needed to produce that is what's called for in the codes. So we have different approach for the logging sector now, and we'd like to see some evaluation of that to see what would happen.

Let me just list quickly the ideas that relate to that for OSHA or NIOSH research that would be helpful. Demographics of the forestry workforce -- there are about four different regions for the forestry workforce. We lost ground when we changed some of our industrial classifications, so there now no is -- there is no series relating to this sector. So we need

to look at the demographics.
The aging workforce is critical. We ought to treat the workforce more like we do trees. Consider regeneration, a little fertilization in terms of education, and consider the old growth that is our aging workforce.
We need to have the technological developments necessary, and the prior sources for that in the federal government with USDA and the equipment manufacturers is no longer there. Those have been cut back. So if safety is going to be the prescription for research, it may need to come from something like NIOSH.
We need evaluation of training strategies and documentation of those systems that work within firms, and we need to find ways to integrate the Hispanics into the logging and the forestry services workforce, keeping in context the cultural and language differences, indeed including some of the risk-taking behaviors that may be different for the Hispanic culture.
I think we need to look at the new approaches to safety and health regulations that I mentioned and study whether or not those have merit for small firms that we're working with.

One special project that I've called for for years has been understanding the risk-taking behaviors of seriously disabled workers. Once all the dust has settled, it would be helpful to find out what was really going through the minds of the workers when they actually encountered the incident. You can't do it right after the accident for a variety of reasons, but I've had anecdotal evidence that workers provide important risk-taking characteristics interviewed some time after the accident has occurred, and that hasn't been done for forestry workers. It would be very helpful.

Operator overload and cumulative trauma from machine operators is an area that will continue to be of importance as more and more of these operations are mechanized.

I'd like to see us study smart clothing and worker feedback in real time so we could tell when the stress is high, when the worker fatigue is at high levels, and I think there are some technologies now in military uniforms that provide a starting basis for this, as well as monitoring heart rates and other measures

that we have traditionally used.
One of the areas that's been critical in recent years has been fighting wild land fires. And much of the applications have been done by individual workers with shovels and by airplanes. But there's a whole category of work that needs to be done with mechanized equipment that can make this wild land firefighting more effective, and that hasn't been studied from its safety and health aspects and certainly needs to be looked into. I've not had good success encouraging that among the firefighting community.

**DR. SEIXAS:** John, if you could sum up.

**MR. GARLAND:** Sure. Two other points, we need to evaluate research proposals within the CDC research system because I think the process now doesn't give good attention to the kinds of proposals that may help the forestry sector. It tends to focus medical research rather than operational research.
And finally, I thank the opportunity to speak to you today.

**DR. SEIXAS:** Thank you very much. Moving right along, Bill Krycia.

**MR. KRYCIA:** Still good morning. My name is Bill Krycia. I'm a Regional Manager with Cal. OSHA Enforcement out of Sacramento. I'm also the Chair for the External Advisory Panel for the Western Center for Agricultural Health and Safety at the University of California at Davis where my daughter now goes. I'd like to thank you for this opportunity, and talk about western ag. And I've been reading these comments and trying to -- you know, the great speakers this morning -- and trying to follow with that. And what I'm going to say, to me, sounds so simple that I'm almost embarrassed to say it, but I feel that I have to say it here. And that's that western agriculture, California agriculture, is very labor intensive -- very labor intensive. And that that labor workforce has a significant population of non-English-speaking immigrant, low-income laborers. And that brings special needs I think to the west coast.

Leaping into things that I want to address from an enforcement standpoint, it's clear that this group does not file complaints with us, so they're almost invisible. That doesn't mean

that they don't have needs. And I may be speaking from my very limited perspective as an OSHA enforcement person, not a consultant. I'm an enforcement person. My folks are -- you know, write citations. We sign off on citations. We take employers to court, and we do all those things that a lot of folks don't really like. But from that perspective, there's -- there are groups out there, the Penaros*, I was just thinking about the Penaros when we were talking just now about logging, and I know that next week we have to reach out to that group. And so there's a lot of things that we're trying to develop right now that I think bear some research, even though I haven't included them in my notes here. But I think that that's a group we need to outreach to in research and find out what hazards address those folks and what needs they have.

To get back to my notes, I'd like to suggest that we continue with ergonomics in agriculture. California has a hand-weeding standard, and it addresses one facet of ergonomics in agriculture, and there are a lot of other issues in ergonomics and agriculture

that need to be addressed, not the least is hand harvesting. I think that we need to continue on and take a look at issues for that. I'd like to see additional research on the practice itself of hand weeding and the impacts of the engineering, horticultural and administrative interventions that employers are currently involved in. I think we need to follow up on that. Just because we have a standard now, I wouldn't want to see that dropped.

Work involved in high heat environments has been in the focus this past season for us. And California currently has a temporary emergency standard in effect. There's clearly a wealth of literature and research on the subject of heat-related illness, but I see significantly less information available on the components of agricultural workloads. One of the things I said I wouldn't do but I think I'm going to do it is say that -- you know, my initial review -- and I'm not an epidemiologist, I'm an industrial hygienist -- is that it's almost all exertional heat stress. And so that's one of the things that I think that we need to bring

to -- information in, maybe do a little bit more research on, so that the -- it's important for employers to have this so that they can understand what exertional heat stress is and have information to train -- I wasn't going to talk about training but I heard other people do that -- so that they can train their employees, to protect their employees. I think that's just critical for prevention, so research on that.

I also think that information about the early recognition of heat-related illness is absolutely critical, and so these employees -- these agricultural employees -- work in remote locations, some exceptionally remote locations. And they're at some distance and time from advanced life support, and so the failure to recognize heat-related illness very early means that they only recognize it when the employee's in the final stages of heat stroke. And when it takes 45 minutes to get an ambulance out some place that doesn't have advanced life support, or it may take, in some cases, 90 minutes to get a helicopter if they even call a helicopter, that's unfortunately in about a

dozen cases been too long. So I think we clearly need to address early recognition. One of the other things, too, that I've noticed this past year is night work in agriculture. I don't think anybody else is talking about that, and what I mean by that is they harvest at night. They harvest tomatoes, they harvest grapes. And there's other night work going on, and some it's due to they're -- they're trying to avoid the heat, and some of it's due to the special crop requirements. You know, they want a nice crisp white wine for the consumer and so they'll harvest at night. So that's okay. But when they run over and kill their employees, that's not. And our standards, I noticed, are -- they really haven't addressed that. I think that's a change in an agricultural practice, and I would suggest that additional research be done on night -- night work in agriculture. I'd also like to acknowledge the western ag centers, both of them, for their input. One of the things I've talked about my myopic focus on enforcement, and I really use the ag centers to kind of broaden that because again, like I've said, the workforce that we're dealing with in

agriculture doesn't call in and file complaints about it's too dusty. They don't generally file complaints, even in California, about ladders. I don't see that, and there's some work to be done on ladders, too.

**DR. SEIXAS:** And if you could sum up.

**MR. KRYCIA:** Okay, and I'd like to thank NIOSH for their cool publications that we use a lot, and that's it.

**DR. SEIXAS:** Thank you. Jim Sedore.

**MR. SEDORE:** Good morning, members of NIOSH and OSHA. Thank you for the opportunity to provide input on the future research on reducing work-related injury and illness in employees in agriculture, forestry, and fisheries. My name is Jim Sedore. I've been the Safety and Health Manager for the Washington State Department of Natural Resources for the last 20 years.

The state manages about five million acres of state-owned land, and protects 12.7 million acres of -- of private and state-owned forest lands for wildfire management. We have approximately 1,200 employees, 400 summer firefighters, and 400 inmates who work for us every day.

Employees file approximately 180 work-related claims per year that require medical attention beyond first aid. Despite the exposures to wildfires, SCUBA-diving, mine inspection, and timber harvesting, the DNR has one of the lowest rates of claims per hour of any state agency. At your request, I can provide statistics on accidents, severity, and frequency for the last six years.

However, I'd like to talk about three related claims that need further research. I appreciate John's comment related to timber, and we can talk about old growth, mid growth, and reprod. In old growth, age-related injuries -- as retired parameters result in older employees in the field, what can employees and employers do to reduce the number and severity of age-related injuries? I'd like to give two examples.

Injuries to load-bearing joints -- the number and seriousness of knee injuries are increasingly significant in field employees over 45. DNR employees, most them now cannot retire until they're 65. It's one thing for a person to carry a chain saw up and down the

mountains when they're 25, 30 years old, but when you're 60 do you want to do that? What can be done to improve conditioning, footwear, medical treatment for knee injuries? In the past five years DNR employees have suffered 127 knee injuries costing $320,000, including about $50,000 dollars in time loss, an average of $2,500 per knee injury.

Hearing loss -- the cumulative effect of years of working around equipment, even with hearing protection and engineering controls, is resulting in significant hearing loss in aging employees. Much hearing protection is cumbersome and unclean in a logging and firefighting environment. We also see of course hearing loss occurring -- hearing injuries occurring in young ages, but manifesting itself in degrees of hearing loss as they become older.

Among the mid-aged workforce, creating and maintaining a physical fitness in wild land firefighters and natural resources workers is more and more an issue for us. While vehicles and equipment are great, there are many places where fire engines and bulldozers can't go.

In government, managers don't know if they can justify fitness programs and gym memberships to the taxpayer. However, many tasks in natural resources environment require a high level of physical fitness. Objective research is needed to show if there is a value of on-the-job fitness programs on injury prevention, productivity, and sick leave reduction. Ideally this research would identify the most effective fitness and conditioning programs for those people who must do arduous work. This research would follow up on current NORA research projects on aging effects and intermittent work capacity, effects on physical conditioning on lifting biometrics, and evaluating the effectiveness of the logger safety training program.

The last -- the new workforce, the upcoming workforce I call weak, fat, and electronic. In years past, natural resources employers often hired children of loggers, farmers and fishermen. The young population -- this young population is shrinking and being replaced by young adults who are great with the joy stick, but have never used a chain saw. They can

operate an iPod, but they don't know what a manual transmission is. And more and more of them are overweight with asthma or diabetes. What medical exams or fitness tests are best at identifying the fitness of applicants?

As much as our young culture becomes more high tech, how do we teach arduous, hand-labor skills like digging a fire trail or operating a chain saw to remove downed trees?

Lastly I'd like NORA to do a better job of marketing the results of your research. We need to implement the findings of many NORA research projects by sharing the results with employers. On the web I found many NORA research projects that apply to my workplace, but I could not find many results or implementation strategies to apply in the woods. Thank you very much.

**DR. SEIXAS:** Thanks, Jim. I believe finally, Hilary Stern with CASA Latina. Thank you, Hilary.

**MS. STERN:** Thank you very much for inviting me here and for putting me at the end. We've been waiting for my colleague, Guillermo Torres, who had car trouble, but he never showed up, so I'm

just going to have to speak on both of our behalf. I am the Executive Director of CASA Latina, and we're a community-based organization that educates and organizes low-wage workers -- mainly low-wage immigrant workers. We've had a day labor center for immigrant day laborers that we've been operating for seven years. We're also a member of the National Network of Day Labor Organizers, which is a national organization that includes 30 different organizations around the country located in 12 different states. Our experience is typical of all of these organizations. We were formed in response to the growing number of day laborers gathering on the streets to be picked up by contractors that need them for home renovations and residential construction, and homeowners that need help with their gardening or any other type of home improvement projects.

We have -- we started to organize this underground economy to provide more protection to the workers, as well as to address public safety issues related to unorganized laborers using the public sidewalks as a hiring hall.

We see over 1,000 day laborers who register at our center per year in Seattle. In addition, there are at least 500 who never register at our center and prefer to work on their own on the outside -- on the sidewalks surrounding the center, or in different Home Depots in the area.

It's very hard for us to measure the number of day laborers who are working outside of our center, but we know that it's growing because more and more places have sprung up as pickup sites. A few years ago, there was -- all of the pickup was done in the Belltown* area, and now there are pickup sites in several Home Depots around the area. And in one Home Depot in the Soto* area, there's 50 to 75 workers that gather there daily.

And these day laborers form a growing and significant sector in the labor force; however, they operate in an underground economy where few records are kept.

Workplace injuries are very common. We see people with bad backs, cut fingers, cuts on their legs, et cetera, and we know anecdotally that most day laborers receive very little

safety training on the job. When they're hired for one day or two days, the -- their employers -- doesn't waste any of that time giving them any safety training. And many times they're left alone unsupervised.

Often they're expected to complete work for which they've had little or no training, and they're not able to do it. Part of this is because they say that they know how to do something just to get the job, when they actually have never had any experience doing it. And if safety equipment is available, they often don't use it since there's very little supervision. And culturally they don't have the experience of using that safety equipment in their own countries even if they have had experience doing that type of work before.

This is a huge unregulated field where little data is available, so it's very difficult to determine the proper remedies. Because the problems are undocumented and therefore it's so invisible, it's very hard for us to get resources to address these problems.

We need research on the extent of safety training and workplace injuries of day

laborers, and particularly on immigrant day laborers. Thank you very much.

**DR. SEIXAS:** Thank you, Hilary. Well, we're doing pretty well on time here, so we're just coming to the end. If I might take a minute to just hear -- mention a couple of the themes that I picked up. First thing that is evident is that if NIOSH addresses even half of the issues presented this morning, not to mention this afternoon, they're going to have a very full agenda.

The first thing that comes to mind is there is a fair bit of interest in this sector-based approach versus the more cross-cutting sector -- the more cross-cutting issues approach. And NIOSH is going down a certain road, and not without some concern and problems identified by some of the speakers this morning. There's a continuing need for basic research that really informs the more intervention-related or -- type of research that might be amenable to specific sectors. So we've heard speakers on both sides of that issue, and I think it continues to be an important thing for NIOSH to consider.

The second theme that I hear is about the very -- the very dynamic and changing nature of the workforce and workplace. And there are a number of things that were mentioned by multiple speakers talking about long shift schedules, night work, the aging workforce, day laborers and undocumented and immigrant workers, and especially non-English-speaking workers. There are clearly very profound changes in the American workplace that need to be incorporated into how we see our research activities, not to mention protection programs. And part of that dynamism is represented by some specific sectors, such as the fishing industry. Trucking industry was mentioned where work is very unpredictable and difficult to get at.

A third issue that was raised in a number of different ways is kind of high technology or new technologies, both in terms of the nanotechnologies, novel chemicals, and mixtures of chemicals that we don't have adequate information on for exposure assessment or for control systems, or the basic toxicology just isn't there.

A third theme is the importance of international work -- or a fourth theme, that is -- is the importance of internal work, both in terms of presenting -- extending our knowledge and expertise in what we have to offer internationally, but also because what goes on elsewhere in the world is more and more affecting us here at home. And we need to engage in that process overall.

And the final thing that I heard from a couple of speakers that I think is very important is training effectiveness. Many of us in safety and health spend a lot of time in training and yet are at a loss for how to really judge whether we're doing the right thing there, so that's another area I hear.

So with that we'll turn to lunch. I'm sure you're all willing to join me in that. Sid, do you have some directions? I'll turn it over to you.

**DR. SODERHOLM:** I'd like to make a couple of quick comments and the most important part is to hear exactly how lunch is going to work. Lunch is one of my favorite times of day, so I don't want to miss that.

First of all, I would like to thank all of those who helped put this morning's session together. Our local organizers have been very key to not only the venue and the whole day, but especially to this morning's session, and if it -- we would be thanking people even more -- in a more physical way if United Airlines hadn't lost part of my luggage, so we'll catch up on some of the thank you's that we had planned to hand out today.

**UNIDENTIFIED:** (Off microphone) We'll take another check.

**DR. SODERHOLM:** We'll take another check, okay. Well, Mike Galvin's* here. He writes checks all the time, so we'll let him do that, so -- and I would like to interject just a real quick note that the -- NIOSH is very proud of what we've done in setting priorities or how we've tried to mobilize people and have succeeded to some extent in mobilizing people to set priorities in occupational safety and health research.

We're a part of CDC. CDC is embarking on a research agenda process, and there's an opportunity for public input. If you go to the

CDC web site, www.cdc.gov, you'll see an opportunity for public input. One of the questions is have they adequately included occupational safety and health research in their public health research plan. Is there too much occupational safety and health research there? And many of you are public health experts. There are lots of other aspects of public health. Please go to the web site and comment on how far they've gotten on setting their research priorities.

So with that about CDC, I'll remind you that we'll be reconvening at 1:15, and we're going to learn about lunch.

**MS. HOLLAND:** Hello. Briefly I want to tell you that those who have pre-ordered their lunches, if you could please just proceed upstairs, Stephanie Timm* will be handing them out. And they are labeled by name so just identify yourself to her, and she'll give you your lunches.

Those who weren't on the list but signed up to be kind of on our standby list, if you wouldn't mind just waiting a moment for the bulk of the people to move through the line, we do have

extras and we have ordered some extras. So I think that we'll be able to accommodate everyone for lunch. It might be a bit of a limited selection. But those who are vegetarians, we definitely have portobello mushroom sandwiches for you, so no worries there. And if you're not on neither list then I think we'll still have enough for everyone. So again, if you could proceed upstairs to the McCurdy* Gallery, we'll get you served.

**DR. SEIXAS:** Thanks very much.

(Whereupon, a recess was taken from 12:15 p.m. to 1:20 p.m.)

**AGRICULTURE, FORESTRY & FISHING SESSION - INTRODUCTION TO THE SECTOR APPROACH**

**GEORGE CONWAY, NIOSH**

**(INTRODUCTION BY RICHARD FENSKE)**

**DR. FENSKE:** We're ready to start the afternoon session, if you could all make yourselves comfortable.

(Pause)

Okay, we're going to get started. If there's anybody outside there that wants to come in, it'd be great. Okay, welcome to the afternoon session of this town hall meeting, NIOSH town

hall meeting. My name is Richard Fenske. I'm a faculty in the School of Public Health and Community Medicine at University of Washington, and also Director of our Agricultural Safety and Health Center that is supported by NIOSH here for Region 10.

This afternoon's session is focused on the agriculture sector, which includes farming, forestry, and fishing. We heard a little bit about that this morning, but now we're going to focus on that exclusively. And we do have people from all over the nation who have come here to share their thoughts with NIOSH in trying to inform the NORA process.

And for those of you who -- some of you I e-mailed to help organize this and I told -- I predicted sunshine for today, and just go outside and you can see for yourself. This is sunshine in Seattle.

So, without any further words, I'm going to introduce George Conway who is going to give some -- an overview for this session. Dr. Conway is currently the Director of the Spokane Research Laboratory for NIOSH and is also the Chief of the Alaska Field Station, another

NIOSH facility out here in the west, and he's going to give us an overview of the agriculture sector from the NIOSH perspective.

**DR. CONWAY:** Thanks, Richard. Thank you, Dr. Fenske. Let's see if can get this talk -- actually before that, since it is right after lunch, I'll exercise a little bit of latitude for postprandial awakeness, alertness. First, there's copies of the NIOSH Worker Health Chart Book in CD version out on one of the tables -- the table that's most against that wall. I think there's enough for everybody to take. This is a really nice -- nice thing. It gives a lot of background information, so please feel free to take that and any literature that's out there.

And then secondly -- is it the prominence -- is this your -- your brochure, Sid? For those of you that, like me, immediately recognize -- it's more evident in the brochure, but on the poster (off microphone) you can see this (unintelligible) figure. (On microphone) And those of us that have worked in agriculture particularly have been the (unintelligible) for farm chores will readily recognize the

specialized implement which is displayed just above "Share Your Ideas," and I just want to reassure that the intent of this was to point out the panoply of complex ergonomic tasks that face this workforce. And I want to personally reassure you that we -- we regard every word said today as golden.

So I've been charged with giving a background -- a little backgrounder. There we go -- so a little background about the NORA and/or seeking your input, and actually I want to acknowledge someone. Is Sharon -- Sharon are you still there? Sharon Morris is here, and Sharon was the -- the organizer of the original town hall meeting in Seattle -- what, ten years ago -- for NORA, so the mater familias of all the NORA progeny in the upper left-hand corner is here with us. Welcome, Sharon.

So the NORA vision -- the National Occupational Research Agenda vision -- and forgive me, some of this may be redundant for people that's on the introductory talk this morning. But because this is organized as two sessions with different -- different speakers and invitees, we wanted to repeat some of this, so forgive me

if some of this is redundant.
The NORA vision is a national partnership to define and conduct and prioritize research. Sector-based approach is as the second decade way that we have of organizing this. Many research needs differ by sector. I think more pertinently, a lot of people's identity about their work is about -- centers around their occupation rather than some abstruse codes, and occupation and certainly one's industry are better captured by this sector organization than these cross-cutting thematic categories we used previously, which were redolent of our science and much less of the identity of the workers.
The intent of this is to focus research goals, objectives, and results. Partnering is one of the main themes, and so our holding these many town hall meetings -- how many were there, about a dozen?
**UNIDENTIFIED:** (Off microphone) Thirteen.
**DR. CONWAY:** Thirteen. And then taking an efficient approach to try and work on the worst problems first, with presumably some hierarchy accorded to fatal and seriously disabling

injuries, and then working our way through the other things. We seek stakeholder input, identify research priorities for the nation, work together to address those priorities, and then leveraging funds. As I mentioned, this is the NORA's second decade.

There will be research councils organized, and I think Dr. Soderholm mentioned earlier the tiered opportunities, but you have opportunities to be involved today in providing your oral input. You can provide written testimony on hard copy. You can put it in via the web -- via our web site, and then you then you can also volunteer to participate in one of the research councils -- correct? -- especially if you have a particular area of expertise that you think would be germane.

Now this afternoon -- well, this morning was a multi-sector, cross-sectoral input opportunity. This afternoon the primary thematic thread through all the testimony and discussion this afternoon is focusing on agriculture, forestry, and fishing. These NORA councils will permit people that have a real active interest, germane expertise, or a really personal drive

to try to see something done in these areas to actualize that.

Then I threw in a couple of slides of mine, I just couldn't resist. One of them is on the changing style of public health practice. You can see this -- I don't know how -- it's a pretty bad slide in the upper left, but it's one of those benches that were in every public health clinic around the United States when I started my career in public health about 30 years ago, and that was the waiting area. And the locus of control was in the practitioner's hands, the government's hands, whatever. And then we went through the -- basically the HIV/AIDS era -- what, 20 some-odd years ago -- and came to the realization that -- that this had to be much more participatory and negotiated. And I think the same is true for the application of any of the research results to public health practice and to prevention. And that's why in this second decade of NORA thematically we're emphasizing partnerships even more than we did previously, and then placing a very special emphasis on research to practice. We have a little logo for R2P, but

when we say R2P we're referring to research to practice. We're talking about taking these research results, not only the leverage -- we mentioned leveraging funds -- but to leverage action and to give people tools such as good findings, good recommendations, as well as surveillance so that you can look and see whether or not you're making a difference in what you're trying to work on. Then the locus of control for that -- even we're, you know, in the government and like to think that we know something and that we're somewhat important -- really locus of controls is a shared one rather than some hierarchical one. And the biggest theme within that is gathering.

The significance of this sector -- and I realize that given that one's identity, professional identity, is often around an occupation, I realize that agriculture, fishing, and forestry are all big things in and of themselves. But out of convenience and the necessity of subdividing things, they have been combined in this sector.

So this remains one of the most dangerous, most hazardous in the U.S. And a particular concern

is the number of children killed each year. There's been a joint -- a collaborative initiative on children's agriculture injury prevention for the last -- almost a decade now. John Myers*, who is DSR* in the back there, will be happy to answer specific questions. He does reassure me that there's tangible progress that's been made in that mortality and injury rates of that very important population.

You can see that for high-risk industries, agriculture, forestry, and fishing is a very, very close second to mining. As a matter of fact, I think currently it's roughly tied neck-and-neck with mining -- significantly more hazardous in rates per 100,000 workers than all the other -- all the other industries.

We have one of the parts -- NIOSH is a large organization, about 1,300, 1,400 people. There've been around ten to a dozen folks working in Alaska looking at commercial fishing, which is at a very high relative risk, about 20-plus-fold the rest of the workforce for the U.S. And just without giving you detailed lecture, I'll just point out that this has been -- the very collaborative effort

that's involved. Regulatory changes involving a lot of equipment and training required by fishing vessels, implemented by the Coast Guard, actualized the training by Alaska Marine Safety Education Association -- you saw Jerry Dzugan speak earlier -- and more locally the North Pacific Fishing Vessel Owners Association. And then studied by us and with NIOSH holding up sort of the mirror of surveillance and been able to demonstrate from a research perspective that this has been a very effective intervention with a very strong downward trend. And then we also estimate that if we impute from the trends that were extant in the early '90's when we started this work, and projected forward from the '80's and the early '90's, the number of deaths that have occurred in this industry have been about 250 less than we would have -- we would have anticipated.

So I think both the child ag success and the traction that that combination of legislation, implementation, enforcement, education, training, and research, all working together with participation by governmental groups,

NGOs, community organizations has borne fruit very much both in the child ag efforts and in this focal effort in commercial fishing in the far northwest. It makes me very optimistic about that any additional concentrated efforts that deconstruct the problems, make sense out of them, and provide guidance in what to do in the future will be very helpful in actually preventing worker deaths, injuries, and illness.

The NIOSH ag centers and children's ag centers -- there's a special web site for them. There are major NIOSH efforts to protect the health and safety of agricultural workers and their families. They were established starting in 1990, and they're distributed around the nation. You can see here there's a photo with the ag centers displayed, proudly displayed, on them. And you can see the one in Wisconsin specifically focusing on children's, and the rest of them basically with a regional locale-based identity.

So we're relying on those of you here today to provide input and also to volunteer. And if we don't get it right, if we don't respond in the

way that you're hoping the first time you say something, then -- then bug us. And if other people don't respond, then bug me. Bug Dr. Michael Galvin, who's the co-coordinator for this sector. Bug Dr. Lum or Dr. Soderholm. Your input will be entered in the NORA docket displayed on the web site, available in a public docket in Cincinnati, provided as substrate for the NORA sector research councils, both as individual comments and then also grouped into broad categories. And there'll be a synopsis, synoptic celebratory version of this rendered at the NORA Symposium in April in D.C.. Right?

We're interested in your -- what you would consider to be the top problems in diseases, injuries, exposures, populations at risk, failures of occupational safety and health systems, key partnerships -- ones that are logical, but things that are a stretch, too. And feel free to be inventive and really insightful in these. Research that you believe might make a difference, also it can be research that's in totally different fields but that has an applicable either strategy or

technology that bear fruit when applied to this industry, and then brief presentations.

I do want to thank everyone for coming today. You can get updates after the fact by getting onto NIOSH e-news; you can provide your additional input. And in case of questions, the NORA coordinator will I'm sure be thrilled to answer them. Thanks.

**AGRICULTURE, FORESTRY & FISHING SESSION:**

**STAKEHOLDER PRESENTATIONS**

**MODERATOR: GEORGE CONWAY**

**CLOSING: RICHARD FENSKE AND BARBARA LEE**

We're going to move on to our docket of presentations. Our first presenter this afternoon will be -- forgive me if I muff some of the names -- Shari Kuther -- do I -- have I -- is it a first approximation of the --

**MS. KUTHER:** Shari.

**DR. CONWAY:** Shari Kuther, from the Progressive Agricultural Foundation -- Agriculture Foundation, speaking about children and farm safety. I should point out that Dr. Lonnie Bolt* -- Lonnie, do you want to wave your hand -- is sitting front and center here. She is the time commissar. She's a -- she's an

extremely polite person. I work with Lonnie in Spokane, but she has a temper exemption from all -- all manner of decorum and can elevate -- and can be progressively rude as you approach, and worse yet, go over your five-minute allocation. So Shari, go ahead.

**MS. KUTHER:** Well, I'll try not to get this started off wrong and be tackled up here the first -- first subject. Good afternoon. My name is Shari Kuther, and I am here to represent the Progressive Agriculture Safety Day Program and its governing body, the nonprofit Progressive Agriculture Foundation. The Progress Agriculture Safety Day Program trains local volunteers and provides the resources needed to conduct one-day, hands-on, age-appropriate community-based safety days for children. This program relies completely on corporate sponsors, such as Farm Plan, Bear*, Case, IH, and it reaches children throughout the United States, its territories, and into Canada.

I have actually been involved in the program since 1998 when I first applied to begin coordinating a safety day for my community in

Nezperce, Idaho. We're proud that since its inception in 1995, more than half a million children and adults have participated in this program.

Representing the Progressive Agriculture Safety Day Program as a volunteer coordinator, I'd like to tell you how my community and others involved in this international program have benefited from several NIOSH-funded initiatives.

First of all, in 2002 NIOSH funding was awarded to the University of Alabama's Institute for Social Science Research to evaluate the program, which was at that time called the Progressive Farmer Farm Safety Day Program. My community was one of 28 involved in this study. At the same time, funding was awarded to the University of Kentucky College of Nursing to evaluate similar programs. These studies have -- results have demonstrated that our programs have a positive impact on children's knowledge, attitudes, and behaviors.

Also, the Progressive Agriculture Safety Days have benefited from NIOSH-funded materials and program developed by the National Children's

Center in Wisconsin. First of those that we use is the North American Guidelines for Children's Agricultural Tasks, also known as the NAGCAT Guidelines; Safe play areas on the farms, a review of child safety -- a review of the child safety section of the National Agriculture Safety Database or NASD; and also the multi-organization Childhood Agricultural Safety Network. Many grants awarded to various recipients through the National Children's Center have also allowed our staff to develop and/or evaluate new lessons and guidelines, such as reaching migrant farm worker children, evaluating the age appropriateness of the program curriculum, reaching old order in a Baptist populations, and developing a variety of teaching resources. All of the evaluations and projects that I've just listed would not have been available to our programs or to my community without the funding provided by NIOSH.

At the same time NIOSH has probably funded many other research studies having implications for our program, and we need further guidance in using these results. We do greatly appreciate

NIOSH support.

Thanks to NIOSH we have made progress in teaching children to safe on farms located across North America. However there's still much to be done. We urge that NIOSH funding be targeted toward continued evaluation of programs such as ours that rely on corporate donations. There should be greater collaboration and advanced planning between NIOSH and other federal agencies, such as USDA, the Department of Education, and the Maternal and Child Health Bureau. For example, both NIOSH and USDA funded separate evaluations of tractor certification programs.

Lastly we request that funding be available directly to nonprofit organizations, such as the Progressive Agricultural Safety Day and Farm Safety for Just Kids. These organizations have the capability and track record of incorporating NIOSH-funded research results into grass roots level programs that fulfill NIOSH's research to practice goal. Thank you.

**DR. CONWAY:** Thank you, Shari. Our next speaker will be Carol Dansereau from the Farm Worker Pesticide Project speaking about farm

worker pesticide exposures. And I hope I didn't slaughter your name.

**MS. DANSEREAU:** You actually pronounced it like they do in Montreal, which is refreshing. It's great. Here we say Dansereau. I am Carol Dansereau. I'm with the Farm Worker Pesticide Project, which is a nonprofit directed by farm workers and their allies. And I want to urge that high priority be given to increasing research on farm worker pesticide issues. Certainly the huge number of workers affected, the high toxicity of the chemicals involved, both in terms of acute and chronic effects, and the documentation of (unintelligible) exposures warrants this priority. That documentation includes extensive urine and dust sampling, air monitoring in California, pesticide instant reporting; focus groups with farm workers here in our state that found that three out of four experience health effects from pesticides at work, but most of that is not reported; and our cutting-edge cholinesterase monitoring program, which you're probably familiar with. But in its first year, two years ago, one of five of the workers who were monitored had the

significant depressions of cholinesterase after handling the pesticides. This last year, with a wider pool of workers, it's one in ten, though the majority of workers have depressions after they start handling.

I want to highlight two specific research needs. One is related to exposure monitoring. We have lots of general information about exposures happening. We have the cholinesterase monitoring evidence of actual physiological changes from exposures. But what we don't have is exposure monitoring itself that shows the concentrations of chemicals to which workers are being exposed.

It's very important to pay attention to the California air monitoring and the results down there. The California researchers have found that very high percentages of the general population are inhaling agricultural pesticides in concentrations that exceed health guidelines, and they warn that farm workers are almost certainly inhaling at much greater rates.

So we want to see research that focuses on collecting this kind of data, which is sorely

missed in the policy discussions that we're having. We also want the research to target identifying what sorts of exposure methods there are so that governments can establish the kind of monitoring that we should be having as a matter of course in these workplaces.

And it is ironic to me that we have in other workplaces, industrial workplaces, air monitoring, exposure monitoring, as a given where we're talking about relatively small concentrations of chemicals and unintentional byproducts of manufacturing in general. Whereas in this workplace we have intentional massive direct releases right next to workers, and yet we have no monitoring.

The second research area that I want to highlight is the need for research related to pregnant farm workers. The terrible events in southern Florida with the severe birth defects of farm worker children have spotlighted this issue over the last year. I want to mention that I work with farm workers in Mattawa, a small town here, who are deeply concerned about the very high levels of cancer in their children. Now we have no idea whether the

birth defects in Florida, the cancers in the children in Mattawa are caused by pesticide exposures, but there is every reason to believe that pesticide exposures are causing health effects, birth defects, cancers, other health effects in some farm worker children.

Because of the toxicity data that exists for the chemicals that we are dealing with here and because we know exposures are happening, we need to focus on this very vulnerable population and be gathering information such as how many pregnant farm workers are there, what kinds of concentrations are they being exposed to, and what does that mean for their fetuses and embryos. And as we do that, we need to use things like focus groups and forums in which farm workers can speak freely.

I'm sure I'm almost done with my time so I will end by asking that the research institutions here, NIOSH and others, and the researchers also take seriously the need to go beyond the research and to leverage action. And in particular, I would urge you to advocate government-mandated exposure monitoring and collection of data that is sorely missing in

this area. Please speak out for air monitoring and other exposure monitoring in this workplace, which is lacking in this workplace and that's really a travesty. Speak out for national cholinesterase monitoring, pesticide use reporting, and other data collection. And also I would urge you to speak for the precautionary principle. If ever there is a time to break the silence and speak about the need for precaution and advancing sustainable agricultural alternatives to end these exposures, this is the scenario because we are talking about highly toxic chemicals. We are talking about documented exposures. And we are talking about exposures not only for farm workers but for their extremely vulnerable children. Thank you.

**DR. CONWAY:** Thank you. Thank you so much. Our next speaker is Mary Miller. It says Department of Labor and Industries; is it Washington --

**MS. MILLER:** Yes.

**DR. CONWAY:** -- Department of Labor and Industries -- talking about young workers.

**MS. MILLER:** Good afternoon. Thank you very

much for this opportunity to speak here today. Most people who know me know that I can't say anything in five minutes, so I want to thank Sharon Morris for slicing and dicing some of this, so -- sorry if I go over a little bit. I'm speaking this afternoon on protecting young workers. Those are the folks under 18, who are our future adult workforce. I'll begin with some general comments about young workers in all industries, and then continue regarding youth working in agriculture.

While focusing on issues of a specific industry, it's important not to lose track of the cross-cutting issues unique to this special and vulnerable population, regardless of industry sector, and the subgroups within them such as immigrant workers. When I began working at the Washington State Department of Labor and Industries in 1991, I was assigned to work on an advisory group to update our non-agricultural child labor regulations; the agricultural regulations had already been updated in the previous couple of years. My first question to ask was where is the data to tell us where these kids are getting injured or

killed? Where are they working?

That set me on the path I continue today to look at data trends beginning in 1988 to the present in our workers compensation program, as well as searching the literature for others doing this work. The field at that time was quite limited. In addition, at that time health and safety professionals did not really consider the issues facing young workers typically, nor did those in pediatric or adolescent injury prevention acknowledge that work was an important contributor to morbidity and mortality. We spent years trying to blend these disciplines.

I want to acknowledge the remarkable work that NIOSH has done to bring us to where we are today regarding the body of knowledge about teen workers. As a result we can proceed with new directions in addressing causes of injuries and prevention strategies. We've identified a great deal about the patterns of injuries and where they are happening, but not necessarily the why or the how to fully prevent them from happening in the first place.

My initial thought when I first began working

in this arena is what could be more mom or dad and apple pie than keeping kids in school and keeping them from getting injured or killed at work. After all, isn't their primary job supposed to be getting a basic education to be able to have more job and career options available to them.

My next realization when I started to look at the data and the literature was dismay at how many were getting injured, and often severely and even killed. I work in a regulatory arena, and jurisdiction is an issue that determines where youth can and cannot work and when. And so protecting them becomes a political issue no different than for adults. However, I believe youth are different and deserve special protections by those who claim to be responsible for their well-being. That would be all of us.

Risk to youth should be addressed regardless of industry and irrespective of regulations. Youth face the same hazards as adults, but are at a disadvantage to protecting themselves. We know that there are different protections for teens, depending on which industries they are

working in. In agricultural settings teens can do far more dangerous activities and at a younger age than they can do in non-agriculture. On a family farm there are no protections in the form of work restrictions, unlike non-agricultural family businesses. Teens under the age of 18 have been found to be injured at a rate two times higher than adults. A majority of the injuries may be minor, so to speak -- lacerations, strains and sprains, and contusions and burns. However, many that I have found in this state have been amputations, concussions, dislocations, fractures, head injuries, and multiple injuries, injuries with potential to have severe long-term consequences. Like adults most of the claims cover medical costs only -- approximately 85 percent for medical costs, 15 percent for lost work time. But to qualify for work -- lost work time or time loss payments, the injured worker must have a specific number of days lost. Here in Washington that's three days; elsewhere it may be more.

However, we cannot compare the severity of these injuries between youth and adults. Youth

do not work in the same pattern as adults. They do not work consecutive days. So if you think about it and they lose three days of work, that may mean a more severe injury because they're not working full-time. And then they are missing more, just as important, age-appropriate activities such as school, sports, extracurricular activities and the like.

There is little or no data on the consequences of these early work experiences -- experience injuries, either in terms of their psychological impact including their general attitudes about work and risk, the effect on their future career options and potential loss of earning power, and long-term disability and associated costs. We need more research in this area.

We in Washington State have an amazing database on our workers comp claims with the majority of Washington employers insured through the state fund and managed by labor and industries. It's an important database that can point us in the right direction, but it has limited -- it has limitations.

There is under-reporting. Teens may not -- may be working informally and therefore not come to the attention of the system. This is a particular concern when young workers -- by my anecdotal evidence and talking to hundreds of teens over the years -- is that they -- they are unaware of their right to file workers compensation claims. Given that a large proportion of youth are uninsured, teens need workers compensation to be able to access appropriate care for occupational injury as soon as possible to mitigate the severity and complication.

Are you the hook?

**DR. CONWAY:** That's a polite reminder of time, fairness and probity.

**MS. MILLER:** And what?

**DR. CONWAY:** Probity.

**MS. MILLER:** Probity? What's that mean? Is it -- okay, I'll get it to you in writing.

**DR. CONWAY:** Thanks. Our next -- our next speaker -- thanks for being a good sport, Mary. Our next speaker is Barbara Morrissey with the Washington State Department of Health, speaking about pesticide illness surveillance among

agricultural workers.

**MS. MORRISSEY:** Mary, you're a hard act to follow. I will try and stay under five minutes. So my name is Barbara Morrissey. I'm a toxicologist at the Washington State Department of Health, and I work in our state pesticide program which conducts surveillance for pesticide-related illnesses and injuries -- and that includes occupational and un-occupational events. I just want to thank NIOSH for funding pesticide illness surveillance in general through the former Pesticide Sensor Program and encourage your future support for this activity and also research that helps these surveillance programs evolve and continue to be relevant and collect relevant information.

Our state program is actually funded by state general fund dollars. We have not been -- we have not been a NIOSH sensor program, but we have received two grants over the years to enhance our surveillance program. One of these grants helped us identify some of the gaps in -- especially in under-reporting, and helped us settle some of the issues that we've had in

coming up with good denominator data. And a grant that we were just awarded is going to help us dig a lot more deeper in our interview strategy and how to dig up root cause for the incidents that are occurring, and hopefully help us get a better list of risk factors and preventable causes of these illnesses.

I just want to make a few comments for why pesticide illness surveillance should stay on the NIOSH radar screen. One of course we've already heard about, that farm workers are a high-risk population, both in terms of their pesticide exposure and in terms of their ability to manage health effects. And if we want to prevent pesticide-related illness in this high-risk population, we really do need to understand how their exposures are occurring and what are -- what are the safety messages and who needs to hear them.

And one of the reasons that our public health program is really important in this area is that we get the stories that the other regulatory agencies often miss. That's because our regulatory agencies, at least in Washington, are largely complaint-driven. If a

farm worker calls and reports a safety problem, then these agencies will go out and investigate. But many farm workers are unwilling to make a complaint. They are afraid they will lose their jobs. Others just may not know the workplace laws, or they may just fear speaking to anyone in the government because of their legal status.

And our program is different. If a farm worker sees a healthcare provider for a pesticide-related illness, then we're notified of that and we call them. Then we hear their story and we ask what could have prevented the exposure. We offer to report the incident to regulatory agencies, but for the most part they ask us not to, and that -- at least in this case -- in these cases, their experience is not lost because we can then take the data that we collect from them and we strip off the personal identifiers, and then we can provide that to the regulatory agencies in an aggregated way so that they still get an idea of what's happening in the field without the farm workers being put at risk for loss of their job. And then of course we also publish our data so that all of

our partners can use it as well.
Just to underscore this difference in our ability to get stories, in a recent two-year period our state OSHA program at LNI investigated 30 complaints involving agricultural workers. The other regulatory agency that works in this area, the Department of Agriculture, issued violations for 23 incidents of human exposure to agricultural pesticides. And during this same time we investigated 248 cases and sufficiently documented 148 cases of illness or injury from agricultural pesticides. So the numbers aren't totally apples -- or they're a little bit apples and oranges, but I think you get the general idea.
Just a recent story -- this is a case that happened in 2005 -- to just illustrate the importance of being -- trying to be proactive and get these stories. There was a group of women told by their foreman to change the sprinkler heads on an irrigation pipe in an apple orchard. The orchard had been sprayed the day with a potent organophosphate insecticide. The re-entry level was -- the re-

entry interval was 14 days so the workers should have donned their full PPE before entering the field, but they did not. There was a strong odor noted by the crew. Only one woman in the group reported symptoms, and she did seek healthcare so we found out about her. Her symptoms were not severe, but they lasted for about five days and she was pregnant. She did not want to report the incident to authorities because she lived in the orchard and the foreman was her husband.

Now in this case we had the opportunity to talk with the foreman and also the employer to make sure that the -- what was broken there would be fixed and that mistake would not happen again. Then we were also able to, again without personal identifiers, share that story with the regulatory agencies.

Am I getting close?

**DR. CONWAY:** You're over.

**MS. MORRISSEY:** I'm over.

**DR. CONWAY:** That was a good story. Compelling.

**MS. MORRISSEY:** So can I just tell you two more things? So in terms of research for --

**DR. CONWAY:** Two more short things.

**MS. MORRISSEY:** -- for NIOSH, we would really support some field research into engineering controls that will prevent exposure to farm workers, and I'll hand you the rest.

**DR. CONWAY:** Thank you.

**MS. MORRISSEY:** Okay.

**DR. CONWAY:** By way of reassurance, Sid, the written material can take a normal person more than five minutes to read. Right? If people want to submit, you know, everything up to your dissertation, feel free. Sorry, we just -- we have a set docket and we have to stay on schedule. Thank you.

Our next speaker is Anne Powell from the Northwest Regional Primary Care Association speaking on lack of data on agricultural workers that migrate to Alaska to work in the fishing and canning industries.

**MS. POWELL:** Hi. Thank you for the opportunity to speak. My name is Anne Powell. I work for Northwest Regional Primary Care Association. We are a nonprofit member association of community and migrant health centers in Region 10, and that includes Alaska, Idaho, Oregon,

and Washington. Just to let you know, community and migrant health centers are public and non-profit organizations that receive federal funding under the Public Health Service Act. They provide comprehensive health services that are high quality, cost-effective, and culturally appropriate to under-served communities, without regard to financial or immigration status.

My position at the Association is the migrant health coordinator so I provide resources, trainings, and do some conference planning for healthcare providers that work in those health centers. And just -- I wanted to thank NIOSH for their support with our Western Migrant Stream Forum, which is actually happening next week in Portland, Oregon starting next Friday. They fund our research and evaluation track at that conference.

So anyway, I'm here today to speak briefly about the issue of immigrant agricultural workers who migrate to Alaska, or elsewhere even, to work seasonally in the fishing and canning industries.

First I will I will give a brief background on

farm workers, which -- I missed out on some of the talks this morning so you may already have heard some of this information, but there are an estimated three million farm workers in the United States. Within our region we have probably over 583,000 migrant seasonal farm workers. As you've heard before, they are largely Hispanic, and according to the National Agricultural Workers Survey, 81 percent of farm workers reported Spanish as their native language; 44 percent self-reported that they could not speak English at all.

So due to a combination of factors including poverty, language, and cultural barriers, low literacy, frequent mobility, and fear of the system, migrant farm workers have minimal access to healthcare and social services. So last spring, May 2005, in Anchorage, Alaska my organization, Northwest Regional Primary Care, held a organized discussion with some Alaskan healthcare providers on the issue of migrant fishery workers and cannery that also work in the lower 48 as agricultural workers, and this is basically what we found.

There's not a lot of data on this population

that is duly employed. Administrators and clinicians from migrant health centers in Washington, Oregon, and Idaho have seen these patients that -- you know, they may mention that they work -- they pick apples in Wenatchee. And then during the off season they head up to Alaska to the fisheries and maybe canning salmon in Alaska -- in Kodiak, Alaska, for example.

So they also reported that the fishery and cannery workers came from many different backgrounds and nationalities. They migrate from cities all over the United States -- cities and states all over the United States including North Carolina, Florida, California, Salt Lake City, and Seattle of course, as an example. And so I wanted to point out that a lot of these same areas have high levels of agricultural workers and agriculture industry. So my recommendation is that there is a need for data on the number of migrant workers that work in both in agriculture and the fishery/cannery industries because both of these jobs are obviously extremely hazardous, physically demanding, and require long

strenuous working hours. And they also have the potential for exploitation and can result in significant environment and occupational related injuries, such as musculoskeletal disorders.

I think this data would be useful for many reasons, but for the purpose of today's discussion, the workers who are employed in a combination of agriculture and fishery and cannery work may have multiple or more complex occupational health problems. And these problems are likely compounded by the barriers to care that many migrating immigrant workers suffer, which I mentioned earlier.

So anyway, thank you so much for the opportunity to speak today.

**DR. CONWAY:** Thank you. Thanks. Our next speaker is Mike Gempler from the Washington Growers League. And I don't have the subject for your talk, but I'm sure you'll tell us that. Was that a clerical omission on our part or did you keep the title obscured?

**MR. GEMPLER:** No. I wasn't aware I was to submit a title. Sorry. All of the above is the title.

My name is Mike Gempler, and I'm Executive Director of the Washington Growers League in Yakima, Washington. I also serve as Vice President of the National Council of Agricultural Employers, and I also serve as the Chair of the EPA/OSHA Committee of the National Council of Agricultural Employers. And I would like to thank NIOSH and the researchers here for doing the work that they do and for working with our industry, and for the generally cooperative and collaborative attitude that we have seen put forth, especially here in Washington State. I very much appreciate that. I would like to speak generally about a few perceptions and recommendations. First of all, our industry supports measurable results in research. We would like to see measurement of how many agricultural employees are benefiting from various types of research. We're frequently asked to support or endorse research projects or to cooperate to give access to employers in our industry. And I think a lot of the research projects kind of blend together in the minds of the employers and start to lose relevance, and I think it's a challenge before

all of you to measure the impact of this research.

We will support safety research that brings results. A few of the approaches related to that. First of all, pesticides may not present a hazard that impact as large a population of employees as other hazards. It needs to be recognized. The industry feels that research on pesticides sometimes is disproportionately -- or the research is sometimes disproportionately focused on pesticides, to the detriment of research on other hazards that may in fact affect more agricultural employees. We think that there should be a fresh look at education and training, changing the culture of the workplace, promoting and developing a culture of safety within the agricultural workplace. It's difficult with high turnover, short duration of employment, a lot of factors. We think there's a lot to gain there.

Also research should grow with the changes in the technology of the industry. Some of that is occurring now as we're looking at picking platforms, harvest aide equipment. The new technology that's coming on line, let's make

sure it's safe, let's make sure it's ergonomically appropriate, et cetera. Research implementation approach, in addition to relevant basic research, our industry supports research that brings -- that results in practical solutions, that brings the research to the field, if you will, and implements it. In this way we can really maximize the impact on the safety of the agricultural workforce.

And lastly, communication -- communication, the way researchers communicate, it affects trust, affects cooperation, affects public policy, and affects public attitudes about all this, and especially the subjects of that research. Media releases impact our industry but not always positively. They don't, in and of themselves, necessarily change behavior or result in more safety. Sometimes they just make people mad. And I think there needs to be an examination of why media releases are issued, what purpose they serve, how it coordinates with the overall dynamic of a collaborative approach to safety, and how it relates to appropriate risk communication to

the public. And I think it's a very important area that we need to explore together as we move forward. Thank you.

**DR. CONWAY:** Thanks for your comments. Our next speaker is Evi Licona from the -- please correct me if I'm mispronouncing your name -- Columbia Legal Services on two subjects, heat-related illness and outreach for health and safety to indigenous workers.

**MS. LICONA:** Yeah, and I'd just like to correct that -- and thank you, you got my name right. I'm only going to be speaking on heat-related illness in the -- in looking how much time there was I didn't feel it was appropriate to prepare for cramming those two topics together. I work for Columbia Legal Services. Again, my name is Evi Licona. I'm a staff attorney, and I focus on issues of health and safety affecting the farm worker population in the state of Washington. I have spent some time on working on pesticide issues and Carol very adequately covered those. And I'd like to second what she had said, and really offer my support on that issue and the fact that it is a huge risk to so many workers in our state, and

we really need to continue focusing on those efforts to protect workers.

What my office works on again is we do what's called impact litigation and legislation. We work on issues that affect a broad range of workers in the state of Washington. And within our own client consultations and seeing what's kind of coming in through our intake procedures, we can get a gauge of what is needed in this state, and heat-related illness has come up as a really major topic in the state.

There was a death in the summer of 2005 in the state of Washington and this issue kind of came to a head. It spurned (sic) a state agency, Labor and Industries, to do an in-depth study of accepted labor and industry workers compensation claims over the past ten years, and they've come up with a number of close to 450 claims that have been accepted. This doesn't include claims that were just filed, claims that were decided for whatever reason weren't going to be investigated. This is a widespread issue across the street -- across the state, excuse me. Labor and Industries has

done a wonderful job with that study, and it indicates the need for more focus and more effort on these issues. Deaths for any reason should be unacceptable in any occupation in our state.

In light of the death that occurred in Washington, there were also six deaths that similarly occurred in the State of California. California has passed an emergency rule-making due to these heat-related deaths. And it's starting to become an issue of greater importance and an issue that's really come out into the light, so to speak, because of recent deaths unfortunately.

There are several factors that need to be looked at when you think about heat-related illness, and one of those is a provision of water by employers. Although this is already provided in the Washington Administrative Code, it is certainly not abided by by all employers. Also in the summer months, more water needs to be -- to be going into the body to keep hydration levels appropriate. There are also needs to be access to cooled areas and shade for our workers. They also need to experience

a few research -- research shows five to seven days is appropriate for an acclimatization of the workers to a hot environment. The same would go for a cold environment.

And in this case workers that are working during summer months become -- their body heat, their core temperature rises significantly, especially as in the case with Manuel Camacho* who died this past summer. He'd worked in the field for 40 years. He was wearing leather chaps and swinging a machete, cutting down weeds in the hot fields. And if there had just been a little more knowledge on the part of the worker and the supervisor to know that when you're wearing leather in a really hot temperature in a place where the air doesn't escape very easily, the heat stays in this area, they would have known that because of the fact that he wasn't sweating and he was experiencing other grave symptoms that death was upon him very shortly and -- you know, so we need education and training on the areas that need to be focused on, which is water, provisions of shade and cooled areas, training and education specifically in those areas.

And also how do you access emergency information. Do they have phone numbers where they can call?

Do they also know how to treat on a first -- I'm thinking in Spanish right now -- on a first response where you have your CPR and other issues where if they start to notice that they are experiencing these symptoms, they know how -- okay, we need to get this person to the shade, we need to take their clothes off.

They also need to be educated on what they're wearing in these fields if they're not working with pesticides, which is a separate issue. You don't want the cotton and things that really absorb the chemicals but when you're dealing with just heat and not the application of pesticides, you want to be wearing cool clothing. And some workers are more aware of these issues than others, but a lot of these workers that don't even know the English language and they're depended on to be bringing in these products for us, we need to be providing them with them with a safe environment.

I didn't see anyone hold up the sign, but

anyhow...

**DR. CONWAY:** (Off microphone) The signs (unintelligible) down here.

**MS. LICONA:** Oh, okay. Thank you. Well, thank you all very much.

**DR. CONWAY:** Incidentally -- I mean almost all the things that are being discussed here are, you know, horrible, terrible problems, so we don't mean to make light of any of these by curtailing people's time. It's just a fairness issue.

We have two more speakers in this section, and I will point out that at the very end of the program today there appears to be a little bit of time if someone else has -- feels to very urgent to speak today.

Our next speaker in this section is Susanna Von Essen* from the University of Nebraska Medical Center.

**DR. VON ESSEN:** Thank you for giving me the opportunity to comment today. I'm a professor of pulmonary and critical care medicine in the department of internal medicine at the University of Nebraska Medical Center, and I have a long-standing interest in rural health

and safety.

I would like to propose that the food processing aspect of agriculture be actually included in the agriculture sector. And I say that because the plants where meat packing occurs or other food processing are usually located in rural areas. They take the materials that are brought in from farms and turn them into what we know from the grocery store. And many of the workers are rural people. Often they also work in production agriculture.

I'd also like to point out that meat packing in particular has a very high rate of injury, both repetitive motion injury and injuries such as lacerations.

And finally many of the meat packing plant workers, and I'm sure this is true for the other aspects of food processing, have many unmet health needs. In Nebraska a large number of them are Hispanic. They do not have ready access to healthcare because many do not have health insurance. Many of the providers do not speak Spanish. And their health needs include such things as chronic illness like diabetes,

also infectious diseases such as tuberculosis are on the rise again in the communities where there are a lot of immigrant people working in meat packing.

So those are my comments. Thank you.

**DR. CONWAY:** Thank you. Our last speaker in this section is Paul Gunderson*, a North Dakota farmer and agricultural center advisor.

**MR. GUNDERSON:** Good afternoon. I'm Paul Gunderson, a farmer on the high plains and advisory board member for the Inter-Mountain Center for Agricultural Safety and Health located in the great state of Colorado.

If you and I were to read the book entitled, Through the Looking Glass and What Alice Found There, by Lewis Carroll we discover that the red queen runs frantically just to stay abreast of circumstances. This futile race is suggestive I believe of the evolutionary forces that keep both pathogens and their targets on the move. Such I believe is the case with infectious zoonotic disease, largely because in our life span changes in climatic conditions and agronomic and husbandry practice have permanently altered human exposures within

North American agricultural work sites. Additionally, demographic changes in the agricultural workforce in many regions of our nation has permanently altered the perception of risk by individual workers due to life experiences from abroad that are different from those here in the U.S.

Just this past summer the emergence of the B. anthracis as an infectious bacterium in cattle, cattle handlers, pen riders, and veterinarians on the northern high plains, extreme northeastern South Dakota, extreme southeastern North Dakota is a reminder of a work site risk that is perpetuated by both a profound change from cool, dry weather to warm, moist conditions on the northern high plains, and changes in agricultural technologies which I submit (unintelligible) by a geographic diaspora. These are also due to workforce interactions that are changing with livestock and the emerging concentration of livestock enterprises.

And if anthrax weren't enough, we have other examples -- Q fever, several of the hantaviruses, swine brucellosis, and katskats

disease or T fever. Because these infectious diseases occur in populations exposed to agricultural risk they're quite likely to go unrecognized, at least initially, and under-reported in this nation's disease reporting networks. That's true because these networks are notoriously unable to capture these kinds of phenomena, and in the written comments I'll detail that in more -- more adequately.

As a nation it's my postulate that we can do better, and NIOSH is in a unique and favored position to promote resurgence of our nation's capability to detect and interdict these kinds of infectious zoonotic outbreaks. NIOSH could encourage its funded agricultural centers to focus some resources, first of all on target local surveillance tests within selected high-risk agricultural settings. Secondly, NIOSH could develop additional laboratory capability which would be in a position to make critical detection. And thirdly, NIOSH could develop field-tested educational materials for (unintelligible) centers to do that, materials and strategies for use by working agricultural populations and perhaps even clinicians who are

responsible for their healthcare.
Additionally, NIOSH itself needs to hold onto its current laboratory capability as well as its occupational hygiene capacity so that it stands ready to assist state public health departments, local public health agencies, and perhaps local medical facilities and veterinarians in interdicting zoonotic disease. It's important to prevent spread and identify opportunities for its prevention at the agricultural work site and surrounding environs, in part because of the infectivity associated with some of these agents.
Included for NIOSH could be new laboratory and field-base detection capability, as well as development of new assays; laboratory assurance and certification activities and development of training materials for laboratory technologists.
Thank you for the opportunity this afternoon. It's always fun to appear before colleagues.
**DR. CONWAY:** Thanks for your remarks. Since we did have two speakers that did not use all their time, there is about two or three minutes if someone has something they'd like to speak

about in a burning fashion. Yes, ma'am. If you'd please identify yourself when you come up so that we can get your name on the docket.

**DR. COHEN:** I'm Betty Ann Cohen. I'm a physician with Central Washington Occupational Medicine so I'm in Yakima. I'm in the middle of the agricultural communities there. And one of the things that -- you know, the Holy Grail of occupational health is prevention. We don't want people getting injured. But the truth is we can -- we can go for that goal of zero, but across all industries, we're not going to reach zero. And I think one of the things that needs to be addressed is how are these people educated and taken care of after they are injured.

There's a huge lack of information amongst the physicians and clinicians out there providing care to these people. They're not informed in a way that helps them to get better, that helps them to get back to work, and there's a lot of research that could be done in this area.

Thank you.

**DR. CONWAY:** Thanks. We have about two more minutes if anyone else has anything pressing.

Failing that, I failed to point out one other important -- well, there's a number of other important folks here from our team, but I want to draw your attention to Delon Holland* in the white shirt in the back row here of this section. Delon is the NIOSH research to practice evangelist. I think that's what they call people that advocate that perspective in Apple computer and what not. He heads our Office of Technology -- Research and Technology. And Delon is taking a really helpful role in emphasizing taking research results and bringing them to bear so that people's health and safety actually improve, so you may want to kick some of those ideas around with Delon while you're here. Sid, yes?

**DR. SODERHOLM:** In case anyone missed my announcement this morning -- and then we'll get off to our break so hopefully we can get back on time -- besides NIOSH working on research agenda, our parent organization, the Centers for Disease Control and Prevention, has a research guide. That's the step where they are in their research agenda-setting process. Go to the CDC web site, www.cdc.gov, look at,

comment on the research guide, particularly does it reflect the needs of occupational safety and health research adequately, and all the other public health issues. So in case anyone missed that this morning, I'll say that one last time, and I believe we're set to go for a break, and we will return in 15 minutes. Thank you.

(Whereupon, a recess was taken from 2:30 p.m. to 2:45 p.m.)

**DR. CONWAY:** So I think if people wouldn't mind filing in, taking your seats -- given by way of a docket, we have to stay on time. Hello?

(Pause)

Okay, our next speaker is -- we really mean business about time here, folks -- so our next speaker is Ann Backus, an old friend, from the Harvard School of Public Health, the ERC there. And she'll be speaking about fishing and agriculture in the northeast. Ann, please.

**MS. BACKUS:** Thank you, George, and thank you to NIOSH and the Northwest Center for convening us to provide input and to exchange ideas, which is a wonderful forum. So greetings from

New England. Do I get the prize for coming the farthest? I hope so, and so my name is Ann Backus. I'm an instructor in occupational safety and health at the Harvard School of Public Health and director of outreach there in the Harvard ERC.

Over the past five years I have worked with the fishing community and the U.S. Coast Guard in New England, and organized with George and the NIOSH Alaska Field Station Anchorage the first International Fishing Industry Safety and Health Conference, which was held in Woods Hole in 2000. And I currently write for Commercial Fisheries News a column called "Fish Safe", which appears every month or every couple of months. And also I'm an active member of the Maine Commercial Fishing Safety Advisory Council which -- the members of which are appointed by Governor Baldacci.

I bring you comments from a variety of people of the Harvard School of Public Health and from the fishing community. I would like to make five points, and many of them you've heard from Jerry and Ken this morning, so I want to echo the importance of their remarks as well.

Number one, the NIOSH-funded centers are a very important infrastructure and funding source for research and agriculture and fishing sectors.
Number two, there's a need for generic, which I'll -- what I'm calling generic research -- research agenda that crosses the industries within this sector.
Three, there's a need for fishery-specific research to reduce traumatic injury and fatalities.
Four, there's a need for research on exposures of bacterial origin and associated antibiotic resistance.
And five, there's a need for toxicological research on pesticides, volatile organic compounds, hydrogen sulfide and other compounds and chemicals that revisits the (unintelligible) and time-weighted averages and brings them into line with exposure levels and types in today's workplaces.
First infrastructure, so the NIOSH-funded education and research centers, of which I'm one -- an employee -- and the centers for agricultural disease, injury research, education, and prevention are extremely

important, especially for the success of research in rural and non-urban settings such as farms, forests, and coastal villages. The ability of our researchers to gain the confidence of prospective research subjects and to be seen as having a substantive hypothesis, integrity relative to the research process, and competence for the analysis and interpretation of research is greatly enhanced and supported by the presence of these centers and by coming from them.

Melissa Perry, who is a colleague of mine, is doing hearing loss research in the Vermont farms, and I've been doing some work with the fishing community. Both of us have been funded by NIOSH pilot project money.

In terms of NORA research areas, the area I called generic, some of the research needed is common to agriculture and fishing. One, work-related hearing loss from exposures to tractors, conveyors, engines, and winches; two, particulate matter, PM 2.5, and ultra-fines associated with grain dust and pot buoy sanding and branding; three, polycyclic aromatic hydrocarbons, PHs from diesel exhaust and heat-

branding styrofoam pot buoys; four, endotoxin from cotton, grains, and algae-covered rope; and five, volatile organic compounds such as paints, degreasers, and solvents.

In both industries -- that is agriculture and fishing -- there is a major concern about child labor and childhood exposures. Kids on farms and in fishing communities are often pressed into service at an early age. And very young children -- in the fishing communities, anyway -- are often in their parents' workshops working right alongside the sanding and heat-branding of styrofoam pot buoys and the painting and being exposed to particulates, PAHs, VOCs, and endotoxins. High school students who are apprentices often sleep above the workshop and are exposed during the night as well.

Is that a one-minute sign already? Okay.

So fishery-specific work is very important and the work platform, as Jerry Dzugan told us this morning, is very dynamic in the fishing industry so we need fishery-specific research to help us understand that work platform.

In terms of the biologics, the warming of the

oceans, bacterial infections once confined to tropical latitudes are going to be with us in the temperate zones. And we have had deaths -- one death, anyway -- in Chesapeake Bay from vibrio vulnificus, which is an exposure that we noticed was in the Gulf Coast during Hurricane Katrina.

And in terms of toxicology, the researchers at the Harvard School of Public Health are very interested in having this be a decade in which we relook at the (unintelligible) and TWAs and try to put those in line with what's happening in terms of the current day technology and research on low level exposures. So thank you very much.

**DR. CONWAY:** Thank you, Ann. Our next speaker will be Eric Blumhagen from Jensen Maritime Consultants, which I believe is in Ballard -- is that right, Ballard or Seattle?

**MR. BLUMHAGEN:** Seattle.

**DR. CONWAY:** Seattle -- talking about fishing vessel safety.

**MR. BLUMHAGEN:** Thank you. I'd like to thank NIOSH for the opportunity to talk today and also to work with you over the last five years

on your deck safety project. I'm a naval architect, which means that I provide engineering work to boat owners. My company works with the majority of the Bering Sea fishing fleet that is based in Seattle. There's an awful lot of boats here that go up to fish up there and then come back in the off seasons.

We've heard a lot about issues earlier. Two I'd like to focus on are traumatic injury and fatigue. And then I have a couple of other items to talk about as well.

When we talk about traumatic injury, one thing to remember is that these are distant water fleets. If somebody's hurt on a boat in the Bering Sea, if they're lucky there'll be Coast Guard fixed-wing plane overhead in about three hours. If they're -- the nearest person with first-aid treatment on Coast Guard cutter or helicopter may be six to 12 hours away. The nearest hospital may be a day. So we're talking -- a traumatic injury that may be painful and causing damage locally when you're near a hospital could be disabling when you're out on the ocean.

The other issue is fatigue. On one of the boats I was on, the crew told me the captain's really nice to us; we sleep four hours a night. They had about three half-hour breaks for meals in there; the rest of the time they were working doing heavy manual labor.

Now onto the other issues, the first of them is stability. About half of the fatalities on board fishing vessels are from stability issues, whether because the boat capsizes and rolls over; or because of watertight integrity, the boat floods, the water gets where it's not suppose to be and the boat goes down. We need to focus on training as far as making sure the people are following their stability booklets. We also need to make sure that stability instructions are within the reach of the fishing vessel owners. We heard Ken Laurencen this morning talk about how he has about 2,000 fishing boats in his district. Virtually none of those boats has any kind of engineering plans that we can use to develop stability instructions. If we have to do a stability tests on those boats so that we can give them instructions, we have to recreate those plans.

And that drives the cost of the stability tests and instructions up to about the same as it would be for a factory trawler. So the cost of stability instructions for a 50-foot boat is about the same as it is for a 300-foot factory trawler.

And I don't know how you tell -- I've had people who say to me I can't afford that; I'm sorry. And we have to say I'm sorry, we can't do it for less money than that. We can't give you a good answer. There are probably ways we can get that within -- the stability instructions within their reach, and we need to look into how we can do that.

Another third of the fishing vessel fatalities are from man-overboard incidents. NIOSH has done some research on factors that influence survival of crew members once they go in the water. But there's been little research into what separates the near-miss from the accident, and even less research into what separates the accident from the fatality. Knowing these differences is key to reducing the fatalities from man-overboards.

Finally, we also heard about the issues of

using high-tech fiber ropes in -- from the people in the forestry industry. These are also moving into the fishing industry. But one of the problems is that there's no retirement criteria for these ropes. And on fishing boats these could be lifting anywhere from 10,000 to 200,000 pounds. They're under a lot of strain and if they break and there's someone in the way, there's going to be an injury or fatality. Right now the only way to look at whether these boats (sic) need to be retired and replaced is a guy looking on and saying yeah, that looks like it's okay. That's not going to do it, especially with fishermen who are known for reusing things well beyond when they're supposed to be. We need to do some research into when we should be replacing these -- these ropes and when they need -- if they can be spliced, if they can be repaired, or a -- damage means that they just need to be replaced.

And I appreciate the opportunity to provide comments here. My last comment is that if you're providing anything to an industry, it needs to be in the language that the industry

can understand. Most of the people in this room are scientists and you can -- it's really easy to talk to scientists. It's easy to talk -- for an engineer to talk to engineers. What we need to do is learn to talk to the workers. Thank you.

**DR. CONWAY:** Thanks, Eric. Our next speaker is Steven Gilbert -- all I have is an acronym, INND; perhaps you'll tell us what that is -- speaking about pesticides and persistent bioaccumulative toxins, health effects/exposure reduction.

**DR. GILBERT:** Well, thank you, and indeed INND is the Institute for Neurotoxicology and Neurological Disorders. INND is much easier. So thank you very much for having me here, and I wanted to thank NIOSH and the other representatives for coming here and listening to us.

Like I said, my name is Stephen Gilbert. I have a PhD. in toxicology. My research and professional activities are focused on ensuring that people live and work in environments that allow them to reach and maintain their full potential. In addition to be a researcher,

I've owned and operated a biopharmaceutical contract research company, so I'm very familiar with a lot of OSHA and NIOSH regulations, which is very good, very helpful. And I'm currently an affiliate associate faculty member at the University of Washington. I left my full-time academic pursuits, in part because I wanted to put more effort into translating research findings into policies and practice that protect public health. You know, for example, advances in the knowledge about the adverse health effects of low-level lead exposure have implications not only for our children, but for also workers in the lead industry. Lowering the Center for Disease Control blood lead action level from 10 micrograms per dust liter reflecting the current scientific understanding of the effects of lead on childhood learning has implications for lead industry workers and take-home. It's a great example of translating our scientific knowledge into relevant policy matters, and it's real interesting that it's not happening.

I'm also a member of the Washington State Pesticide Incident Report and Tracking Panel,

commonly referred to as PIRT. The PIRT Panel was formed to ensure that the state agencies responsible for pesticide regulation coordinate their incident investigation reporting and educational activities in a timely manner to protect worker and public from pesticide misuse. Mostly recently Washington state -- and you heard a little bit about this -- established a cholinesterase monitoring program for farm workers exposed to pesticides, and found that a significant number had depressed cholinesterase levels. A number of commonly-used natural and synthetic pesticides, and indeed weapons-grade nerve gases work by blocking the activity of cholinesterase, which is essential for normal nervous system function. (Unintelligible) monitoring effort demonstrated that some workers are being exposed to pesticides despite applications, regulation, and efforts to reduce exposure and spray drift. The unintentional exposure to pesticides from drift following aerial and ground-based applications are of particular concern to applicant workers, communities, homes, and schools. Policy makers, such as the

PIRT Panel or the Washington State Legislature and DR agencies, need more information on the (unintelligible) of exposures, such as the work done by Drs. Rich Fenske and Michael Yoth* at the University of Washington, which examined community exposure to pesticide drift. We need to know how to translate this research into best practices and to evaluate the effectiveness of regulations and guidelines once they're in operation.

NIOSH has an important role to play in encouraging research in program evaluation methodology, translating research to best practice techniques, and procedures that can be implemented to reduce or eliminate exposure. The challenge of pesticides is evident in that there are about 900 pesticide active ingredients currently registered. Approximately 88 million pounds of active ingredients were used in the United States in 2001. Our experience with pesticides indicates that NIOSH should invest in research that moves beyond the classic risk-assessment approach to ensure workers' safety and community health and safety. NIOSH can be a leader in the paradigm

shift away from the standard hazard evaluation toward research and effective exposure prevention. Workers and community members receive multiple chemical exposures that are not well characterized by the classic hazard and risk-assessment approach. The uncertainties related to the hazards of multiple chemical exposures will not resolve soon, which argues for preventive approach. We have a vast amount of knowledge from the biological and toxicological sciences. We need to heed the lessons learned and take a precautionary approach to pesticide as well as the potent compounds, such as those emerging from the biopharmaceutical industries and more recently from the nanotechnology materials. So I think we have a lot of work to do, and I really think we need to work on translating research into good best practices and prevention in this area. Thank you very much.

**DR. CONWAY:** Thank you. Our next speaker will be Kevin Keaney from U.S. Environmental Protection Agency talking about pesticide worker safety.

**MR. KEANEY:** My name is Kevin Keaney. I'm the

chief of the Pesticides Stewardship and Pesticide Worker Safety Programs in the office of pesticide programs in EPA headquarters. The office of pesticide programs headquarters is a 900-person -- has a 900-person staff, which I think would indicate the importance that the agency places on concerns related to the use of pesticides, the safe use of pesticides. This program also has staff in ten regional offices. My particular focus in our group's focus is driven by two regulations -- three regulations, I'm sorry. One a recent regulation related to pesticide containers and containment, a soon-to-be-proposed regulation on pesticide recycling, and two regulations that focus on the span of labor that work with and around pesticides and the health implications that are inherent in working with and around pesticides. The regulation governing the agricultural worker protection, the field worker, and the regulation that tries to establish standards for certification of competency of pesticide applicators.

We also have an aggressive grant initiative in the healthcare provider arena to better prepare

healthcare providers to recognize and manage pesticide poisonings and to gain information from the field clinician level of the effects of working with and around pesticides.

My remarks today are focused primarily on the practice aspect of research to practice. And I would like the theme that NIOSH and those here would carry away would be the more aggressive collaboration between agencies on -- in these areas and capitalizing on scarce resources to better effect the changes that we think would be necessary to better protect human health and the environment.

We are about the business in my office of trying to establish competencies, competencies for applicators, competencies for workers, and competencies for healthcare providers that have to deal with both of these segments of labor.

We do support financially a number of NIOSH projects. We are in a long-term grant relationship with -- recently established a long-term grant relationship with PNASH to better affect the way healthcare providers are trained and to establish essentially champions in the area of public health for better

training in the awareness -- the raising of awareness of how to deal with the implications of working with pesticides.

We also support the Migrant Clinicians Network that you'll hear a spokesman for later today in their efforts to bring tools that would be developed and awarenesses that would be developed to the clinician level and feedback that information to us in the pesticide program.

What I work with are field programs, and the value of field programs is the information that can be brought back into the agency so that the registration of pesticides and the specific directions of use for pesticides and the mitigation measures that are incorporated in the training for pesticide users can be more realistically shaped and functioned by the field information that we get. To that extent we help, through an inter-agency agreement, the funding of the sensor network, the Sentinel Event Notification System of Occupational Risks, and the pesticide aspect of that. And we would -- we heartily endorse that project and are committed to funding -- helping fund

the expansion of that project so that at some point we can have SENSOR network information coming from the agricultural -- the states where there is high labor working with and around pesticides. and we can get a better sense of the actual incident -- incident picture in the country, which we don't have at the moment, and we can use that then to better regulate pesticides.

We also have an extensive training network that we've established through grants under the umbrella of AmeriCorp. We have safety trainers -- bilingual safety trainers dealing with agricultural workers in a way that provides them with the basic principles of safety so that they can help protect themselves, but also tries to engage them in ways that would make them active participants in a safety net of safety training, safety -- safe clinicians services, and so forth. We would benefit by research in that area from NIOSH into methods that would better reach this -- into this community, it's a challenge, as -- as many of you know, the nature of the agricultural workforce is varied from the migrants coming in

to work a seasonal -- a seasonal session to the resident labor to the fairly sophisticated applicators in aerial settings and ground rig settings. So it's a challenge to reach into that community and actively engage them in the matter of protecting themselves and by protecting themselves protecting human health and the environment.

So I would heartily endorse your move to bring research to practice, and we should be more aggressively collaborating in these -- in these efforts, and I hope that we will.

**DR. CONWAY:** Thanks. Our next speaker will be Mitch Ricketts, Kansas State University Research and Extension, speaking on opportunities for reducing fatal and nonfatal injuries in agriculture.

**MR. RICKETTS:** Thank you. I've got a lot more things to say than I have time for, which is why I've given you the comments there. I'm Mitch Ricketts. I am a Certified Safety Professional. I work for Kansas State University Research and Extension. One of the things that I would like to say -- and I think we probably all know it but maybe don't think

about it enough -- is that there is a real disconnect between the way that we think and the way many farmers think, particularly in terms of safety and health. And to illustrate that I want to tell you a little bit of a story.

Last summer an agricultural worker that I know was using a PTO-driven auger to transfer soybeans from a grain bin into a truck. He and his coworkers started the auger and soon they found that it was not quite in the right position to dump the grain into the truck. They were in a hurry so rather than shutting off the PTO, the man in charge -- who was a middle-aged worker; he's about my same age, he had done this work all his life -- without shutting the power off, he leaned over the auger to try and move it by hand.

Now this same worker -- about a week before a pin had sheared off the drive on this auger and about a week before he had taken the shield off and he replaced the pin with a long bolt, and he didn't have time to put the shield back on. So as you can imagine, he went to lean over the auger and as he did, the bolt grabbed his

clothing -- I wasn't there, but there were two witnesses and what they told me is it flipped him head over heels and slammed him against the ground. Then something very fortunate happened, which probably saved his life. The auger ripped his clothing completely off. Had it not done that it would have wound him up in there, and he probably would have been crushed or suffocated. To give you an idea of the power of this auger, he was fully clothed before this happened, but when he ended up on the ground he had two things on. One was the collar of his tee shirt -- not the rest of the tee shirt -- and the other was his left boot. Okay? Everything else was gone, everything but the collar of the tee shirt. He tells us he was wearing underwear and even those weren't there anymore. But that probably saved his life.

This -- as I said, this was a very experienced worker. He never would have let his employees do that. He knew better than to do that. As I visited with him the next week, you know, I asked him what -- what can we do to make sure that this sort of thing doesn't happen in the

future, and he told us the kind of things that I'm sure every one of you in here have heard. He said, you know agriculture is a very dangerous business. He said sometimes we have to take risks in order to get our work done. Most of us would not agree with that. Most of us believe that there's no job worth risking our -- our health for in order to get the work done.

So I think the safety culture in agriculture is something that we really need to work on. One of the questions is how -- how can we deal with the safety culture among farmers. I think the only way that we're ever effectively going to do that is if we enlist farmers and laborers to help us -- or to help develop approaches that are practical and profitable in their own workplaces. Farmers are not going to adopt methods unless those methods make sense to them. It's not enough for those safety methods to make sense to us. Farmers will not adopt new methods for improving safety unless those methods are also efficient, profitable, and realistic in relation to the goals and resources on the farm.

In that regard, I would like to encourage NIOSH through NORA to encourage more partnerships with the agencies and organizations that are already set up to work with agriculture. In particular, the Cooperative State Research Education Extension Service through the Department of Agriculture has a system of local extension offices, experiment stations, and land grant universities throughout the United States. I know in Kansas, the state that I'm from, we have agents in every county of the state, and I think -- I think most states are like that as well. Farmers are already used to working through this network, and typically when rural people have questions, their first call is to a county agent or to the land grant university or to the agricultural experiment station.

This is a great resource that's out there. Most of the big changes that have occurred in agriculture have taken place through the efforts of the cooperative extension service, the agricultural experiment station, the land grant universities. It is difficult to imagine how we're going to make any major changes in

agriculture without getting this group of people more involved. I realize that in some regions of the country that -- that group of folks has been very much engaged, but not in every region of the country.

So my challenge to NIOSH and to NORA is to go ahead and get this group of folks more involved in every region of the country. Thank you.

**DR. CONWAY:** Thanks. Our next speaker is Sharon Hughes from the National Council of Agricultural Employers speaking about adolescent farm workers, media reports, and policy-relevant research -- tongue twister.

**MS. HUGHES:** I believe it's everything, yes. Hi, my name is Sharon Hughes and I represent the National Council of Agricultural Employers, which is the only national organization that's devoted to representing agricultural employers from the farm management viewpoint in Washington on labor and immigration issues. We represent the growers and producers interests before the federal government on -- on these issues and work closely with Congress, the Immigration and Customs Enforcement Bureau, the Departments of Labor and Agriculture, the

Occupational Safety and Health Administration, and the Environmental Protection Agency. NCAE membership is open to growers, producers, processors, cooperatives. Other agricultural organizations at the state, local, and national level belong to the council, and we thereby have membership in all 50 states dealing with labor-intensive agricultural crops.

As NCAE's Executive Vice President I've had the opportunity to work with the Department of Labor's review of the hazardous occupations orders regarding children's work in agriculture, advised on the USDA's Hazardous Occupational Safety and Training and Agriculture Initiative. I was one of the employer representatives to the International Labor Organization when they developed their safety and health in agriculture protocol a few years ago. And I also served as advisor on several NIOSH-funded projects, including our current project with the Marshfield-based National Children's Center for Rural and Agricultural Health and Safety where we're testing a strategy to motivate employers to improve the safety conditions for hired

adolescent workers.
Our organization has a vested interest in the safety and health of agricultural workers.
For today's statements I have five key points to make. First, NIOSH-funded investigators should be required to partner with agricultural businesses and organizations, such as NCAE, to plan and implement studies; then disseminate the results that have practical application for agricultural producers and hired workers. Too often there's a disconnect between what academics want to study and what is of real importance to agricultural producers and/or their hired workers. Many papers and scientific journals have virtually no impact on the health and safety of agricultural workers.
Second, NIOSH research should identify effective health and safety interventions targeted for hired farm workers, especially those with short-term employment requiring skills and machinery operation. For many of our crops there's a brief window of time for planting or harvest. Workers circulate through quickly and may not return for a second season.
We need help in providing effective training

and safety interventions for these employees. Third, the NIOSH agricultural research agenda should address cross-training of workers in agriculture. Skills building, including safety aspects, would improve worker options for promotion and longevity in agricultural work. Many of our trained employees have moved out of agriculture into construction, retail, and other occupations that offer full-time, year-round employment. Ideally, farm workers would be cross-trained and given opportunity for upward mobility within the agricultural industry, and we need help with this type of research into doing that type of skills training.

Fourth, NIOSH should maintain designated funds to test and disseminate effective programs that agricultural producers can use for promoting health and safety among legally employed young workers ages 12 to 17. Many employers flatly refuse to hire teen workers because of all the regulations, the liability concerns, the inability to get workers compensation coverage, et cetera. But agriculture can provide safe, meaningful employment opportunities for the

local youth. The NIOSH children's initiative has ensured a focus on this topic, and we support its continuation.

Finally, new strategies are needed to bridge the research to practice gap. You may want to consider jointly-funded projects between USDA and NIOSH. As the speaker before me indicated, working with extension personnel at the state and local levels would be very effective in being able to actually implement the practices, you know, with the growers. The USDA HOSTA initiative for youth, tractor, and machinery certification might benefit from further testing, evaluation, and promotion via the NIOSH regional centers. And there are other health and safety issues that could benefit by linking NIOSH, you know, with the cooperative extension personnel.

I will go ahead and submit the written comments at a later date, but I do want to thank you for this opportunity to address.

**DR. CONWAY:** Thank you.

**MS. HUGHES:** Thank you.

**DR. CONWAY:** Our next speaker and penultimate for this block is Jane Elam from the Fayette

County Farm Bureau speaking about health and safety issues for farmers and farm families in Kentucky.

**MS. ELAM:** Good afternoon. It is indeed a privilege to be here. I am Jane Elam from Lexington, Kentucky, the horse capital of the world. I have been involved with Kentucky Farm Bureau for many years. I'm serving currently on the State Safety Advisory Committee. My husband and I farm a six-generation horse, cattle, and tobacco farm.

I introduced myself stating that I am from the horse capital of the world, but my state holds another record, being near the top for all terrain vehicles accidents and deaths. We have many reclaimed coal mines and fast, hilly country sides that promote ATV riding -- abundant tourists and locals riding at these sites that promote ATV riding and cause injury problems.

The sites are always glad to collect a few bucks from riders who use them. We have the largest ATV dealership in the nation located in eastern Kentucky. ATV accidents, which are usually head injuries, can be greatly reduced

with proper use of helmets, especially on farms, but they are not widely used by ATV drivers.

Motorcyclists are another problem group -- a group that has gotten the lawmakers to rescind the mandatory helmet law in Kentucky. This is a problem in itself.

My message today is education and research, because that is the only way to reduce injuries and deaths. We were at the top of the nation's farm deaths and injuries before our Department of Agriculture started an education program. Now we have cut these statistics in half since farmers are using roll bars and seatbelts on tractors.

Other ways we are educating are by holding safety camps, health and wellness camps for all the ages, and working with 4-H and FFA in pilot programs. Many people think farm accidents are inevitable, but they are preventable when children and adults are educated how to be safe on the farm.

Being from a top tobacco and coal mining state, we again hold another record as being near the top for lung cancer and related health

problems. We are working on solutions through education and research. Results will be slow coming because of habits and peer pressure. We are asking our General Assembly, as they go into session this year, for monies for research and education to help deliver the health and safety story. Thank you.

**DR. CONWAY:** Thank you. Our last speaker in this section is Regina Luginbuhl* from the North Carolina Department of Labor.

**MS. LUGINBUHL:** Good afternoon, everybody. I thank you for the opportunity to speak today. I'm Regina Cullen Luginbuhl from the North Carolina Department of Labor. I'm representing my agency and also ECU, the agrimedicine program.

I want to tell you a little bit about agriculture in North Carolina since we're on the other side of the universe in this kind of a different place. In North Carolina agriculture accounts for 22 percent of the state's revenues and employs 18 percent of the workforce. You probably know we're tops in tobacco, but also turkey, some really delicious healthy fruits, blueberries, and some good

vegetables -- my personal favorite, cucumber pickles. And our Christmas trees go as far as Hawaii and Japan, and they usually end up in the White House for whoever is the President. It's going to be his tree, too.

But I also want to talk about the migrant labor workforce that puts all these things on our tables. It's an indeterminate number. Some people say it's a 100,000, and some people say it's 300,000, and some people just tell us to go and find out. We don't really know, but we do know they start -- they all start in the agricultural area pretty much. Most of them are from Mexico. Some of them now from Laos and Cambodia, and the ag start is at the bottom of the ladder. They might go on up into construction. We don't really care about that, either. We just -- our job is to make sure they stay safe on whatever step they're at.

I want to talk about three safety topics -- the ones we know about. The first one has to do with injuries and death from heat stress and heat stroke. That's been addressed earlier, but I can tell you from our point of view it's pretty important. We had three workplace

fatalities this past summer, 2005, and they were all heat stress/heat stroke. And these were guest workers, people that were guests in our country. They came here under the H2A Program.

At the time of their death they were working for the farmer that hired them, and they were doing the job they were paid to do. They were not alone when they died. Their fellow workers were with them, and in two of the three cases their employer was with them as well. I really don't think anybody ever intended that these deaths would take place.

So why did they take place? Studies point to work rest cycles, adequate hydration, job cross-training. My personal bet, recognition of the hazard. I think if anybody knew, any of the workers knew, if the worker himself knew, and the farmer knew that some of those symptoms were going to be life threatening, they wouldn't have put them at the end of the field to rest.

Our second pick is pesticides. That's also been a theme this morning -- this afternoon. Some of my colleagues in North Carolina are

really convinced that we do need a reporting system that works. Right now we don't have one. We need chemical exposures that can be traced, understood, and prevented. We need to record exposures. We need a record. In California we have a state law that mandates doctors' reporting illnesses from occupational exposures to local health offices. So surveillance is important.

The Department of Labor takes care of the HazCom, Hazard Communication Standard, and we've noticed when we issue citations there's three of them that typically occur. Most growers don't have a written program. They don't post their Material Safety Data Sheets, and they fail to train their employees.

Third topic -- this actually is a -- it's going to end on a happier note. In North Carolina we've created a gold star grower program. Those are the guys who do it right. They would do it right whether we were there or not, and they sort of manage us. Sometimes I like to think we're managing them, but of course that's not the way it is. And in many of our conversations they told us what their most

serious workplace safety issue was. How nice, and I didn't guess it anywhere close. It was driving their vehicles on the rural roadways. Everybody in the room I guess was on top of that.

So we got some government money, state government money, and got some slow moving signs out, and they promised not to put them on their mailboxes. And we educated the public, which was their number one issue. And the grant provided us with an intern so I think that's always useful, a useful way to put your money, and she got her MPH out of it. So I'd like to see that sort of effort continue and maybe move on in North Carolina to the roll-over protection.

So I think there's a few things that are important to us. One is that the education we have, we share it with farm workers and with farmers, and that we listen to both groups, and that we get additional help from folks like you. Thank you.

**DR. CONWAY:** An artful transition. Speaking of artful transitions, given that there was no time put in for a break on our docket schedule,

we're going to take a five-minute, as Dr. Bolt says, bio and caffeine break. Please try to get back in five minutes so we don't fall much further behind. Thank you.

(Whereupon, a recess was taken from 3:35 p.m. to 3:43 p.m.)

**DR. CONWAY:** If we can take our seats we'll rev right up again here. I'll be back in just a second.

(Pause)

Take an opportunity to recognize some of our colleagues that have helped out with this process. If people can file in, or not, we'll get going again. First I want to thank our gracious host and PNASH. Drs. Fenske and Lee will also be providing concluding remarks, which will be a near impossible challenge at the very end of a grueling docket when people are worried about rush-hour traffic and day care of all the other stuff that people of a certain age have to worry about.

The other folks I'd like to acknowledge are some of the NIOSH team that have worked either front and center or behind the scenes. Dr. Steve Owentrock* is the long-term, long-time ag

coordinator for NIOSH, which historically has been more pure terrestrial agriculture, but with the advent of the sector orientation has been broadened to include fishing and forestry. And then Commander, now Dr., Jennifer Lincoln just received her PhD. in health policy from Johns Hopkins this week, recently defended her dissertation successfully, who's the ag forestry and fishing co-coordinator, and I think really emphasizing the fishing and forestry components of that. Dr. Lee Husting* who was here a moment ago -- I don't see Lee. I guess he's still out in the -- oh, hi, Lee; sorry, spotlights -- who oversees the agriculture components of the office -- NIOSH office of extramural programs. And then a tale of two Christy's, Christy Bowles, who's in our office of communications, works very closely with Max Lum, staffing and assembling this whole -- the whole town hall thing, and then Christy Forrester who's on detail to our OD from EID to help us make sense out of and organize the entire docket, a formidable task. She's going to apply her epidemiologic skills to that fore.

And then I'd like to introduce my co-consul in for the ag sector management, Dr. Michael Galvin, whom you've heard about earlier today, but I don't think seen. He has an exciting initiative to tell us about.

**DR. GALVIN:** We never talk more than a minute. Thank you. Yes, I worked with George on this, but we did have an interesting thing that we have announced. We have launched a national tractor initiative program. Lee Husting again -- we mentioned his name -- he is the program manager. We have Max Lum is our in-house advertising agent, and we'd like to announce that I think Steve Olinchuck* has been involved in this helping us set this up, and Steve Reynolds and a collection of everybody in ag as working with this. And Steve, did you want to maybe give us a one-minute summary of where we are with this? It's something exciting. It's our first national initiative. We're very excited to have it and hopefully it'll be very successful. Steve.

**MR. REYNOLDS:** Thanks, Mike. One of the biggest problems in agriculture has, and continues to be, fatalities and injuries

associated with agricultural tractors. There are engineering solutions that have been adopted in some countries virtually eliminating the problem, but the U.S. has an agricultural economy and a society that's much more complex. The agricultural centers, all ten of them, quite a while ago actually decided that we wanted to work together to try to really address this most pressing problem. And after a lot of work by a lot of people, we finally are at the point today where we are able to do some of the initial work. We have funding from NIOSH to put a couple of years' effort into filling in some of the gaps, and especially focusing on some key areas such as social marketing where we really need to look at, you know, what does it take to get people to adapt and to use the technology that is out there. What we're hoping to do at the end of this time period is to be prepared to launch a national public health campaign similar to what has been done to attack other problems, like smoking and seatbelts. So that's our goal.

One of the major issues that we need to address right away with this activity, though, is

bringing partners in to work with us. This is only a small group. NIOSH is only able to support a small amount of resources to direct at it, and it's going to take a lot of partners to do this. So we're looking for partners. We haven't done very much yet with this because we hadn't received the funding and we didn't want to move ahead too quickly. But we're wide open. If anybody has a particular interest in it, I'm sitting up in the back of the room and have lots of cards with e-mail and phone numbers. So again, we're looking for lots of partners and hoping to make some progress in this area that we think has been one of the biggest issues facing agriculture in the U.S.

**DR. CONWAY:** Thanks.

**MR. REYNOLDS:** Thanks.

**UNIDENTIFIED:** (Off microphone) (Unintelligible)

**MR. REYNOLDS:** All walks of life. We are and have been -- initially in terms of developing this we've been talking and working with the manufacturers, with farm bureaus, with the distributors, with owners that are using and operating the tractors, all kinds of partners.

We're wide open.

**DR. CONWAY:** Great news. Thanks. So our next speaker is Marilyn Adams from Farm Safety 4 Just Kids -- I hope I got that right -- speaking about childhood agricultural community-based intervention.

**MS. ADAMS:** Well, that's 10 seconds.

**DR. CONWAY:** We'll give you a credit. We'll start the clock now.

**MS. ADAMS:** Good afternoon. My name is Marilyn Adams, and as the spokesperson and founding president of Farm Safety 4 Just Kids, I take this opportunity to thank NIOSH personally for the past efforts that you have given to the child farm safety and health issues. The majority of our funding comes from agribusiness, but we also depend upon NIOSH. We depend upon the studies to justify ongoing corporate donations and to justify the categories that we need to address. We feel strongly that NIOSH should continue its dedicated and separate focus on children in the coming years.

The Children's Farm Safety and Health Initiative was appropriated by Congress as

separate funds and for the sole purpose to be sure children were not forgotten. I know because I was there. I was one of the members of the national committee that worked really hard to make this happen.

Collaboration and support from others in the agricultural safety and health field is crucial at this time. Networking and project funding provided by NIOSH centers, such as the National Children's Center, the Great Plains Center, the Southeast Center, have really directly benefited the Children's Farm Safety and Health. For example, the network created by the National Children's Center has given Farm Safety 4 Just Kids the opportunity to work with under-served world populations with educational materials both for Spanish-speaking populations and for the Amish.

Community outreach programs that address the entire family and protect children are extremely vital to preserving the rural environment. Farm Safety 4 Just Kids has nearly a 140 grass roots volunteer chapters across North America that reach more than one million rural children, youth and farm families

each year with life-saving educational materials based on research to practice principles. In year 2000, Farm Safety 4 Just Kids developed an educational packet called "Farm Tasks, When Are Kids Ready?" This educational tool is based on the North American guidelines for agricultural tasks created by the National Children's Center.

Farm Safety 4 Just Kids has also created a farm safety day camp manual in response to a two-year evaluation done by the Southeast Center on farm safety day camps. Some of our chapters who conducted these day camps were trained by the Progressive Agriculture Camp Program. I mean, excuse me, the Progressive Agriculture Safety Day Program.

ATVs are extremely important. You've heard that more than one time today. Along with the Great Plains Center for Agricultural Help, Farm Safety 4 Just Kids surveyed the attitudes and behaviors of youth on ATVs during the recent national FFA convention. Two educational sessions with peer to peer education were also conducted. The results are being used to shape up -- shape an upcoming educational tool that

includes a community planning guide, paper and pencil activities, demonstrations, posters, presentation materials, a brochure -- and the list goes on.

Our vision at Farm Safety 4 Just Kids is simply keeping rural kids safe and healthy. For agriculture to continue as a viable and prosperous industry, we need to make sure agricultural safety and health outreach programs are researched, implemented, and evaluated on an ongoing basis. We also need to make sure our efforts are geared at reaching all generations within the family unit from the curious toddler asking for a ride with grandpa on the tractor, to the 12-year-old wanting to ride an ATV, all the way up to the teen that's working around the power take-off for the first time. Our education and awareness efforts are timely and effective.

In closing, Farm Safety 4 Just Kids is working to deliver grass roots programs based on research to practice. We take pride in creating programs and educational materials that are based on the foundation of networking, research, evaluation, and awareness about farm

safety and health issues. Farm Safety 4 Just Kids is prepared to expand our organization to implement the intervention that has already been tested, while continuing to specifically address the needs of children, youth, and farm families through community outreach programs. In addition to my verbal comments, I have a handout that describes our priorities in ATV safety, rural health, and tractor safety. And yes, we would love to partner with you on the tractor safety initiative.

Three key points that I'd like to quickly make. Children's initiatives should remain viable and separate. Recipients of NIOSH research funds should strongly encourage the partner -- to partner with organizations such as Farm Safety 4 Just Kids and the Progressive ag Foundation day camp program to ensure that the knowledge gained through research is implemented at the grass roots level. Even better yet, direct funding to the nonprofit organizations to be provided to organizations such as ours that have had proven track record conducting and disseminating educational programs based on the NIOSH funding -- funded research. Okay. I

firmly believe that if steps are taken in this direction -- and I wanted to say this most importantly to you, sir -- the modest reduction of children's agricultural injuries and fatalities, together we can assure that agriculture will remain a strong, viable industry for years to come. Thank you, Sir.

**DR. CONWAY:** Good recovery. Do you want those?

**MS. ADAMS:** Yes, I want to keep these.

**DR. CONWAY:** Thanks. Our next speaker will be Deliana Garcia from Migrant Clinicians Network speaking about migrant workers and child agriculture safety.

**MS. GARCIA:** Good afternoon. As he just said, my name is Deliana Garcia, and I represent the Migrant Clinicians Network based in Austin, Texas. The Migrant Clinicians Network is the nation's oldest and largest clinical network dedicated to improving the health of the mobile under-served. For 22 years we have worked to prepare clinicians to meet the healthcare needs of migrant farm workers, those persons who cross a prescribed geographic boundary and stay away from their normal residence overnight to perform farm work for wages, and other mobile

under-served workers.
Occupationally-related illnesses and injuries continue to be some of the most complex and frustrating healthcare events handled in the primary care setting. I am grateful for the opportunity to address you today with our recommendations for the agricultural section -- sector, excuse me -- of the National Occupational Research Agenda under development. Your work will have enormous impact for many years to come. We have seen this in the critical pesticide-related research that has been conducted over the last ten years based on the previous NORA. The body of knowledge has greatly improved, yet those crucial advances must be taken to the next level. Understanding of the impact and effects of pesticide exposure must be translated into critical evaluation strategies, and treatment and management protocols for the clinician in the field.
Related to the research to practice initiative, our first recommendation would be that NIOSH-funded research include an applied component to swiftly translate findings into clinical practices. We ask that future requests for

proposal include requirements to seek to link research findings to programs or organizations that can apply the results. In this way, as studies are defined and executed they will have a specific aim, the rapid deployment of major findings into the settings where they will have the greatest benefit.

Currently MCN is involved in a five-year partnership with the U.S. Environmental Protection Agency to integrate pesticide practice guidelines into the primary care setting. We would like to see additional partnerships with NIOSH that take the cutting-edge research sponsored by your agency to the front line provider.

Our second recommendation is that the agricultural sector of the NORA redouble its effort to study injuries and illnesses resulting from occupational insults to workers. When caring for migrant workers it is critical that the clinician look beyond pesticide exposure at incapacitating injuries resulting from rapid and repeated motion, awkward body mechanics, and the strain of supporting excessive weights. And it would be important

at this moment to also highlight that this work has not been conducted looking at female farm workers and female workers in other occupations who are currently pregnant.

These work requirements result in a whole host of traumatic injuries and musculoskeletal disorders that greatly impact the longevity of workers in many segments of the agricultural industry. The long-term effects on the human body are not fully understood, yet due to these injuries we see a growing number of workers no longer able to maintain employment either in agriculture or in any other work setting. For many of these individuals their very survival, and that of their family, depends on the ability to work at whatever job is available to them. The field of workers compensation and rehabilitation has far to go. I would again urge that future research incorporate the identification of strategies for the prevention, as well as the treatment and clinical management, of these injuries. The NIOSH Northeast Center for Agricultural and Occupational Health, NICAM, provides an outstanding example of research in this area

that has been translated into clinical recommendations, and more efforts like this are needed.

While there is enormous concern about the impact of injuries and exposures on adult workers and the young children and their families, little attention has been paid to adolescent workers, older children ages 14 to 17 functioning as emancipated minors. Reports of studies looking at the changing face of migration repeatedly indicate that the migrant population is getting -- that is increasingly not English speaking and also non-Spanish-speaking, is getting younger. These young workers are not yet fully developed either physically or physiologically -- or psychologically, excuse me -- but life circumstances have required that they function in the adult world of work. They are, however, children unfamiliar with worker protections and often incapable of requesting assistance, and additional research is needed to understand the impact of occupational injuries and illnesses on the adolescent worker.

Our third recommendation is that research

funding targeted at children remain in place, with a special focus on an older child because we do not believe that this population can be adequately addressed in adult research. We have benefited enormously from our partnership with the NIOSH National Children's Center in Marshfield, Wisconsin and our active involvement in the Childhood Agricultural Safety Network. This partnership led to the development of highly sought-after resources to help educate farm worker families.

Continuation of this kind of intervention is critical. Again it is important that research work to assist the healthcare provider in understanding the effects on the developing body and identify strategies to prevent and clinical management.

So as I'm closing I'd like to reiterate linking studies to organizations able to translate the findings into critical strategies -- clinical strategies, broadening the research agenda beyond pesticides, and expanding the child-focused initiatives to include the adolescent worker who is functioning essentially as an adult. Thank you.

**DR. CONWAY:** Thank you. Our next speaker is Robert Petrea from the University of Illinois Urbana-Champaign speaking about older and elderly farmers. Mr. Petrea.

**MR. PETREA:** I've already said I might sound like God with this and so I hope you listen appropriately. It's -- we pronounce it "Petrie," but I've had Greeks and Romanians both tell me that they know people in their countries with that name and gave me that pronunciation. I asked my dad about it, and he just said I'm American, so -- I am Chip Petrea from the University of Illinois at Urbana-Champaign, the Department of Agriculture and Biological Engineering. I also have an appointment with the Centers for Environmental and Occupational Safety and Health at the University of Illinois Chicago, which is an ERC center for NIOSH.

I would like to speak about older farmers, that being those farmers older than 55. I know lots of places older farmers -- or older guys, and older white guys in particular, don't get a lot of good press, but there's a lot of them out there. The average age in Illinois is

something over 55 for farmers, going up. So I have four particular factors related to that category of farmer that I'd like to address. One is the physiological changes of aging. We have a lot of data on lots of things that takes place as the body ages. However, related to farming we do not know how these changes may interact with the continuing workload and the long hours that farmers tend to do. I served on a dissertation committee of farmers in northern Illinois, and they routinely put in 40 to 60 hours, which is similar to what my dad does and he's 74.

There's lots of information on chronic diseases and the increasing prevalence of those diseases as individuals age. However, we do not know what the impact of those may be on the older farmers. We know that lots of farmers, particularly the older generation, are not typically preventative health oriented. They only go when they need to to a physician or clinic, and sometimes not then, and whether -- the suspicion is that there's lots of undiagnosed chronic diseases out there that are -- in fact there are some of them that have

been diagnosed but may be under-medicated, and so there's -- their relationship of those factors to injuries and fatalities is not well understood.

The relationship between prescriptions and over-the-counter medications with farming and farm health and safety, in Illinois we lose 10 or 12 older farmers every year from tractor overturns, and it would be nice to know what kinds of medications those individuals were taking and whether there was any impact of that on their particular situations.

And also the role of stress and mental health problems such as depression and anxiety. We know that farmers spend more of their times being humans than they do being farmers, but they do have a particular set of circumstances that bears to be better understood.

I would recommend that there be a specific NORA research target of older farmers in production agriculture to assess the role of physiological changes of aging, health status, chronic disease, mental and physical health effects, and the effects of medication as they relate to occupational injury and mortality. I would

like to see the continued work on better mechanisms to document farm and farm-related injuries and fatalities. We of course recommend a collaborative approach between nursing, medicine, agrimedicine, agricultural safety and health, agribusiness, public health, and of course the farmers, their spouses, and their family members. And NIOSH has a nice publication on community-based participatory research that I think offers a model that we can follow. And I would also offer that the -- related to older and aged farmers that something similar to the current previously work related to the rural and agricultural children's efforts would provide a good model, and also the USDA cooperative states research, education and extension service AgrAbility project, which relates to disabled farmers and their families, are both good models for furthering the research that we need and the appropriate mechanisms for guiding both preventative as well as facilitative programs. Thank you very much.

**DR. CONWAY:** Thanks. Sorry about mauling your name. Our next speaker is Dee Jepsen from Ohio

State University speaking about -- from an extension perspective.

**MS. JEPSEN:** Glad to see there's so many people still here, and thanks for the opportunity to speak this afternoon. I am Dee Jepsen, the director for agricultural safety and health programs at Ohio State University. I am also the President of the National Institute for Farm Safety, which is the leading professional organization in the nation that's dedicate to occupational safety of agriculture workers. When asked about the topic of my session I simply chose to speak from an extension perspective, so I may be echoing some of the remarks from my colleague, Mitch Ricketts. For those of you who are not familiar with extension, oftentimes referred to the cooperative extension service, let me just briefly summarize it as an educational research and service organization that receives funding from federal, state, and local budgets to address issue-based initiatives.

Extension receives financial and programmatic support from the stealth government agency familiar with ag, that being the USDA. From a

historic perspective the extension service came about in 1913 through the Smith Lever Act. This Act called for the information generated by the research and the academic communities to be disseminated to the citizens and put into use. So with no disrespect to my NIOSH officials who I know and who developed that R2P logo, I would like to say that extension and the federal land grant institutions are the original crafters that the research to practice model.

Now in all seriousness, I do want to acknowledge NIOSH and their efforts to incorporate R2P in the current research expectations. Basic and applied research findings through the R01, R21, and feasibility studies are much needed in the ag sector. Each study, whether it's farm-related asthma, injury surveillance, noise-reduced hearing loss -- I could go on and on -- these studies are just bricks that help form the wall of research in the agricultural workplace.

But this wall that we built can also be a barrier between the researcher and the workforce. Perhaps the findings are there, but

the common practitioner does not know what to do with them.

This is where extension comes in. Extension professionals can take those findings and transform them into a more palatable format for teaching and training. Utilizing the R2P model, researchers can be sure that the occupational workforce, including farm families, are getting the most current findings and strategies for prevention of illness and injury. Extension is comprised of four major program areas, not just agriculture, but also family, youth, and community development. Extension has a presence in every state of the nation and often in every county or parish. Extension professionals work directly in the communities that they serve. They are faculty members of their state land grant universities and are familiar with methodology, program planning, and systematic evaluation. I heard this morning and then again this afternoon that the NORA agenda will encourage partnerships. I recommend that extension be that logical and effective partner when it comes to the agriculture sector.

The regional agriculture centers have the ability to work directly with the extension professionals in their area. These professionals have access and the rapport with the agricultural workforce.

The mission of extension program is to take information to the people. Extension can effectively target the appropriate audience and utilize research findings in their local communities. On the local level, extension professionals have community linkages with the veterinarians, the public health departments, and local clinics or hospitals. Including extension in the R2P process ensures that the researchers that have valuable occupational findings -- that their findings are being put to use. In a nutshell, extension can be those wheels for research, knowledge, and safe workplace practices.

Let me conclude by saying that long after the grant dollars expire, and we all know they do, extension offices will still have a presence in the communities. and can keep the information and the best management practices set by NORA progressing. Thank you.

**DR. CONWAY:** Thanks. Our next speaker will be Anne Greenlee from the Oregon Health and Science University speaking about agricultural health risks in northeast Oregon and southern Idaho.

**MS. GREENLEE:** Good afternoon, everybody. And I certainly would like to thank NIOSH for organizing this opportunity for listening, and for myself for learning from many of you from the audience, and also an opportunity to contribute to the next ten years of research with regards to agricultural health and safety. I am Anne Greenlee, and I'm an Associate Professor with Oregon Health and Science University within the School of Nursing. I have a secondary -- that's my primary appointment. My secondary appointment is with the Center for Research on Occupational and Environmental Health, and I am located on the LeGrand Campus. That's about four and a half hours away from the Portland Campus. And I'm developing a new program of research there within the School of Nursing, so I've had an opportunity with over the last year and a half to talk with some of the producers and

veterinarians in the area. So I have kind of a short message that underscores really what has already been discussed with regards to beef production and dairy industry in northeast Oregon and southern Idaho.

And essentially the issues as far as health and safety, traumatic injury, really stem from animal handling issues, understanding the animals and moving the animals about, bull/human interactions and yard maintenance with regards to heavy equipment. So many of -- I guess what I'm -- what I'd like to underscore is just the need for translating the message of safety and how to get it into the more remote areas of efforts that are occurring in northeastern Oregon and Idaho.

Long hours, personnel turnover, harsh work environments, and training opportunities that may or may not result in behavioral change, those appear to be issues on the minds of producers.

An area in which I am more familiar in that I'm more of a laboratory-based scientist and I have not heard yet today, sort of two areas that are emerging as far as knowledge gaps, that I think

need to be on the agenda. And that is the fetal basis of adult diseases, those exposures that occur in the workplace with regards to heavy metals and solvents and agrichemical exposures; and those exposures that pertain to or have the possibility of trans-generational effects, those heritable changes that occur during in-utero exposures that are -- not only affect the offspring but also have the potential for affecting future generations as well.

And there's increasing evidence that some of the environmental agents, especially those with hormone-like activities, may alter developmental programming. They do not result in overt malformations, rather they alter the developmental program and result in functional deficits. And the functional deficits are expressed later in life as an increase in susceptibility to disease and dysfunction. And the mechanism proposed for this phenomenon, i.e., the fetal basis of adult disease, is believed to be epigenetic alterations in the genetic -- in gene expression; that is, altered DNA methylation. And in some instances these

exposures may result in transgenerational or heritable changes in the germ line.

So I think my point is, my suggestion is with regards to the agenda, the future agenda, is to look at those exposures, those low-dose, chronic exposures that don't result in an overt malformation but yet may lead to the risk of the interaction with those exposures and later susceptibility, or increased heightened susceptibility to cancer, to reproductive changes, fertility, decrements in fertility, and neurological health. So I think there's a lot -- just having my foot in the arena of toxicology and reproductive health and agricultural health, it's becoming very obvious -- this -- this is a hot topic. This is what is really on the agenda of many upcoming meetings and is going to be building over the next few years. And I think that low-dose, chronic exposures really need to be kept at the forefront as far as disease susceptibility.

Thank you very much.

**DR. CONWAY:** Thanks. Our next speaker is Don Villarejo, no affiliation listed, speaking about occupational health and safety of U.S.

hired farm workers.

**MR. VILLAREJO:** Perhaps the most important change in U.S. agriculture during the past 30 years is the dramatic increase in the importance of labor-intensive agricultural production and the associated greater reliance on hired workers.

Three major factors account for this greater utilization of hired workers. First, there's been a steady increase in the proportion of U.S. crop farm cash receipts derived from the sale of fruits and nuts, vegetables, nursery and greenhouse products. In 1974 that total was about 17 percent of total crop farm sales. By 2002 that share had more than doubled, and is now 40 percent.

Second, increased farm size often requires supplementing farmer and family labor with hired workers. Among fruit and vegetable producers there has been a dramatic increase in size concentration in recent years, and correspondingly a greater reliance on hired labor.

Third, the labor supplied by hired workers on U.S. farms today probably now exceeds the labor

input of farmers and unpaid family members. The 2000 U.S. Census of Population indicates that just 587,000 persons said their occupation was farmer or rancher, down from roughly 830,000 ten years earlier. In contrast, the number of persons reported in the census of agriculture working 150 days or more directly for farmers -- these are regular hired workers -- was reported to be 928,000 in 2002. That's up from about 700,000 25 years earlier. Of course the latter figure does not include the one million or more short-term or temporary hired farm workers who labor on U.S. farms. What do we know about this population? First, most U.S. hired farm workers are characterized by low socioeconomic status, long associated with adverse health outcomes. The National Agricultural Workers Survey of the U.S. Department of Labor finds that the typical hired crop farm laborer today is a young, low-income, foreign-born, mostly Mexican male with low educational attainment and who has only recently migrated to the United States. In California the most significant development in the farm labor market is the sharply increased

flow of indigenous migrants from the southern Mexican states of Chiapas, Oaxaca, Guerrero, Puebla and Veracruz. Approximately 20 percent of California farm workers today are believed to be indigenous migrants. Many speak only their indigenous language, not Spanish, not English, languages that very often doesn't even have a written form.

The seriousness of farm labor occupational hazards was underscored in California during the past summer when a statewide attention was directed to multiple deaths among workers who suffered heat illness while hurrying to pick crops in the San Joaquin Valley. My belief is, and this underscores something that Bill Krycia said earlier, that there is persuasive evidence that vigorous enforcement of occupational safety laws can reduce workplace injuries and illnesses throughout industry.

An economic -- an econometric multi-varied analysis of non-cumulative injury, Workers Compensation claim frequency for all industries in California conducted by the Workers Compensation Insurance Rating Bureau, showed that Cal-OSHA enforcement and education was the

single largest factor contributing to reductions in paid claims. But unfortunately there's been relatively little progress in the recent past among hired farm workers. In particular, the number of fatalities on California farms among hired workers in the ten-year period 1988 to 1998 was 442, an average of 40 fatalities per year, and that rate has not decreased subsequently.

I believe that hired farmers are a special population based on the unique demographic features, the lack of access to care, the lack of health insurance, the high rate of occupational injury, and the poverty status. A major factor of course is the extent of poverty in this group. This has its impact in different ways, including lack of access to healthcare, limited nutritional choices, decrease in preventive health services, dental/vision care, vaccinations, and poor housing conditions.

If we're going to understand the pattern of disease and illness in this population, we can't only look just at the occupational exposure. So here's my recommendations.

One, I think we need to support prospective cohort studies of this population that includes workplace and living condition exposures, as well as acculturation and risk behaviors.
Second, I think we need to insist that future cross-sectional studies in this population should include comprehensive physical exams. We are seeing a pattern of infectious disease, tapeworm, tuberculosis, and other illnesses endemic in the sending countries now appearing in our state.
Third, NIOSH should add a periodic occupational health supplement to the National Agricultural Workers Survey, perhaps every three or four years, and take advantage of the wonderful work that that organization has done.
And fourth, and this I'll end on, NIOSH should immediately provide public access to raw data files already collected, such as the 1999 Occupational Health Supplement to the NAWS, subject of course to privacy protection, as is the standard practice in the Census Bureau's PUMS files and the NAWS has recently put on the web all of the raw to data files for the past ten years.  Thank you very much.

**DR. CONWAY:** Thank you, sir. Our next speaker is Richard Dressler from the Association of Equipment Manufacturers speaking about agriculture and forestry.

**DR. DRESSLER:** Good afternoon, everybody. My name is Dick Dressler, and I'm speaking to you on behalf of AEM, the Association of Equipment Manufacturers. We appreciate the opportunity to speak today on agriculture and forestry, and will briefly highlight some of the recommended -- recommendations we have for the agenda.

AEM is a nonprofit manufacturers trade association, headquarters in Milwaukee, Wisconsin. We also have offices in Washington, D.C.; Ottawa, Canada and Beijing, China. AEM serves the agricultural, forestry, construction, mining, and utility equipment sectors. We have over 700 corporate members with 375 original equipment manufacturers and the rest suppliers of goods and services for the industry.

Agriculture, as you've heard today, ranks among the most hazardous industries. In addition to adults, children and teenagers are regularly performing work on many family farms and are

exposed to potential illnesses and injuries. NIOSH currently supports research and prevention programs, but more can be done. The following topics are recommended for the NIOSH agenda. One, high productivity equipment. Ag equipment working and traveling at higher speeds requires special consideration for steering, braking, hitching, lighting, marking, and training the operator.

Two, global positioning and other automated systems. Automated functions allow machines to perform complicated tasks with minimal or no operator assistance. Unexpected movements or occurrences must be addressed in the operator's training and re-training.

PTL, drive lines and other hazards. Guarding and warning for preventions of entanglement, crushing, or cutting industries have improved dramatically over the last 20 years. They must continue to be evaluated and tested for safety, functionality, and comprehension.

And as we talked before, training. NIOSH needs to identify the most effective means for operator and technician training. Examples could be classroom, web-based, or interactive

training. Consideration also needs to be made for the non-English-speaking individuals.

Operator visibility studies. NIOSH has supported visibility studies for the construction and mining equipment sectors. This should also be done for ag equipment. Run-over, backing injuries and fatalities continue to plague the ag industry. Closed circuit monitoring is available. A human factor study needs to be done in an ag environment.

Public acceptance requiring cultural changes. The public must be educated to accept that ag equipment manufactured in recent years, probably since the mid-1980s, is inherently safe. It should be investigated whether further reduction of injuries and fatalities may require cultural changes in addition to improved standards.

NIOSH should also become an advocate encouraging OSHA to have -- to base their regulations on modern standards rather than developed in the '60s and '70s. An example is the reinstatement of the Roll-over Protective Structure Standard.

Finally, research is suggested to study the benefits and risk of injecting manure into the soil to minimize run-off and contamination. This should be compared to the common practice today of spreading. The process may be regulated by the EPA, but we do not believe there is sufficient data available to make an informed regulatory decision.

Forestry is another hazardous -- hazardous industry and there's clearly a need to prioritize efforts intended to make this occupation less dangerous. Forestry per man-hour worked in many states is the most hazardous industry.

The following two topics are recommended for the NIOSH agenda. One, fire prevention. The Society of Automotive Engineers is currently working with the insurance industry to prepare an informational report on fire prevention practices. Collaborative research with NIOSH in validating these practices would be a worthwhile effort. A specific area of study is the total loss of machines resulting from the misuse of forestry and construction equipment in firefighting applications.

Two, operator protection. Forestry equipment generally provides excellent protection, but some conditions are more challenging to the manufacturer than others. Topics for investigation could be (a) additional protection from falling objects; (b) durability of polycarbonate window material that may be bullet proof, but it may react differently to a heavier mass, lower speed object; (c) effectiveness of add-on roll-over protective structures on forestry conversions; and (d) safety research for ground personnel, such as fellers, choker setters, and even truck drivers.

There are other research topics but these are some of the higher priority issues we believe should be placed on the NIOSH agenda. Thank you for your time and the opportunity to speak.

**DR. CONWAY:** Thank you. We're off our printed docket but we have three more scheduled speakers. The first didn't have an opportunity to speak this morning, so this is not, strictly speaking, ag. Susan Wilborn from Washington State Nurses Association, also has an affiliation with WHO, speaking on healthcare

sector chemical exposure.

**UNIDENTIFIED:** (Off microphone) (Unintelligible)

**DR. CONWAY:** Pardon me? Okay, well, presumably we'll get written input from her for the docket.

Our next speaker then is Charlotte Halverson -- I'm having a little trouble with handwriting here; I don't remember who wrote this -- with (unintelligible) Mercy Medical Center speaking about agricultural safety. I hope I didn't maul your name too badly by misreading.

**MS. HALVERSON:** Everybody does. You did wonderfully.

**DR. CONWAY:** Thank you.

**MS. HALVERSON:** Thank you very much for the opportunity to make just a couple of comments on behalf of some of the folks that I work with. My name is Charlotte Halverson. I am from eastern Iowa. I am employed by Mercy Medical Center. We have a rural health service through that hospital. Half of my time is contracted to the National Safety Council where I work with the National Education Center for Agricultural Safety. My background is

occupation health nursing, and I have done a focus study on agriculture, so sometimes I have to look at my name tag to tell you where I'm working today.

I really, really want to commend NIOSH and NORA and most of you here for your emphasis on the importance of collaborative efforts. None of us have a lot of time and a lot of money, and so all these things are precious to us. I think collaborative efforts are going to be especially effective in a lot of areas, and we need to be working very closely with researchers in university centers and NIOSH centers -- the importance of having the media involved in a lot of what do. Looking at those collaborators that we don't oftentimes think about, such as the community -- community colleges, working with producer groups; involving rural practitioners in not only looking at what are the issues to be researched, but in getting the word out when we do have the materials.

I very much represent the P in the R2P. As an occupational health nurse, I spend a tremendous amount of time with farmers, with farm

families, with very young workers, and very much the older working population.

There are some issues that I think that we have a particular interest in and see a need for research time and dollars, and we have hardly scratched the surface on some of the issues around respiratory -- chronic respiratory issues. I have, believe it or not, driven down the highway and seen farmers with their oxygen tanks driving the tractors -- you know where I'm coming from.

Hearing conservation -- hearing loss is being seen in our clinics at a younger and younger age.

Women in agriculture -- I think this is an important issue because more and more women are very directly involved with agriculture, and in the actual work, not just the book work.

Mental health and stress issues in agriculture -- this is just huge. And I want to reiterate what Chip Petrea talked about, particularly the physiological issues in the older adult population. We have older adults working longer and working harder.

Those of us that are nurses in agriculture --

and I am actually representing the Agrisafe Network. We are a group of occupational health nurses with a focus in agriculture, and that's where we are trying to devote most of our time. But we have really seen that there is a need for agricultural focus in the occupational health programs and in the community health portion of nursing and medical training.

Now that being said, I know that the schedules are extremely tight. There is no room for any additional information to be put into these programs. But the sad part of it is is the majority of nurses that are working in the agricultural community have less than a bachelor's degree, very oftentimes out of your two-year programs where there is no time to put any community health issues in. So I think we need a challenge for those of us that are in the arena is to look at how can we get information and training to people that are the healthcare providers.

I preceptor some of the master's degree students in the occupational health nursing program for the University of Iowa, and there is a direct -- a definite interest in the

agriculture arena in these people. And they really have a passion and a caring and an interest in working in agricultural health and safety. But we all know that it is definitely not a revenue-producing area. It is very rarely third-party reimbursed, and we need to be looking at how can we integrate this practice into a model that will give us a paycheck.

Providing research information on the continuing education front. NIOSH alerts are a wonderful tool and we have really -- really used them and -- and look forward to them. But I think that these alerts not only alert those of us in the agricultural health and safety industry, but they also can be a way of getting to our colleagues who don't always interact on a day-to-day basis with agricultural workers. So any kind of information that can be disseminated that we can have available to physicians and nurses that don't always see people in the agricultural arena. And my emphasis story on this is I worked with an occupational health physician. I put him into a training program at the University of Iowa

that we took, and he came back and he said Charlotte I've been misdiagnosing. So that's where the value is in the NIOSH dollars that go into the research. Thank you.

**DR. CONWAY:** Our last speaker on the docket, which will be followed by some wrap-up speakers I'll introduce in a moment, is Leslie Hughes, a well-known colleague from the North Pacific Fishing Vessel Owners Association speaking about commercial fishing safety.

**MS. HUGHES:** I want to thank NIOSH for the opportunity to participate in this forum. I -- I've learned a lot today, and I wish there was a little bit more time. But hopefully as a follow-up we can look together at some of the commonalities between the ag and the -- particularly processing industry for -- in our fishing sector.

I am Leslie Hughes. I'm the executive director of the North Pacific Fishing Vessel Owners Association better known as NPFVOA Vessel Safety Program, and this program was started 20 years ago. I've worked in the commercial fishing industry for 31 years, but with the safety program for 20. And it's

been an amazing program where we've seen huge improvements, but some of the comments that have been made today about disconnects are a constant challenge with trying to get a culture to understand that they are at enormous risk. The fishing industry is regarded as typically the most dangerous occupation in the United States.

So I think we've been very effective as an organization because we're nonprofit, we're totally dedicated to safety education and training, but we have a membership base. We're not exclusive to our members, but it gives us a population that we continually communicate with and they communicate with us. And they will come to us, for instance, if they have say a pneumonia incident where their people are exposed. They'll come to us and say we've just discovered we need training. So I think we're in excellent forum for collaborating with NIOSH, and we've appreciated the opportunities where we've been able to do that, because we have the trust of an industry over many, many years, and so we're just very unique. There's

nothing like anywhere in the country, and there's actually nothing like us in the world. The International Labor Organization had me come up to Geneva because they couldn't figure out how fishermen would do anything on a voluntary basis.

So some of the things where I think NIOSH has -- could work further to have the kinds of positive impacts they've had already -- and for the shortness of time I'm not going to identify what some of those were but we would like to see them continued. And some new projects that you might consider would be having some assessment of some of the things that the Coast Guard, which is the agency that has the predominant authority over fishing industry, but to look to see where some of their interventions have been really effective. And recently the District 13 and District 17 -- which is Alaska, Washington, Oregon -- Coast Guard has had some real hands-on interventions. It would be interesting to look and see how that compares to dockside exams and some other things they've done.

Also we see that 30 percent of our fatalities are caused by man-overboard incidents. NIOSH in 1997 did some initial work in that, but I think we really need something much more in-depth and stronger, and we would very much like to participate with you in working on that.

We are seeing an increase of foreign population in the workers that we're hiring. Many are third world countries, and there's a lot of concern about how an epidemic that would break out on a boat in the kind of conditions Eric Blumhagen described to you, how you would deal with that. Would you quarantine the vessel? You would have very limited means of quarantining people as individuals. So I think that's something that there -- could be very, very helpful in the future.

And I would say that the comments that have been made about being able to communicate with an industry is totally critical and industry participation is critical. If you don't involve industry, I don't think you'll ever hit the mark. It's industry that knows

where the problems are. If you can identify a risk, then they will work with you to try to mitigate it because no one in our industry wants to have people killed or maimed. And I think that's how you get the buy-in, and the work that you've done in the past has been very much appreciated because you've had the respect for the workers that you're addressing. And again, I thank you.

**DR. CONWAY:** Thanks, Leslie. Deb Reed, apparently one other person has requested speaking.

**UNIDENTIFIED:** (Off microphone) (Unintelligible)

**DR. CONWAY:** Not on ours, but I don't see a problem. Do you want to say something?

**MS. REED:** (Off microphone) Sure. (Unintelligible)

**DR. CONWAY:** Well, it's -- we don't mean to conscript you. Is it -- is it correct?

**MS. REED:** (Off microphone) (Unintelligible)

**DR. CONWAY:** Do you want to?

**MS. REED:** (Off microphone) (Unintelligible). (On microphone) It won't take me long at all, but it's late in the afternoon and we all

need to hear the wrap-up. It's been a very interesting session, so thank you very much for this opportunity.

My name is Deborah Reed. I'm from the University of Kentucky College of Nursing and the Southeast Center for Agricultural Health. Although I'm here as an occupational health researcher, I really come from a long line of farmers. My sisters, ages 73 and 71, are still full-time farmers in the fields every day. My brother, age 60, just retired from a career at Lexmark to take over the family farm. They're worried sick about their future. And as Forrest Gump would say, that's all I got to say about that. Except that I echo what Chip said earlier about issues of aging farmers.

And I would tell you, though, that young people on a farm are worried sick, too. A child psychiatrist told me at the University of Kentucky Children's Hospital -- seeing an increasing number of farm children. And one example the physician said the teenage girl felt that she would quit eating because she felt if her dad had one less mouth to feed

perhaps he could hang onto the farm. In my own experience conducting research in high school agricultural classrooms, I've overheard countless stories by teenagers who use extremely, extremely risky behaviors to deal with their stress, particularly on weekends.

While all of the topics covered today are worthy and salient to the health and safety of agricultural workers, I feel there's a basic risk to health that has not been mentioned very much this afternoon. The person is really more than an entity that bleeds and breaks. The many cascading pressures faced by farmers today -- competition in global markets, the disappearance of their family-based industry, rapidly advancing and expensive technology, and a marked shift in the labor force -- creates stress and psychological strain on farm families that is absolutely enormous. Research is needed to identify precipitating factors and the effects of this stress, not only in the workplace but within the families that work together. There is limited, albeit

very limited, evidence that supports the negative health effects experienced by children in struggling farm households. There is documentation of the direct link between stress and injury. We need epidemiologic studies to examine this issue and to develop research-based strategies that can help children and families deal with the increasing stress in agriculture and related work.

We've had this in the past with adults. We've looked at it with the adults. But let's not forget that family farms are made up of children, too. Thank you.

**DR. CONWAY:** Thank you, ma'am. So we're going to go to our wrap-up in two minutes, so what we have time to do stand up and stretch while we huddle very quickly with our wrap-up folks, or it's time for an emergency bio-break, so -- but two minutes.

(Whereupon, a recess was taken from 4:45 p.m. to 4:47 p.m.)

**DR. CONWAY:** We don't have any more attrition, we're staying on our two-minute thing, we have two -- two colleagues who have agreed to

take on the yeomanly and often thankless task of summarizing the high points that they've heard during the day. They've been laboring taking notes all day I've seen here. The first, providing a synopsis of the child and childhood-related issues is Dr. Barbara Lee, who is Director of the National Children's Center for Rural Agricultural Health and Safety affiliated with the Marshfield Clinic in Wisconsin. Dr. Lee.

**DR. LEE:** Thank you, George, and thank you all for sticking around. I want to again just follow up with some of the comments that were made here and start out by saying that for those of you who have been involved in this, you know that NIOSH assumed and accepted leadership of the Childhood Agricultural Initiative back in 1996 with a specific action plan that had been developed by a committee of people from around the country. So we commend NIOSH for doing a fabulous job of taking that on because that was an area that other federal agencies thought maybe they should get involved, but it was falling through the cracks of many places, so NIOSH

took the lead and they've done a nice job. And as somebody pointed out earlier, we have some successes. In fact, we have verifiable numbers from the NIOSH injury surveillance of children in agriculture that the number -- overall numbers of injuries have dropped and the rates have dropped -- about 3.1 percent I think was the last three-year trend -- in the actual rate of injuries to children. So these are good important things that we have learned through this NIOSH-funded surveillance.

It still is an important issue, though, because while the numbers are not great in terms of kids being injured on farms when you compare it with transportation or recreational or sports injuries, we still look at this as an occupation which is a shame to say this many children are working and are injured and killed because, in terms of occupational injuries, it still stands out as a real sore issue.

What we learned from the surveillance, though, also is that more than half of the children who are injured and killed on farms are not

working. So that creates a whole different set of issues in terms of occupational safety and approaches for us.

When we -- what we heard today were a number of cross-cutting issues that affect both children and adults. And a lot of things affect adult decision-making about what children do on the farms. And issues such as ATVs, about communication, risk communication, partnerships to get messages across, the whole research to practice or applied research principles really cross over with the children's initiative.

And then the whole issue of pregnant women and what are the long-term effects of pregnant women and subsequent effects of them working in agriculture.

But just to -- to take a quick look at what I saw coming out, if we look at the children who live and work on farms, on family farms, what we're hearing is that a lot of the interventions out there are being funded by agribusiness, corporate America. In fact, two of the organizations that spoke today actually receive more than $2 million a year

of corporate sponsorship for their programs. And what they're saying is we want to hear from NIOSH. We want NIOSH to do the evaluation and research so that we take that money, that $2 million, and use it most effectively. I think that's really a cool partnership between NIOSH and industry and then using the non-government organizations and extension to deliver those programs that have been tested to be effective in reducing injuries, reducing exposures for kids who are living and working primarily on family farms. The other piece that we heard was the growing number of young people, whether emancipated minors or they're the local teens who are working in agriculture -- many times it's the short-term employment. And we heard from the employers we want to do something for these people, but tell us what we should be doing. Tell us how to help the employers provide safe working conditions for these teen workers and how do we find the right match between the young worker and a safe working environment so that they're assigned to the right types of work.

And then how do we also provide support to the clinicians who are taking care of these young people who are coming in, either as preventive services or occupational services, and help them provide the training.

So these are just some of the key themes that we heard some really great messages throughout the day, and we look forward to seeing how you synthesize the results. But overall I want to thank all of you for providing comments, especially for those of you who took the time to speak about the children's issues. And we thank NIOSH again for your continued leadership in this really important area. Thanks. And I'll hand it over to Rich Fenske, who's been our primary host for the day.

**DR. FENSKE:** Thanks to all of you who are still here, and I hope you enjoyed a number of these things. I certainly learned some things today. I want to take care of one detail before I close out. Don Villarejo didn't talk about his affiliation. Don, are you still here? He's gone. I just want to -- since Don didn't mention his affiliation, I

just wanted to let you know what it was. He's retired, and he's happy about it, too, I'll tell you.

What I heard today -- I'm not going to go through the details of the types of injuries or illnesses that we're concerned with; those were I think done very well by our speakers. But all I'm really going to say is that I found that there was a kind of a widespread endorsement of the research to practice theme that NIOSH has articulated and is trying to push right now.

I also agree that the original research to practice is the cooperative extension; no doubt about it. So there's a good model for us, and I think that Dee's suggestions are well taken.

I guess the question is -- there is extension, but how else are we going to take research to practice? And a couple of things that I heard in attempting to answer that question. One is, especially for those of us out here in the west where we're dealing with the hired farm worker, we don't even know how many people there are. We heard calls for

enumeration. How do you get incidence rates and know that you've reduced them if you can't even get the denominator? This is a really serious problem. I don't -- I don't have any quick solutions because of the nature of the workforce as we've heard. I'm not going to repeat all that, but if we're going to document the effectiveness of interventions and practice, we're going have to have their basic demographic data. And the NAWS program, the National Agricultural Workers Survey that Don talked about, almost went out of business this year. I wrote a letter and a lot of other people wrote letters to the Department of Labor saving that program. Fortunately, it was saved at least for a year, but given the budget situation in Washington, D.C., I certainly hope we can not only hang onto that but amplify that kind of documentation.

Another way of doing research to practice is through partnerships, and we heard a variety of people use that work and talk about collaborative efforts. And there's no doubt about that, I think this is the way to go.

I'm not going to elaborate all the possible partnerships we have. People have already done that. But let's all try to make an effort to do that.

And the last thing I'd say is, as part of R2P, we'd like to talk now about translation. In fact we talk about translational research and translation of science. We heard about that from a number of people, and one thing we discovered -- if we didn't know it already -- is we don't speak the same language; that those of us in science have to come to understand how best to communicate. I've worked in the risk communication field for a while, and there's no doubt that the only effective risk communication is a two-way dialogue. So I hope we don't repeat some of the errors of the past where as scientists we decide that our job is, in translation, is to explain to people what the real facts are, and kind of leave it at that. We really need to back-translate, find out if what we're saying even makes sense to people. And we also need to understand the differences in basic values and perceptions that underlie

what we're saying so that we can communicate effectively.

We want measurable results. I agree that --we heard that and I think that that's -- that's what we can build on. We also heard about precaution, though. There's a lot of uncertainty in some of the science that we do, particularly -- I don't know how many speakers talked about chemical exposures and concerns that actually are hard to study and get measurable results when we're talking about effects on the fetus, when we're talking about early childhood development, low-level exposures, these kind of things. The question then is how precautionary should we be? That theme was raised as well, and I think that's one to keep in mind.

And with that I'm going to close, give the floor back to George.

**DR. CONWAY:** Thanks, Richard. Well, we're almost done for the day. I'm going to turn things over to Dr. Max Lum who's our Associate Director for Health Communications and Global Coordination. Did I get it right? And I want to thank Richard for being such a

great host.

Before Max speaks, I want to acknowledge Max for organizing -- taking the lead in organizing these -- is it 13 meetings?

**DR. LUM:** Just a -- just one minute here, and that is the man with the shovel has been bothering me all day. But now that I look at him, I think we're going to -- that's us. We have a lot to shovel, I think, to move this -- seriously -- to practice. All of us have to get down. We want to get to the product, but we're going to be doing a lot of shoveling. I mean there's no question about it. And I think the -- the excitement that I have about doing these town hall meetings is that we're hearing that we have partners who are willing to do the shoveling with us, and that is most exciting.

And in closing I just want to recognize Rich. I mean this is a lot of work, and both the ERC and Rich's group have really put in the effort. I mean beyond what we expected when we started this. We greatly appreciate that, and Marcie, just stand up a minute. You know there's always one person -- that one person

you know that you've got to get it right -- or she's the one that says well, now wait a minute, you know, and that's -- that's -- that's been very helpful.

And on my staff, Christy Bowles please stand up. Christy's -- hasn't been with us actually that long, but has the paper cuts to prove that has been stuffing a lot of envelopes and doing a lot of real scut work in our office, and it's been greatly appreciated.

But there are a lot of people that should be thanked. I'm sure I'm missing folks really who have put a lot of effort in this -- in the -- in the town hall. The tough work is to be done is to put the synthesis together, to put the partnerships together for the next ten years, and to make the difference for all of us and for workers and their families.

Thank you very much for coming, but thank you for staying. That's also very important.

**ADJOURN**

**SID SODERHOLM, NIOSH**

**DR. SODERHOLM:** So thank you for coming. Keep involved. Sign up for e-news. Volunteer for

the research councils. Keep involved with the process. NORA is going to be around for at least another ten years, and we need each of you involved. So contact me if you have any questions or issues, and drive safely.

(Whereupon, the meeting was adjourned at 5:00 p.m.)

**CERTIFICATE OF COURT REPORTER**

**STATE OF GEORGIA**

**COUNTY OF FULTON**

I, Steven Ray Green, Certified Merit Court Reporter, do hereby certify that I reported the above and foregoing on the day of January 17, 2006; and it is a true and accurate transcript of the testimony captioned herein.

I further certify that I am neither kin nor counsel to any of the parties herein, nor have any interest in the cause named herein.

WITNESS my hand and official seal this the 28th day of February, 2006.

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**STEVEN RAY GREEN, CCR**

**CERTIFIED MERIT COURT REPORTER**

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