

**NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
BOARD OF SCIENTIFIC COUNSELORS (BSC)
September 27, 2018**

**THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION**

**NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
BOARD OF SCIENTIFIC COUNSELORS (BSC)**

SEVENTY-FIRST MEETING

BOARD OF SCIENTIFIC COUNSELORS

(BSC) MEETING

September 27, 2018

The verbatim transcript of the
Meeting of the Board of Scientific Counselors

Meeting held on September

27, 2018, 8:30 a.m.

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PARTICIPANTS

(alphabetically)

KARLA ARMENTI, ScD - BOARD MEMBER
KYLE ARNONE - BOARD MEMBER
MICHAEL BEHM, PhD - BOARD MEMBER
TERRY BUNN, PhD – CHAIR, NIOSH BSC
SHARON COOPER, MD - BOARD MEMBER
THEODORE COURTNEY - BOARD MEMBER
MARY DOYLE - BOARD MEMBER
ALBERTO GARCIA - DESIGNATED FEDERAL OFFICIAL
JOHN HOWARD, MD – NIOSH DIRECTOR
MARGARET KITT, RADM, PhD – NIOSH DEPUTY DIRECTOR
CHRIS LASZCZ-DAVIS - BOARD MEMBER
GRACE LEMASTERS, PhD - BOARD MEMBER
JUDITH MCKENZIE, PhD - BOARD MEMBER
MARK NICAS, PhD - BOARD MEMBER
CHARLES REDINGER, PhD - BOARD MEMBER
MARC SCHENKER, MD - BOARD MEMBER
RONALD STOUT, MD - BOARD MEMBER

PAULINE BENJAMIN
DR. TERRI SCHNORR
DR. LAURALYNN T. MCKERNAN
DR. ANN BERRY
MARYANN GARRAHAN
LORE JACKSON-LEE
ED JOHNSON
DR. PAUL MIDDENDORF
DR. MARYANN D’ALESSANDRO
ANGELA MORLEY
DR. RENE PANA-CRYAN
DR. JOHN PIACENTINO
DR. PAUL SHULTE
JANICE SCOTT-BLANTON

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WELCOME AND INTRODUCTION, MEETING LOGISTICS

- MR. GARCIA: Good morning and welcome to Washington DC once more. I want to express a thank you to all the staff that typically makes these meetings possible for us. There is a lot of work that happens behind the curtains and I want to thank everyone that makes this possible. The first issue that I want to address is emergency exits. If we were to have an emergency exit, we can go behind the glass doors. We'll go out and around the patio and we'll congregate on the back—we'll go down the street, what's the name of the street?
- DR. MIDDENDORF: There's Third Street. We're on Fourth Street and D.
- MR. GARCIA: So then we'll make a right when we exit the building, we'll go down towards 4th street heading to the Hyatt Hotel and make a left, and then we'll congregate at the park that is a couple of blocks down the street.
- We want to remind you that this is a Federal Advisory Committee and we need to conduct the meetings based on the FACA regulations. So when we do the roll call, we're going to, I'm going to ask you guys if you have any conflict of interest regarding the topics that we're discussing today and if you do so, then you voice it out at that time,
- For the fourth time, we're recording the meetings, so all that we say in the meetings is actually transcribed. So we used to do minutes back in the day and now we do transcription service, so everything that we say is transcribed verbatim. And then, so to calibrate that they know who's speaking, if you don't mind, before you make a comment or something, if you don't mind saying your name and then your comment so they know that it's you speaking.
- And I guess with that, we'll go ahead and do the roll call. I think that we're going to have two members on the phone, Sharon Cooper and Charles Redinger, and so we'll start with the roll call then and I don't know if we should go around the table or I should just say the names but why don't we go around the table and we'll start with Dr. Armenti.
- DR. ARMENTI: Okay, Karla Armenti and I don't have any conflicts.
- DR. NICAS: I'm Mark Nicas, I don't have any conflicts.
- DR. MCKENZIE: Judith McKenzie, no conflicts.
- DR. BEHM: Mike Behm, no conflicts.
- MS. LASZCZ-DAVIS: Chris Laszcz-Davis, no conflicts.
- DR. SCHENKER: Marc Schenker, no conflicts.
- DR. BUNN: Terry Bunn, no conflicts.
- MR. ARNONE: Kyle Arnone.
- DR. HOWARD: John Howard.
- MR. ARNONE: Kyle Arnone, no conflicts.
- MS. DOYLE: Mary Doyle, no conflicts.
- DR. STOUT: Ron Stout, no conflicts.
- DR. LEMASTERS: Grace LeMasters, no conflicts.

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MR. COURTNEY: Ted Courtney, no conflicts.
MR. GARCIA: Let's see, do we have Sharon on the phone?
DR. COOPER: Yes, this is Sharon Cooper, no conflicts.
MR. GARCIA: And do we have Charles on the phone?
DR. REDINGER: Yes, Charles Redinger, no conflicts.
MR. GARCIA: All right, so we have one, two, three, four, five, six, seven, eight, nine, ten, eleven, twelve, thirteen, so we have fourteen. A quorum is nine for the meeting so we're good to go.
I don't think that we have any public comments signed in, but we have received a letter that we have printed on your packet, so that was submitted to us as a public comment, and I guess we'll talk about that a little later.
I don't know if you, Dr. Howard, Dr. Kitt, want to say anything?
DR. HOWARD: No, it's not my turn.
MR. GARCIA: Before we open the meeting, but I'll turn it up to Terry Bunn.

AGENDA, ANNOUNCEMENTS, AND APPROVAL OF MINUTES

DR. BUNN: Well, I just wanted to welcome everyone here to Washington for the NIOSH Board of Scientific Counselors meeting and hope everyone had a good trip in. We do have, I believe, four new members on the Board right now. One, I'll just say right away, Steven Lerman is out of the country so he was not able to participate in this first meeting, but for our other three new members—Kyle Arnone, Mary Doyle and Marc Schenker—if you could just tell us a little bit about yourselves, start with you, Kyle.
MR. ARNONE: Sure. It's a pleasure to be here. I don't really know that I'm an occupational safety and health expert so much as a knowledgeable intermediary. So I run the Collective Bargaining Division at the American Federation of Teachers and we represent teachers and hospital-based nurses, and so I help negotiate a lot of contract language and implement workplace violence prevention programs and deal with teachers' stress on a daily basis all across the country.
DR. BUNN: Welcome. Very nice to have that expertise, you know, with boots on the ground, so.
MS. DOYLE: Hi, I'm Mary Doyle and I'm the Deputy Director of the Johns Hopkins ERC, which is funded by NIOSH. My background is occupational health nursing. I have about 14 years' clinical experience and I ran my own consulting business and then I went back to Hopkins to run their CE program and now I'm Deputy Director.
DR. BUNN: Welcome.
MS. DOYLE: Thank you.
DR. BUNN: And Dr. Schenker.
DR. SCHENKER: Hi, I'm Marc Schenker, I'm Distinguished Professor Emeritus, University of California at Davis. I am honored to be a part of this Board, having worked with NIOSH and been funded by NIOSH for three decades basically; one of the founding directors of the original Agricultural Health and Safety Centers at UC

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Davis. My background is in pulmonary medicine and occupational medicine, and my research began there and has become more eclectic, looking at changing occupational hazards in the workplace and a range of exposures, and then in the last decade, focusing on immigrant workers and the unique hazards that immigrant workers face in the workplace and addressing those.

DR. BUNN: Very timely topic. Well, welcome. I do want to make sure, as far as the two board members on the line, can you hear us all well in the room?

DR. HOWARD: Maybe not.

DR. REDINGER: This is Charles. It sounds really good, clear on my end.

DR. BUNN: Okay, all right. Wonderful. Well, we have a very exciting agenda today. We have three great presentations that are coming up. I do believe the format has changed today, Dr. Howard, in that typically we have four presentations but now we're going to be having three...

DR. HOWARD: Right.

DR. BUNN: Which allows for more discussion.

DR. HOWARD: Well, it allows for more discussion and also, people have planes to catch in the afternoon sometimes and so we begin to thin out about two o'clock, and so we decided to reduce the number and then have more time for actual discussion because that's why we'd like you guys here is to hear that, because we hear ourselves all the time. So it's great to have that. And with four, it was felt a little rushed and then people had to jump out and go to the airport. So we're hopefully, at 2:30, people will be able to get to the airport on time.

DR. BUNN: Okay. All right, great. Well, I guess the first item of business is to look at the minutes. They should all have been included in your briefing packets. I just wanted to know if there are any additions or corrections to the meeting from May 15. No?

PARTICIPANT: Seeing that they're transcribed, it's not something we can make an opinion on.

PARTICIPANT: Right.

DR. HOWARD: I didn't really say that.

DR. BUNN: Any additions or corrections from the members on the phone to be mentioned?

DR. REDINGER: This is Charles. Not here, none for me.

DR. BUNN: Okay, can I have a motion to approve?

PARTICIPANT: I so move.

PARTICIPANT: Second.

DR. BUNN: All right. All right, so duly moved. All right, so, oh, I guess the next thing is, is I typically, in these meetings, we ask if anyone has anyone announcements that they would like to make. Anyone have any announcements? This is a quiet group this morning.

PARTICIPANT: We're not awake yet.

PARTICIPANT: We're warming up.

DR. BUNN: Okay, well, I guess we'll move right then to Director Howard's opening remarks.

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DIRECTOR'S OPENING REMARKS

DR. HOWARD: Great, and first of all, I want to thank you, Terry, for agreeing to chair because we're changing chairs, as you know. Bonnie Rogers finished her term. And so we're delighted that you're able to take up the gavel.
And I thought one of the things we might do before I start talking is just go round the room so everybody knows who is actually in the room that is not on the committee.

DR. BUNN: Oh, thank you.

DR. HOWARD: So Pauline, do you want to start?

MS. BENJAMIN: Put me on the spot, Dr. Howard. Hi, I'm Pauline Benjamin and I think everyone knows me. I coordinate your travel and just any problems that you have, I'm your go-to person. So hello.

DR. PANA-CRYAN: Good morning.

DR. HOWARD: See if that mic has an on button.

DR. PANA-CRYAN: I don't think I need the mic.

DR. HOWARD: No, you don't.

DR. PANA-CRYAN: Okay. I'm Rene Pana-Cryan and I'm Director of Economic Research and Support Office and I'm also co-managed our new cross-sector Healthy Work Design and Wellbeing.

DR. HOWARD: Apparently you do need the mic because otherwise it doesn't pick up on his recording device, so you don't have to repeat it...

DR. PANA-CRYAN: Thank you.

DR. HOWARD: But we'll just leave you absent for now and Alberto will get the mic and we'll go over there. See if that has an on button on it because I didn't really hear any amplification.

DR. PANA-CRYAN: It does...it's on.

DR. HOWARD: It does?

MS. JACKSON-LEE: How about that? Is that coming through?

DR. HOWARD: It does work.

MS. JACKSON-LEE: Hi, I'm Lore Jackson-Lee, I'm the Associate Director for Policy, Planning and Evaluation.

MS. GARRAHAN: Good morning, I'm MaryAnn Garrahan and I am a six-month detail to NIOSH from OSHA, and so I'm delighted to be here, and I know I actually recognize some of your names so I look forward to talking to you during break.

MS. MORLEY: Good morning, I'm Angela Morley, I am the chair of the NIOSH Institutional Review Board.

MS. SCOTT-BLANTON: Good morning, I'm Janice Scott-Blanton and I work in the Associate Director for Science office, and I'm your second go-to person.

MR. JOHNSON: Good morning, I'm Ed Johnson, I'm the AV technical support.

DR. PIACENTINO: Good morning, I'm John Piacentino, I'm the Associate Director for Science here at NIOSH.

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DR. HOWARD: So I think that's everybody.

DR. KITT: What about Paul?

DR. HOWARD: I'm sorry, Paul is...

DR. KITT: And me.

DR. MIDDENDORF: Good morning, I'm Paul Middendorf, I'm the Deputy Associate Director for Science for NIOSH.

DR. KITT: Me.

DR. HOWARD: Oh, well, everybody knows you.

DR. KITT: I don't think so. I'm Margaret Kitt, I'm the NIOSH Deputy Director for Program.

DR. HOWARD: And I wanted to thank the gentleman who is doing the audio. You know, as Alberto said, this is a new experiment for us, but we think it's really going to help people who can't come to the meetings actually see what's going on in the meeting. So really appreciate that. It's a little tedious to say, when you start off saying your name and then your comment and it's a little artificial in terms of conversation, but it would really help, it would really help our wonderful transcriber.

So I wanted to also point out, we're delighted that MaryAnn is with us for six months. You know, we had on a regular basis folks from OSHA come over for details, and then there was a period of time when we haven't had that. So we want to thank MaryAnn for being volunteered or volunteering and coming to us, because it really helps us. As you know, we have a very direct relationship with OSHA and it's now wonderful to be able to say, MaryAnn, go ask somebody at OSHA what they think of this. So it's really been very helpful in that regard.

And I want to welcome the new members. Thank you very much for joining us. We really appreciate the time of all of you, traveling here, especially those of you who come from the West Coast. We can't sit the California people together any more, Alberto, because they could plot. They could plot. So a lot of time and effort goes into participation and we really appreciate that, all the advice, opinions, comments that you have. Surprisingly, we actually do take them up on occasion, so don't feel that they're just sort of air. We really appreciate you participating, so thank you very much and again, thank you, Terry, for taking the gavel.

So, I'll start. As you know, for new members, we do a written sort of presentation which we prepare ahead of time, by the various parts of NIOSH. And I don't read all that; that's up to you to read. If you have a question about one of those items then, you know, please bring it up and we can go into it in more detail. I usually just pick out a few things as we go through, because otherwise we'd spend all the time doing that. So I want to thank everybody in NIOSH for contributing to this summary.

The thing that's not in there, because obviously it's very late-breaking, is the budget issue. So this will be a little different this year, although not unprecedented. But starting with FY18, the NIOSH budget was \$335.2 million,

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okay. Now, that does not include the World Trade Center Health Program, which is actually a bigger budget than NIOSH, okay. This is only the regular NIOSH budget, 335.2. Now, in FY19, which starts on, what, Monday? Is Monday the first? Yes.

MR. GARCIA: Sunday, Monday, yes.

DR. HOWARD: Monday.

MR. GARCIA: Monday is the first. That will be the beginning of the federal fiscal year. And this year, it's a little different than previous years because, one, Congress has actually done, I think, five out of the twelve Appropriation Bills, which is a shocker because usually we haven't seen that. That's called regular order. Now, they haven't done all of them, so, but the five that the Senate passed have to do with Department of Labor, Department of Defense, Health and Human Services, the Education Department, military construction, a few smaller kind of things, call it a minibus, you know, as opposed to an omnibus. So a minibus. And the Senate passed that 93-7 last week, which is really quite remarkable, and in that budget, NIOSH budget was 335.2, the same as FY19, with an addition of \$1.1 million. One million of that is for the firefighter registry, which is a new registry that was authorized in a separate bill and now the Appropriations side of the Senate has come back and said okay, we're going to give you a million in FY19 to begin work on the firefighter registry. \$100,000 is for a feasibility study to determine whether or not a mesothelioma tissue bank will be feasible and whether we should go forward with that—we, meaning the government. So then the budget that the Senate, the minibus that the Senate sent to the House, then the total budget was then 336.3, so that's 335.2 plus 1.1. So the House yesterday passed the Senate version after striking down 13 out of 13 amendments that were offered during that process as basically too late. And the House passed the minibus 361-67, and now that minibus goes to the President for his signature, hopefully before midnight on Sunday.

Now, in that same Senate minibus that the House then passed was a phrase, a sentence, a provision that said the remaining part of the government that weren't part of the minibus, which is the seven out of the twelve that don't have Appropriation Bills, that they would receive funding starting October 1 under a continuing resolution, which we're all familiar with, which would go to December 7. Their budget levels would be the same as FY18, okay. So those departments—DHS and Commerce, etc., etc.—would operate under their FY18 until some time on or before December 7 when their Appropriation Bills are passed or they get another continuing resolution.

So, I know it's a little complicated but that's the situation with the budget. So the good news is that if the President signs the minibus then we would have FY19 funding. The more remarkable news, I think, to me at least, is that after now two years of the President's proposed budget proposing a 40% reduction in NIOSH's

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budget, we are still flat, meaning we still have the same budget we had in FY17 and now in '19 we have \$1.1 million more. So I think that's somewhat remarkable given that the proposal is so drastic and the end result is not. So I think, to me, when I sort of think about that, I think about all the great work that our grantees do to produce relevant, impactful research. I think it's all the work that NIOSH does intramurally also that produces relevant and impactful research. And I think those are the stories that people then carry to the appropriators and say look, you know, these people are, this agency is really helping us out. So I think it's a testament to all the work that goes on within the NIOSH community, and I think that community is very large and includes all of our grantees all over the United States, as well as our partners who are in professional societies and other types of entity. So the fact that here, in very difficult budgetary times, where a lot of proposals for a lot of agencies, including ours, are draconian, we're still here. So it's an interesting phenomenon.

So any questions then about the budget for FY19, '18-'19, any? Is that, like, clear as mud or?

DR. STOUT: Ron Stout, question if I could.

DR. HOWARD: Yes.

DR. STOUT: You've been flat for two years. In my world, that implies cuts because you have salary increases, and so what is the actual effect of being flat?

DR. HOWARD: Well, sure. I think that's a very good question, Ron, and it does. You know, flat is of course better than 40%, so everything's relative. But you're right. You know, salary increases, etc. do eat into that. So the percentage probably, if you go to our accountants, would say, you know, we're down 4.5% or something like that. But that overall, again, to me, is more minor than 40% down. Yes.

Yes, Margaret?

DR. KITT: This is Margaret. I think there was also specific language in there that said that NIOSH would not be moving to NIH; that it would be staying with CDC. So that was also some important language that was in there, correct?

DR. HOWARD: Right. It was also in the budget language too. So moving, I just—oh, one more question. Yes, Marc.

DR. SCHENKER: One more question. Marc Schenker. One hears a lot about Study Section and the shrinking budget or the challenge of getting funded. Is there any comment on discretionary funding within the budget for extramural awards?

DR. HOWARD: No. You know, I think the Senate had a plus-up in the ERCs in ag centers of \$4 million, three or four million I believe. So I vaguely remember that. It didn't come out in the end, so that that increase did not happen. So for us in our extramural program, we don't anticipate any major changes in the proportion of funding available.

DR. BUNN: Any other questions?

DR. HOWARD: And then on the issue Margaret raised of moving to NIH, we are moving though.

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The Washington office here, we're leaving the Patriots Plaza Building here and leaving Mr. Mueller behind, and we're going to the Mary Switzer Building, which is an HHS building, a historical building from 1935 which is part of the HHS Southwest Complex. So if you are familiar with the Humphrey Building, the Humford Building, the O'Neill Building, the Switzer Building and the Cohen Building make up what's called the HHS Southwest Complex.

So we're moving back into government space. Our move is scheduled around the Veterans' Day holiday weekend, and the CDC Washington office is remaining here for the time being, and we hope to be able to find a suitable room in the Switzer Building where the Committee can meet also there. So that, our next meeting then probably will be in a different location, so we'll keep everybody posted. It's not that far from here. It's actually closer to Independence Avenue than we are right here, so it's Third and C instead of Fourth and E.

Okay, so you know, we've got some really great presentations today and I don't want to take much time away from that but I did want to mention, just draw your attention to a couple of things that I starred in the materials that you've been provided. On page 3 under the Division of Safety Research, they report a bit about our new Center for Occupational Robotics Research, and one of the milestones that's not there I wanted to mention is that we were invited to participate in a panel on safety of robotics at the RoboBusiness Conference in Silicon Valley this week, and it really is an exciting invitation because it's the first time that they've ever had a safety panel. So it's kind of exciting to be there with 2,500-3,000 folks that come to discuss the business of robotics. So it's kind of exciting. Dawn Castillo, who is the Director of the Division of Safety Research, will be presenting for us in that area.

On page 4, I just wanted to give a little shoutout to one item there under the Education and Information Division, EID, is the proposed recommended exposure limit for silver nanomaterials. As many of you know, silver nanomaterials is probably one of the most common, next to carbon nanotubes and fibers, that are used in nanotechnology. So having a proposed REL for this, again, I think moves the occupational safety and health community closer to the issue of how best to protect workers in the nanotechnology industry. So I wanted to point that out. And I was going to go through all of these and then open it up for questions. Page 5, at the bottom there, there's a little note about the heat app that we have inherited from OSHA that now is co-branded, and we're very delighted that OSHA has asked us to host that app, which is extremely popular, almost as popular as the ladder app.

On page 7, I just wanted to also point out, under the coal workers' pneumoconiosis, I gave you a separate handout that I hope some of you have which is from the current employment survey that BLS does every year—excuse me, every month. And then what's interesting about the mining employment—this

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is mining and logging, mostly it's mining though—you'll see from the terrific decrease in employment in mining, you see the rather remarkable increase in employment over the last number of months here. And the reason I wanted to point it out is because of our work, you know, from the Respiratory Health Division showing the, as is stated here on page 7, showing the increase in black lung disease in certain areas in the United States. And you know, some of these folks that are coming into the mines may be returning workers but many of them may be very new workers to the industry and I think it really increases the urgency that we feel and MSHA feels about how best to protect those workers that are coming in, because we're seeing, as has been reported by the Respiratory Health Division, we're seeing black lung disease and progressive massive fibrosis develop much sooner, in shorter-term employment settings. So I think that the fact that mining employment is increasing I think is a real challenge for us. I'll have some comments about the opioid, introduce Lore, but that's it for just pointing out some issues in the handout that's prepared. So happy to chat.

- MS. LASZCZ-DAVIS: Yes, just a couple of real quick questions. Do we have—Chris Laszcz-Davis, thank you—do we have a formal relationship with the ASSP, as NIOSH? Is there much work between ASSP, the old ASSC, and NIOSH?
- DR. HOWARD: Oh yes.
- MS. LASZCZ-DAVIS: There is?
- DR. HOWARD: There is a lot and we do have several formal engagements.
- MS. LASZCZ-DAVIS: Okay.
- DR. HOWARD: As well as folks who attend, like their Research Committee, and that, that kind of thing.
- MS. LASZCZ-DAVIS: Okay.
- DR. HOWARD: But yes, their Government Affairs Committee comes to visit us, they go to OSHA, they come here. So, and we also participate in many of the—in their national meetings too. So there's lots of, I think probably AIHA and the Safety Engineer, the ASSE or whatever, they're changed now, their name, whatever.
- MS. LASZCZ-DAVIS: ASSP.
- DR. HOWARD: ASSP, whatever, that those probably are the two, and then AECOM, the nurses in terms of practitioner, professional society engagements. I think those are probably the big four.
- PARTICIPANT: And I think Dawn Castillo is our liaison with ASSP. She is our Division Director in the Division of Safety Research, but we have lots of different tentacles out.
- MS. LASZCZ-DAVIS: All right, you know, and the other reason I ask, I'm on ASSE's CoPA Council and I don't know that we're doing anything with NIOSH specifically.
- DR. HOWARD: What's the CoPA Council?
- MS. LASZCZ-DAVIS: It's the Council on Professional Affairs which kind of directs its strategic efforts. But anyways, we can do, we can have an offline conversation.
- DR. HOWARD: They've sent us our strategic plan that they did a while back.

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MS. LASZCZ-DAVIS: Yes.

DR. HOWARD: Which we commented on, and all that. So we may not be actually on the committee but we're aware of their strategic plan. And then the other problem is, you know, we can't be on every committee, you know, so.

MS. LASZCZ-DAVIS: Yes, you know, and the other thing on the mining, what is driving the mining numbers up? Are they...?

DR. HOWARD: Well, that I will not comment on and I will ask our chair to consider having a formal presentation from David Blackley...

MS. LASZCZ-DAVIS: Okay, yes.

DR. HOWARD: David Weissman and other Davids at the Respiratory Health Division.

MS. LASZCZ-DAVIS: All right.

DR. HOWARD: Who would be able to do a full presentation, which they've done for, in many—the American Thoracic Society meetings, for MSHA, etc. I think it would be very exciting to have them come.

MS. LASZCZ-DAVIS: Yes, okay. Okay, thank you.

DR. BUNN: Would everyone be interested in hearing a presentation on the mining...?

PARTICIPANT: Yes.

DR. BUNN: Okay. All right, wonderful. Anything else, Dr. Howard?

DR. HOWARD: Well, no, Ron. Ron.

DR. BUNN: Oh, Ron, sorry. Didn't see your...

DR. STOUT: Dr Howard, you mentioned—that's Ron Stout. Dr. Howard, you mentioned your appreciation for our comments, etc. A question and perhaps it's a placeholder question to be answered more appropriately another time. In my two years here, I really value all the presentations and some of them have really caught my interest. And I think the question I want to ask is is there a formal way that you have of updating the Board on presentations that have been made in the past? You know, we hear a presentation, we're asked questions, we give responses. Now, there are several of them, in the two years I've been with them, I've been personally interested in because of professional or personal interest, and perhaps appropriately or not, I've followed up with the presenters personally and I've gotten great feedback. But on some of these, maybe I'm alone on Council, on some of these things, I would love to have you consider some way of updating us on the status of the project or the questions that we were asked and answered.

DR. HOWARD: Sure, I mean we're happy to do that. Today, we're going to do that when Lore Jackson-Lee presents on our opioid initiative, which we talked about in the last meeting, which was sort of information, and now we have something more mature so we're going to update you all on that. So that's one way that we do that, and then we circle back with issues that people have an interest in. So you know, if you're interested in any particular presentation that we've done in the past that we could update you on, that would be fine.

DR. STOUT: Yes. Assuming it's okay for us to contact presenters directly...

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DR. HOWARD: Sure.

DR. STOUT: It meets my needs but I wasn't sure if that was the best way of doing it.

DR. HOWARD: That's why they do the work they do.

DR. STOUT: Perfect, thank you.

DR. HOWARD: Happy to, happy to have content.

DR. BUNN: Following up on that, if there's something that you think is really impactful that the Board should, you know, would be interested in hearing, that would be a great suggestion for a follow-up presentation on new results or new impact because of the research that has been conducted.

DR. HOWARD: Right. I think that would be very helpful because you know, oftentimes, you know, we sit down and we go okay, here's what we think is interesting or pressing but—and then occasionally, we'll get ideas from you all. So if you have ideas in terms of areas that you would like to see presented then bring them forward and happy to do that.

DR. BUNN: Great.

PARTICIPANT: Thank you for the invitation because I would, with the Firefighters Surveillance Program starting up and gearing up, whenever you think it's an appropriate time, I would love to hear what that is, what it entails, what information is going to be collected, because a number of us hereat the table have done work with firefighters and I think could have some valuable input into the process, so I'm really interested in that.

DR. HOWARD: Well, that's great and we'll put it on the list, and then Terri Schnorr is our lead on that and DSHEFS in Cincinnati will be doing that. They've done firefighter, the cancer study, etc., before, already been published. So we'll ask her when she thinks there's something to present. So those kind of ideas are really helpful to us because...

PARTICIPANT: Earlier rather than later might be good, you know, earlier in the process before it's all tied down.

DR. HOWARD: All done and the registry is done.

PARTICIPANT: Yes, I mean...

DR. BUNN: Maybe helpful, informative evaluation.

PARTICIPANT: Yes, we might have some input on...

DR. HOWARD: Sure, sure.

PARTICIPANT: I know they, I know well their research at NIOSH on firefighters.

DR. BUNN: Mary?

MS. DOYLE: Mary Doyle. I just had a quick question, going back to mining. With this increased employment, is there any shortage of readers.

DR. HOWARD: Oh, that's an interesting question. I do not know. We'll have to—I don't know, we'll have to ask Dr. Weissman.

MS. DOYLE: I just saw the difficulty we've had getting Grade B readers for our surveillance projects.

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PARTICIPANT: I do know that David has been really actively trying to recruit people that are very interested in doing that, especially now that the new ILO standards for digital radiography are being somewhat formally approved with, between us and ILO, and so I think he's really trying to recruit more potential B readers. So if you have people that are interested, I know he'd love to hear from you, so.

MS. DOYLE: Thanks.

DR. BUNN: Yes, I...

DR. REDINGER: This is Charles Redinger, I have a question.

DR. BUNN: Go ahead, Charles.

DR. REDINGER: Terry, can I go?

DR. BUNN: Yes, go ahead.

DR. REDINGER: Yes. Great. This is Charles Redinger and thanks, Dr. Howard, nice overview and again I apologize for not being able to be there today. I have a question, Dr. Howard, on page 5 regarding the risk assessment guidelines document. Dr. Bunn and Dr. Howard, I think that would be a topic potentially for a future meeting, to have an update on the agency's work in that area. But Dr. Howard, specifically about this document, the draft document, are you in a position to give us just a snippet of an update on how things went with that September 13 meeting? And then the second piece I'm curious about is the focus of the document is on chemical risk, which clearly is an important topic, and the curiosity is the extent to which the Agency, through that portal of a document like that and looking at occupational risk assessment, we know that there are risks way beyond just chemicals and hazards beyond chemicals. Is that document (inaudible @ 00:38:35) we're looking more broadly at some of those things like culture, or some people might even say the soft stuff? That's the end of my question, thank you.

DR. HOWARD: Okay, so I wasn't at the meeting on September 13 and I don't know whether anybody here was. No, everybody's shaking their heads. So I can't give you a report other than Dr. Shulte sent me an email saying that there were many active attendees and I believe that the docket is still open on that. So they're still receiving comments on that. And this has been a project that's been several years in the making. Some of you remember that what's called the Silver Book, which was sponsored at the National Academy by NIEHS and EPA and it sort of goes through the environment risk assessment, a big book like that. And then OSHA and NIOSH approached the same committee in 2009, Dr, I think, David—the OSHA administrator at the time—was interested. It never came to fruition and so we've proceeded on to be able to, after the carcinogen policy development, to be able to tell people here's how we are doing occupational risk assessment. So I don't know whether, John, you have anything else to add on that issue.

PARTICIPANT: The only thing I might add is that the docket is open until October 15 and so we welcome any suggestion or comment from anybody. It's simple. If you just go to the NIOSH website, you can get directed to documents which are currently open

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for public comments. And as well, Dr. Howard, the silver nanomaterial document that you mentioned earlier is also available for public comment.

DR. SHULTE: Dr Howard?

DR. HOWARD: Yes.

DR. SHULTE: This is Paul Shulte. In response to Dr. Redinger's other part of the question regarding non-chemical hazards, we do have an effort underway on cumulative risk assessment and we will be putting out a tape of a workshop that we held recently on cumulative risk assessment, and there we looked at the integration of all different types of hazards, psychosocial as well as chemical and physical and biological, and I would be glad to get that information to Dr. Redinger.

DR. HOWARD: Okay.

DR. REDINGER: Thank you so much.

DR. HOWARD: Great. Paul, did you have any comment on the meeting itself that Charles was asking about?

DR. SHULTE: Yes, there were about 60 or 70 people who had signed up for the meeting and we gave an overview of the documents. It was well-received and we didn't get any kind of negative response, but we're looking to hear some in-depth comments or to see in-depth comments that are submitted to the docket.

DR. HOWARD: Okay, thank you, Paul.

DR. BUNN: Thank you. Judith had her hand up next.

DR. MCKENZIE: This is Judith McKenzie. I was going to add to what Mary said in terms of trying to find B readers. We have a very difficult time. In fact, we now have one in Florida and we're in Pennsylvania. So it's really hard to find B readers.

DR. BUNN: Thank you.

DR. SCHENKER: Marc Schenker. I just want to second Dr. Redinger's comment about these other factors affecting occupational risk. They come under different terms, social determinants, etc. I think they're very important to recognize. And I haven't read the document on the risk but I hope that NIOSH is addressing those in a substantive way.

DR. HOWARD: Paul, do you have any comment on that?

DR. SHULTE: Again, reiterating what was said that mostly the document pertains to chemicals. That's been our experience and that's where we've done a lot of quantitative risk assessment. But we certainly agree with Dr. Schenker the importance of looking at the broad range of determinants of health in workers and we have a number of projects that are addressing that, everything from Total Worker Health to efforts in worker wellbeing to cumulative risk assessment, and at some point, it would be good maybe to do a more formalized presentation to the Board on all of these. But we do, we are aware of the issue and we have a number of activities to push back the frontiers.

DR. HOWARD: Yes, and I just wanted to add to say that Paul is reaching out to the Total Worker Health program that's looking at that whole range of determinants of work health

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and is developing some interesting sort of cumulative risk assessment ideas for that. So I'd say it's definitely on the agenda. It would be, we had a cumulative risk assessment, the symposium that we did was a half a day symposium where folks, speakers came from EPA that are struggling with that same issue. It's certainly, you know, I went to the mini symposium and I likened it to the millennium problems in mathematics. They're there, we know they're there. They're really challenging. But we're definitely thinking about them.

DR. BUNN: Michael?

DR. BEHM: Mike Behm. Since we were talking about possible topics, I would like for the group to consider the Prevention Through Design and update on that. It seemed to have a lot of momentum several years ago and it seems to be a cross-cutting, cross-sector, so I would really like you to consider an update on that.

DR. HOWARD: That would be great, and we have a coordinator in Dr. Shulte's shop that would love to do a presentation on it.

DR. BUNN: Okay. Any other questions? Chris?

MS. LASZCZ-DAVIS: Chris Laszcz-Davis again, actually to follow up in terms of future topics. Occupational hazard banding, where is NIOSH, where are we at on that issue?

DR. HOWARD: Well, Dr. Shulte, I'm very grateful you're on the phone. Occupational hazard banding, where are we at?

DR. SHULTE: We are so excited that we think this is going to be a very important resource for the occupational safety and health community. It's been out for peer and public review. We responded to the comments. We have the final version, which is currently residing with the Associate Director of Science's office, and we're close to tying it down and hope to get it published in the next couple of months.

DR. BUNN: Thank you. Wonderful. Well, it sounds like we have a whole range of topics already for the next time, so yes. Don't need to look any further for (agenda @ 00:46:21) number. Any other questions? Okay, I think we're pretty much almost on time to start with our first presentation, and this will be the opioid crisis.

DR. HOWARD: Right, and I just want to introduce Lore, who needs no introduction but you know, the Board heard a bit about this issue at the last meeting when we had Jennifer Hornsby-Myers come and talk about a very pressing part of the issue which is the exposure of first responders to fentanyl. That's just one part of it. Now, since that time, which has been...when was our last meeting.

MS. JACKSON-LEE: I think it was about a year ago.

DR. HOWARD: Was it a year ago?

MS. JACKSON-LEE: I think it was.

DR. HOWARD: So we've been busy since and the first thing that we did was develop an internal working group to be able to look at the issue from a much broader perspective than this one type of worker, the first responder, and the fentanyl exposure. So Lore and Casey Chosewood are co-coordinators of our initiative, of how we are confronting the opioid crisis, and in a very short period of time, I think, we've really

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developed a lot of materials in this area. So I wanted to thank Lore and Casey for all their work on this, and all of the folks that form our intramural subgroups which are many, I think there are six of them. And so Lore is going to summarize all that and tell you where we're at now, and then we can talk about where we can go in the future.

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MS. JACKSON-LEE: Great, thank you so much. I'm Lore Jackson-Lee. I introduced myself a little bit earlier. Casey is away so he's not here today, but I did, many of you probably know him but I wanted to point out that his role at NIOSH is Director of the Office of Total Worker Health, and you'll see how that, in our view, plays into the opioids crisis in just a few minutes.

So what I wanted to do is talk a little bit first about sort of the context we're looking at for thinking about opioids in workers, and then I'll sort of move into the second part, which will really focus on our new framework for confronting the opioids crisis.

So I think probably all of you have been reading a lot, hearing a lot and probably working on this issue yourselves, and some of you are from sort of hotspot states and other locations. So there's a great deal of work going on in this area, certainly at HHS, it's been designated a priority. The Surgeon General has issued some reports and been very vocal about it, the Secretary as well. There's a five-point comprehensive strategy that HHS has developed, and CDC also has a framework as well.

And you're probably also fairly familiar with sort of the magnitude of this epidemic within the US, so I won't spend a lot of time on it, but we are seeing that the overdose deaths are continuing to be really high, five times higher than in 1999, bringing us to, on average, about 115 American workers dying every day from opioid overdose.

So what we know a little bit less about, although we're starting to get a better picture, is really what is the epidemic doing to US workers. So we do know that in 2016, 95% of the drug overdose deaths occurred in the working population persons aged 15-64, so that's something interesting to note. And we also know that according to a survey, there were about 4.5 respondents 18 years or older that reported illicit opioid use in the past year and of note, an estimated 66.2 of these self-reported users were employed full- or part-time.

We also note from the Bureau of Labor Statistics that overdose deaths have been increasing between 2013 and 2016, and we also know that workers with a current substance use disorder miss an average of 14.8 days of work per year, and while those with a pain medication use disorder miss an average of 29 days per year contrasted to an average of 10.5 days for most employees.

So there are some pictures of the workers at work slowly emerging. We'll talk a little bit more about some data, more specific data that's drilling down in a few

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minutes. So as Dr. Howard mentioned, a lot of our efforts have been focused on first responders and fentanyl. That's still a very important issue for us in our portfolio, but we really did realize that we needed to take a broader view and that looking and social and economic determinants of health, as Dr. Schenker was pointing out a few minutes ago, is really critical.

So in the opioids crisis, this is a list of some social and economic determinants that have been identified in the literature. So we've been looking at some examples here but then we really decided it was important to drill even further, and are continuing to do that, to try to look at some specific characteristics of work that could be impacting opioid use and overdose. So for example, what about the lack of employment, insecure employment in opioid risks. Clearly thinking about work is important but what about sort of the flipside of that? Thinking about, for example, lower wage work, hazardous work and increased risk of work-related injury. Also thinking about working conditions that could predispose workers to chronic health deficits, i.e. pain. And then finally, an example, another example is looking at new employment arrangements. Do they correlate to social distress, isolation, loneliness, hopelessness, things that may lead to opioid use or overuse? So then a logical sort of next step was for us to really begin to look at this issue through a Total Worker Health lens, and this is where Casey's expertise, in addition to his clinical expertise, is particularly useful in NIOSH's efforts in this area. And I think most of you are familiar with the NIOSH Total Worker Health program and approach that really looks to integrate protection from work-related safety and health hazards with promotion of injury and illness, prevention efforts to advance overall worker wellbeing. So as far as how this might apply to opioid use, we know that the effects of opioid use and misuse are not isolated to work or home environments, they're happening in both places, and that potential for addiction could be preceded by injuries that happen in the workplace with the consequences then cascading both into an individual's working life as well as their home life.

So from there, we've adopted, developed and adopted this framework to address opioid misuse, and we really think of it as sort of a lifecycle approach, going sort of from the beginning, even precursors of use, all the way through response. So I'll give you just a second to look at that graphic but I'd like to break it down just a little bit more.

So on this slide, this shows sort of the actual, describes a little bit more the independent lifecycle pieces of this opioid framework. So first of all, looking at the determination, looking whether antecedent factors for opioid overutilization among workers can come into play, precursors such as injuries. If the worker is injured at work, what happens in terms of his or her prescribing and use and that kind of thing? And then moving into looking at risk factors or opioid use conditions that could affect workers. And then moving into developing strategies for protecting

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and assisting workers involved in the opioid crisis, and again this is where the emergency responders and fentanyl work fits. And then finally, looking to develop methods for opioid detection and decontamination of workplaces, which we have heard a great deal of need for but we don't necessarily know, at this point, the best ways to do that.

So in thinking about how we will put this into practice at NIOSH, we think that these are the most important ways to go about doing that. Obviously obtaining the relevant data is really critical to understand and characterize this crisis in the workforce. Conducting field investigations, exposure surveys and research studies to try to determine the extent of exposures and also best prevention approaches. Developing information and knowledge to address the problem and then, as we try to do with all of our work, really transferring that knowledge to stakeholders and agencies to promote effective interventions.

So, we do have some ongoing work in this area, in these areas. I'll go through this slide and then I really want to focus on three key areas of activity within NIOSH, research, field investigations, and data. But as you can see here, we have numerous efforts going on. So looking at work-related factors and exposures as risk factors. Coordinating with intramural and extramural partners for addressing this crisis—this is really important and this is something that Casey and I are trying to ramp up doing more and more, and we do have, certainly, some extramural efforts but we also have recently sort of tried to compile the extramural efforts that we're funding and we have over a dozen that we've pulled together, and we're going to be highlighting some of those on our web. And I know, Terry, you've been involved in a number of those. And then also, creating topic pages and education materials relevant for workers and employers, this is really important. We've been hearing continually from first responders that they need information, they can't get information readily, and I think that it's a time where we have to decide, you know, even if we don't feel we're complexly ready to make guidance, we need to try to get something out there. There's just a critical need in this emergency situation. And then conducting health hazard evaluations, which I'll talk a little bit more about. And then, you know, really trying to develop recommendations for prevention, in the first responders, healthcare workers and in the other frontline groups.

So first just to talk a little bit about the examples of the kind of research that NIOSH is either currently examining or looking to go into a little bit further. I should note first that we are really trying to identify research gaps. One of the workgroups that Dr. Howard mentioned that we have is a research gap definition workgroup. So they've been systematically looking at the literature, they've been looking through some things that we've been doing ongoing, in an ongoing fashion, and they're really trying to get this together. It's going to be ready very soon and then we'll be looking at how it might change our course or help us tweak our course,

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and we'll have that information available on our website as well. But for now, again, risk factors which I keep mentioning. We know that that's a really important area for research, and then as I mentioned earlier too, the opioid use conditions that affect workers, looking at things like how that might contribute to workplace injuries and decrease productivity, again the education for the workforce about the risks as I mentioned. The availability of medication-assisted therapy is something we're very interested in and I believe that Casey is about to try to delve into that. And then the really important issue of how workers could be integrated back into the workplace after they've been affected by opioids.

I'll talk about our website in a minute, and there are some additional research examples there.

So next I want to talk about the NIOSH field investigations but before I do, I'm going to sort of have to talk about fentanyl overall, and I know that you've heard some about this from us. And in your reading, you're probably all becoming very aware of this. This is really, over the past few years, becoming a serious problem in the context of what we already know is a crisis. We know that fentanyl is continuing to play a huge role in overdose deaths, with nearly 30,000 overdose deaths occurring in 2017 just with fentanyl. And it's, you know, incredibly potent—50 to 100 times more potent than morphine—and we also know that it's being sold illegally for its heroin-like effect and sometimes can be further complicated by being mixed with heroin and/or cocaine. So the landscape here with fentanyl really does make things even more complicated.

So NIOSH field investigations have been going on through our Health Hazard Evaluation program, HHE program. Probably most of you are familiar with this program. It's a legislatively mandated program to NIOSH that allows us to respond to requests from workers or worker representatives and employers to go into a worksite and try to assess hazards that might exist and then make recommendations for addressing those. And so far, we've had 12 projects through the HHE program assessing hazards to emergency responders and other groups of workers. We included two Health Hazard Evaluation final reports in your binder so that's there for your—when you have time to read it.

Just to give you kind of a broad brush of the examples of the findings that we have, we're finding that even after our retrospective analyses of emergency situations, there's still a lot of questions about exposure and health effects. And we also are finding that in most emergency responses, there are multiple types of substances present, which again adds additional complexity to the problem. And then we have found that ill effects were related to work activities, that they've impacted the ability of workers to perform their job duties. You know, this is a really important piece given that the first responders themselves are trying to play a really key role in the overall response to this epidemic. So we think that this is some really important area.

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A lot of the information that we've been able to get from these field investigations have led us to provide two different kinds of prevention measures, which are on our website, and I think Jennifer might have mentioned those when she was here last year. But we have information about preventing occupational exposure in first responders posted on our website and also preventing occupational exposure to healthcare personnel in hospital and clinic settings.

So we know there's a lot of follow-up work that needs to be done here. One of the things that we've heard repeatedly from our time in the field and from others is that NIOSH really needs to provide more detailed instruction on how personal protective equipment should be donned and doffed in conjunction with law enforcement equipment in these types of settings. And so we're in the process of creating a video to address this, and we should have that done pretty soon. And then also there was a piece, I think it was on the very front page of the report of NIOSH activities, where we've entered into a new agreement with the National Institute of Justice to pursue a project of detection and remediation of fentanyl and fentanyl analogs specific to public safety.

And when you think about public safety response to opioid overdoses, you might also think about naloxone sort of based on what's been reported in the press, in the literature. You're probably aware that naloxone is used as a non-addictive lifesaving drug that can reduce the effects of opioid overdose, if it's administered in time. The thing that's changed a little bit is it can now be given nasally to a person suspected of overdose, and that really opens the door for trained laypersons to administer the drug without injection. So given that, there's been some questions raised and we've been approached about what does that mean for the workplace? Is there a place for naloxone in workplaces if, in fact, laypersons can administer it? And we are in the process, imminently, of publishing a factsheet with information for employers and workers for using naloxone in the workplace, really includes things to consider as employers or workers are trying to decide whether to implement a naloxone program in their workplace. So I think that that may be posted on our website as early as early next week, so we'll make sure that that information, you get the link to that so you can follow that.

So moving on to talk a little bit about data, the data around all of this, as I've mentioned, is really important. There are a number of different things that NIOSH is doing related to data. For example, we're looking at prescription patterns in workers' compensation. There is an analysis there that we are finalizing. Rene's group has also done some work in looking at some economic data and how that sort of plays out.

One of the things that we've just recently published is an MMWR article, which is also in your binder, that highlights occupational patterns in opioid-involved overdose deaths. And this study really does support the thought that occupation might be an important factor in understanding and responding to the opioid epidemic.

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So NIOSH researchers analyzed drug overdose deaths within 26 job groups for a five-year period and of the over 57,000 drug overdose deaths, the majority were male, white, aged 45-54 and then also 35-54, all of which are important working years. And we were able to highlight some of the groups for highest risks for these things, starting with construction, also extraction, pre-preparation and then healthcare, several different subcategories of healthcare. The other thing that this study was able to do was actually identify the types of drugs mostly likely lead—that most likely lead to overdose deaths, and show the sort of variance by occupational groups. I've highlighted that here on the slide, which again makes this landscape very complex, especially when you start thinking about interventions.

It was also interesting that we saw some elevation for unpaid and unemployed workers or nonworkers, and it's interesting if you think sort of back to the lack of employment or underemployment and how that might play into this. So it sort of circles back to some of those social and economic determinants of health and work or non-work and how that might play into this.

There's another really important report that has come out recently from the State of Massachusetts, which we also included in your binder, and this came from the Massachusetts Department of Public Health and they looked at opioid-related overdose deaths by industry and occupation from 2011 through 2015, and they found that opioid-related death rate for construction and extraction occupations was six times the average rate for all Massachusetts workers. And you'll see some correlation from what the NIOSH study showed there in terms of some high-risk industries. Other occupational groups are listed here with higher than average rates—farming, fishing and forestry, material moving, etc. And the report also found that the rate of fatal opioid-related overdose was higher among workers employed in industries known to have high rates of work-related injuries and illness and then additionally, rates were higher among workers in occupations with lower availability of paid sick leave and lower job security. So again, that sort of circles back to some of the elements of work that might really be playing a critical role here.

I want to stop just a second and sort of throw out a PSA for a webinar that NIOSH is pulling together for November 6, and it will include the authors of the NIOSH study and the Massachusetts report as well as the Center for Construction Research and Training, and we'll be getting everybody together to talk more about these data that I presented and then also, you know, just sort of what does all this mean and how can we try to address this, and some of the more specific industry and occupation issues, and also potential interventions. So there is a registration link on our website. If you can't find it, let me know and I'll be glad to point you to it. Again, that's on November 6.

So the other thing that we did in addition to really developing this framework is we

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have created new NIOSH web pages on opioids. So if you haven't seen it, please definitely take a look. You'll see a lot of what I've discussed here today, but we've been able to really feature the NIOSH framework I different subpages, which has been great and then gives us a really good home, as things continue to evolve, for us to be able to put them and have information available for people.

So I did create some questions to bring to you all. I don't know if I really need to do that because I think there's going to be a lot of discussion overall on this, and you know, there's so much here. But these are some areas that we thought if you could help us think a little bit more about them, it would be really useful. The first one is, again, the critical social and economic determinants of health and what should NIOSH's role be in addressing these. Secondly, industries and occupations—certainly we need to talk about and would like to talk about what kind of industry-specific interventions are needed, but there's another angle too of we're starting to see some patterns of some high-risk industries and occupations, and what can we do to prevent stigma from developing around these.

And then finally, in terms of research gaps, what priority research gaps should NIOSH address? I mentioned that we're looking at doing a research gap analysis but we'd certainly appreciate any thoughts there. And then also, what new information should NIOSH provide for workers or employers?

So that is where I'll stop. I don't know if, Dr. Howard, do you want to say anything before we leave it to discussion?

DR. HOWARD: No.

MS. JACKSON-LEE: Okay, great.

DR. BUNN: All right. Open it up for questions. A lot of food for thought in this presentation so...

MS. JACKSON-LEE: Yes.

PARTICIPANT: We've only got 20 minutes? We could spend all day.

MS. JACKSON-LEE: I know. I started to say that and I didn't.

DR. BUNN: Actually, we have about 35 minutes so plenty of time for discussion. Ron.

DR. STOUT: It's Ron Stout. The opioid-affected worker and integration into workplaces is something that is top of mind I think for employers, particularly the interaction between safety-sensitive functions and drug testing, complicated by state-by-state differences with an approach to marijuana. It's just, the whole environment is coming together, particularly of a restricted applicant environment, there's just not a lot of worker out there. How do we deal with these folks that have, in a certain demographic, economic, social, that have been affected by the opioid crisis personally, perhaps are continuing to be affected? How do we integrate them into the workplace? Do we? What are best practices for employing them, to an employer standpoint?

DR. BUNN: That's an excellent question.

MS. JACKSON-LEE: Those are all excellent questions.

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- DR. BUNN: Actually, I was just asked to give a presentation last week to a large company in Kentucky and that's kind of the question that they also had, their first comment being, well, we really can't find drug-free employees and if you have a traditional drug-free workplace policy, you know, if they come up positive for random testing, what do we do with them then? If we send them to treatment, what do we do with them then to get them reintegrated into the workforce? So I think that that's a huge concern for employers, not only in Kentucky but in the US.
- DR. HOWARD: I wanted to—this is John Howard. I wanted to ask Ron, as a follow-up in this whole discussion, you know, the coverage of medication-assisted treatment by employer's insurance, do you have any idea of how that plays out in terms of assisting in bringing employees on or continuing employees in that employment setting if your insurer, your health insurer, won't cover medication-assisted treatment? Do you think that plays a role?
- DR. STOUT: In a lot of workplace cultures, there is a zero tolerance for drug misuse or abuse, particularly if it's involved with a safety incident, etc.
- DR. HOWARD: Right.
- DR. STOUT: So I'm not sure if I'm directly answering your question.
- DR. HOWARD: No, no, it's...
- DR. STOUT: It's not, we don't even, some companies don't even give an opportunity to provide insurance assistance because employment is terminated.
- DR. HOWARD: Right, right. So this is a big, it's a philosophical issue and a philosophical approach in the drug rehabilitation area because there are two schools of thought. One school of thought is—and there's much science behind the effectiveness of medication-assisted treatment, okay—but the other school of thought is, you know, it's abstinence. You're just giving somebody another drug. So that school opposes the use of methadone or buprenorphine, all of those medication-assisted treatment drugs, that that's not the way they... So there's this MAT group and there's the abstinence group and it sounds like, from what you're saying, with the zero tolerance thing, an employment setting is in a catch-22 between those two and yet they have discharge workers, terminate them, whatever, or they have trouble bringing them on. So something's got to give here in terms of that tension.
- DR. STOUT: Ron Stout again, Dr. Howard, if I could try. So the safety-sensitive piece is one area and then there are, there's another area where an employee perhaps is not involved in a safety-sensitive issue, they've perhaps been found passed out in a restroom, a workplace restroom. In that situation where there's not a safety-sensitive issue, many thoughtful employers will surround these people with assistance, particularly if there's a physician that can provide treatment, alternative medication perhaps, and understands the workplace and understands what it means to integrate those two. But it's very often difficult to find a substance abuse specialist that understands the reality of integrating someone into the workplace.

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DR. HOWARD: Right, and everybody should note that to be a provider of medication-assisted treatment, you have to be registered with the DEA and approved. So there's a limited supply, so that's one of the limitations. But back, then, are you saying that the employer's insurance then would cover those non-safety-sensitive position folks or are they still not going to pay for that?

DR. STOUT: If I could answer it this way. For many of the companies that are self-insured, they'll do whatever the company chooses to do, the insurance company will do.

DR. HOWARD: Right. Right.

DR. STOUT: I probably am not able to comment on the smaller or midlevel employers that aren't self-insured.

DR. HOWARD: Right.

DR. STOUT: And that have a very distinct policy.

DR. HOWARD: Right. And also, I wanted to just comment on this. We understand the term "safety-sensitive position" from the point of view of the safety issue is for the airplane passenger and the train rider and all of this public safety stuff. But you know, the opioid issue affects every employee, whether they're in a so-called safety-sensitive position or not. So that dichotomy is a little dysfunctional in this area.

DR. STOUT: Yes.

DR. BUNN: Okay, Mark?

DR. NICAS: Yes, it's Mark Nicas. I had a couple of questions specifically regarding healthcare worker protection when treating overdose patients. So by your own information, is it par for the course for emergency response personnel who are bringing in patients to hospitals to inform the healthcare worker staff of everything they know about this person's, you know, was there drug paraphernalia there, was there visible...

PARTICIPANT: Yes.

DR. NICAS: Was there visible residue or dust present? You know, should you be treating this person as an overdose victim? Is that basically par for the course or does there need to be some encouragement to convey that information?

DR. HOWARD: No. This is John Howard. First responders do a report to the emergency room when they bring the patient in.

DR. NICAS: Okay.

DR. HOWARD: Including the first responder they brought in who experienced something during the response who is now the patient.

DR. NICAS: Okay. And the second question is I understand that in California, the California Nurses' Association was critical of certain aspects of NIOSH's recommendations for protecting healthcare workers when handling drug overdose patients, and I think that one issue was that—I may be wrong—that NIOSH recommended donning certain PPE only if there was visible residue or dust on clothing, and I guess the issue was, well, there could be something there even if it wasn't visible

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when you looked at it. Can you clarify what NIOSH's recommendations are for healthcare workers in terms of donning PPE and when and then what ensemble should be donned?

DR. HOWARD: Sure. This is John Howard again. So if you look on the website, you'll see that we made an attempt in a qualitative way to create sort of tiers or levels of exposure so that there is minimal, moderate and severe, and then each of those, if you read the definition, goes to the issue that you just talked about. If you see it and there's a lot of it, it's severe. If you see it, it's not so much, it's moderate; if you don't see anything. And one of the reasons, the rationale behind that is that, you know, we don't want Fire, EMS and emergency room in Level A suits when it really isn't necessary. So the invisible nature or this microscopic nature of that, depending on that report, you know, the healthcare worker could decide that it's really at a moderate level, it's not really on a minimal level even though nobody sees anything. So I think some of the guidance that we have is general and it needs to really be made site-specific and circumstance-specific. But yes, you're right and that's a valid, certainly a valid reason to say, well, there could be these types of situations. But then if you decide that for the hospital or in general, then everybody is going to be in a lot of PPE that probably will not be necessary. And as we know from the influenza issue, putting a healthcare in an N95 is not a very, it's not a positive thing for a healthcare worker.

DR. NICAS: Thanks.

DR. BUNN: Oh boy, where to start next? Okay, Michael?

DR. BEHM: Thanks. Mike Behm. Well, first, thank you for that presentation. I really like the way you're now looking at the data in terms of the different occupational groups and kind of looking at that. And kind of piggybacking what you two were talking about, I think about when someone enters the workers' compensation system, and it seems like the National Safety Council is also bringing that out in their recommendations, so I think that's good. But as we know, many injured workers do not enter the workers' compensation system for some reasons; but for the other reasons, there's just a significant amount of underreporting of occupational injuries and illnesses, and that's pretty clear, particularly in construction, which now you're kind of showing, yes, that that's kind of leading and so there's been a lot of work done in the construction sector to show that, some work by Hester Lipscomb, Hester at Duke. And so I wonder if, you know, at some point, NIOSH through some mechanisms could try to capture some of those folks. They would have an interesting story to tell.

DR. HOWARD: Yes. This is John Howard again. And you know, our partnership with CPWR, which is one of our large grantees...

DR. BEHM: Yes.

DR. HOWARD: In our discussions with them, these issues that you're talking about, Michael, are all of the ones we've been talking about. And I would just add one more, where

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you could have an injury and you have a claim but you're waiting to be seen and all that, and some of the workers there are in a difficult situation and they may borrow their family's opioid or go out in the street and get their own opioid or whatever. So the comp system is not just when you get it prescribed, you know, at the end.

DR. BEHM:

Right. Right.

DR. HOWARD:

It's that waiting period. So CPWR is now—and we've encouraged them to look very carefully at how we can get at those people. And one of the other groups that we've engaged is the COSH, the national COSH and the local COSHs because they're very close to these workers, especially the workers that Lore mentioned that are more vulnerable in the temporary job or the day laborer, etc. They're very close to that population. So we're trying to figure out ways, and we've had Sarah Felknor from the Office of Extramural Programs to figure out how we can stimulate that type of research so that we could fill in those gaps. So what you bring up is a very important area of data acquisition that we hope not only those groups but our extramural researchers will think about and figure out a way to get at that group, especially on the state level because you should know, all these worker comp issues are all state issues and they differ. So we're hoping our extramural researchers will think about how to do those kinds of studies too.

DR. BEHM:

And I think particularly, it is okay if I...?

DR. BUNN:

Yes, yes, continue.

DR. BEHM:

Yes. I think, and particularly I think in the construction sector, there's many, many reasons documented why an employer wants to keep their official numbers lower and kind of not keeping folks in more of a managed workers' compensation system and so... I say "managed"; that would be the wrong word.

DR. BUNN:

Supervised.

DR. BEHM:

But there are just a lot of folks who are on their own.

DR. BUNN:

Yes.

DR. BEHM:

In particularly small and medium enterprises and so if you could keep those folks in mind too, that would be great. Thank you.

DR. BUNN:

Thank you, Michael. Chris.

MS. LASZCZ-DAVIS:

Chris Laszcz-Davis, another question. Do we have any learnings from a more global standpoint? I realize these are domestic figures and a domestic landscape painting, but this issue I doubt is US alone. Do we, have we learned anything from anybody outside of the US?

DR. HOWARD:

This is John Howard again. You'd be surprised at how US it is.

MS. LASZCZ-DAVIS:

Really? Yes.

DR. HOWARD:

The US consumes 80% of the opioids produced on the planet, okay, and there isn't a country that I know of that has anywhere near this kind of problem.

MS. LASZCZ-DAVIS:

Yes, interesting.

DR. HOWARD:

This is a US issue. And you know, if you go back and look at Angus Deaton's

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paper and the proceedings of the National Academy of Science, which got into the *Wall Street Journal* and the *New York Times*, everywhere, where he pointed out that Caucasian men in certain categories in certain parts of the country, and Alan Krueger of Princeton in his paper showing that the unemployment issues and the labor participation rates localized by region that has been hit by opioids, this is a US issue. It's not an international issue.

MS. LASZCZ-DAVIS: Interesting, thank you.

DR. BUNN: Karla, you had a question.

DR. ARMENTI: Yes, just a couple of things. Karla Armenti. Thinking about insurance companies, you know, we're talking about companies that cover their employees, I think one thing that maybe you could do is reach out or target insurance companies with messaging about the importance—this is going like way upstream but the importance of, you know, ensuring that these types of protections or coverages are available in their insurance plans. That's a huge issue. But then of course you've got self-employed, and many construction workers are self-employed. They really don't even have a huge tie to the construction company that they're working with. So you know, construction companies can still offer health promotion efforts, the Total Worker Health and everything else, but there's got to be more for those who are self-employed. And then as far as surveillance goes, many states have a claims, you know, insurance claims databases. The problem is that they don't collect industry and occupation, but there may be a way to explore those data sources with ICD codes or other indicators that might show a work-related injury and opioid prescription and overuse and that sort of thing.

DR. HOWARD: Yes, Karla, this is a great, great contribution here because what you're talking about is an area that we really haven't gone into that we really need to go into. Right now, you know, hopefully today or tomorrow, the House will pass the Opioid Bill and in that, it's looking at government health insurance, in the Medicaid program in terms of coverage for medication-assisted treatment for instance, and residential programs which usually are abstinence programs and are very, very costly. And one issue that arises from that bill will be what government will pay for in terms of insurance. Obviously Medicaid is means-tested so it may not have actively employed people at certain levels of income. And then the private insurance, which is what you're talking about, and self-insured employers, what's going on there in terms of providing the treatment, one of the things that we've discussed with CPWR is, you know, not every medication-assisted treatment offering may be appropriate for a construction worker or other type of worker because the idea of medication-assisted treatment is to keep people employed so that they can go on with their life and not take six to twelve weeks out of their life and end up in a residential facility and trying to maintain abstinence, and the rates of relapse after abstinence therapy is much, much greater than medication-assisted treatment. So that issue is one we're trying to explore, have CPWR also

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explore in that area.

But the point that you make about going to the insurers and saying, you know, what are you seeing here in terms of your employers who are buying your health insurance and the coverage of medication-assisted treatment I think would be really helpful.

DR. BUNN:

Okay. Paul.

DR. MCKENZIE:

Terry?

DR. BUNN:

Yes. On the phone.

DR. COOPER:

This is Sharon Cooper.

DR. HOWARD:

It's Sharon.

DR. BUNN:

Sharon?

DR. COOPER:

(Inaudible @ 01:30:02) but a few comments.

DR. BUNN:

Go ahead, Sharon.

DR. COOPER:

Okay. Well, thank you for an excellent presentation and my first comment is to something that Dr. Howard referred to as well, well, several of my comments goes to other programs in NIOSH that I've seen in the past, maybe they could be tied back in now, but some articles by Tish Davis and Sherry Baron, and so you already have the Massachusetts study, have shown that the priority populations that are addressed by health departments or public health disparities are the same populations for occupational health disparity. So I wondered about, you know, partnering with health departments to look at some of these priority occupations and also the work NIOSH has done with electronic health records and community health centers, and thought that might be another route to go to for research or partnership.

And I'll just list all my comments and then perhaps if you respond. The second one is that I notice that your focus is on medication for interventions, which certainly makes sense, but I also wondered about focusing on health outcomes, like you've suggested for NORA 3, and maybe you would get a different idea if you looked at back pain for example, or diabetes or other chronic conditions that have pain associated with them, to see where you could make an impact or look at risk factors.

And finally, at the policy level, it's my understanding that a lot of the cause of this has to do with the pharmaceutical companies and distribution of drugs. So is there any partnership with the pharmaceutical industry or the FDA in addressing these from the worker perspective?

DR. HOWARD:

Okay. So I'm going to leave the health department thing to Lore because she's closer to the CDC larger effort in this area which, as you know, is connected to health departments. The health outcomes idea that you have, Sharon, is really great and certainly in the mid-Nineties, the whole issue about pain as a fifth vital sign and its use in noncancer pain has been attributed as an important cause here.

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The third issue about pharmaceutical companies, we're aware of NIH's effort in this regard of developing non-habit-forming pain medications, in addition to they just signed a relationship with a pharmaceutical company to develop a long-acting naloxone, the reason being that naloxone has to be given repeatedly in some response situations. So NIH has committed to developing these drugs that are oriented to relieving the—to producing analgesia but not the euphoria effect that causes the addiction issues. You'd be interested to note that Purdue Pharma, which has been, you know, held responsible for producing the oxycontin issue, is also now developing a new form of buprenorphine so they'll be able to market that pretty soon.

So the pharmaceutical issue, we're aware of those issues that NIH and FDA is doing, but we don't have direct relationships with either one of those except through our sister agencies at HHS.

And then Lore, did you want to talk about the issue of the Health Department?

MS. JACKSON-LEE: Sure. I mean, I don't know that I have a whole lot to say—this is Lore—except that we can definitely go back and talk a little bit more. You know, the Injury Center at CDC has a lot of money in state grants related to addressing opioids. So, but I don't think we've thought about it in terms of the health disparities and how that could overlap with some of the health disparities from an occupational perspective. So that's something that we can go back and look at. I think it's a great suggestion.

DR. COOPER: Thank you.

DR. BUNN: Thank you. I think there was a question, yes. Kyle.

MR. ARNONE: Yes, this is Kyle Arnone. So building off of the question on health benefits and coverage levels, you know, there's the question of whether benefits cover medication-assisted treatment but there's also the prevention coverage as well. So I know a lot of health plans would not cover alternative therapies for pain treatment, and the easiest option was often to prescribe opioids instead. So I'm also curious to see whether there's a relationship between substance use disorder and the sort of upstream effects of coverage levels for pain treatment.

DR. HOWARD: That's a great observation and certainly that's been written about too. The alternative therapies are frequently not covered, not reimbursable, and it's just easier to write a script for oxycontin.

DR. BUNN: Yes. Thank you, Kyle.

DR. SCHENKER: Yes, this is Marc Schenker. I think it's useful to put this in a classic prevention model context of primary, secondary and tertiary prevention and most of what I've heard has been descriptive work on secondary and tertiary prevention, identifying the addicted workers or treating the overdoses. And I think, I would hope that primary prevention has a role, for several reasons. One, it's a fundamental belief of those of us in preventive medicine but two, it's in the company interest to explore primary prevention. I mean, a worker addicted, a worker who dies, a

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worker who has serious illness, who is injured costs companies a lot, particularly in a time of low unemployment, and you know, it's to the company's benefit to explore ways to prevent this, whether that's an educational effort or training or what have you.

And to give an analogy, I have NIH funding to look at diabetes prevention in the workplace for the same reason, because diabetic patients cost companies more and it's in their interest to have programs that reduce the prevalence or identify diabetes early or in some other way reduce their costs. So it makes sense in a public health sense and in an economic sense, and I hope that there's more attention to that. And that would include research moving from what I've heard, which is mostly descriptive, into intervention research. What is effective? Do these programs work? Does it help to, you know, provide programs that educate workers, etc. etc.?

So I'm delighted to see this. I think the workplace is a great opportunity to deal with what's obviously a much bigger public health issue, and it's not just the impact on the workplace but the potential for addressing it.

DR. HOWARD:

Yes, this is John Howard. Great comments. If I start with the end, the end comment about intervention effectiveness, you know, there's been a lot of studies, for instance intervention effectiveness studies of medication-assisted treatment, which now the federal government, HHS, believes is the most effective way to deal with the worker who has opioid use disorder, as opposed to the abstinence program. The Surgeon General has talked about that.

The other issue which there has been a number of studies showing its effectiveness, but you get into some very difficult legal issues, is in safe injection sites as an alternative. Some cities are doing that. Vancouver has had it for many, many years. It's been studied. In the Netherlands and other countries, these have been studied and been found to be effective. In the US, it would be, some cities are considering it—New York, Philadelphia, Seattle, San Francisco—but it's a very difficult issue given the Controlled Substances Act and the federal view. The Deputy Attorney General wrote an op-ed piece in the *New York Times* recently saying that no way, no how is the Department of Justice going to countenance, you know, people giving out drugs in safe injection sites. So on that intervention effectiveness, even though there's been studies about that, the implementation from intervention effectiveness in some cases can be really difficult. So that just, when you were talking, it just reminded me of a conference I just went to at the Department of Justice and the struggle there people were having is we've done these studies, they're effective, how come we can't do a safe injection site. Now, that remains to be seen, whether New York or Philadelphia, etc. will do it despite the federal government issues relative to the Controlled Substances Act.

But on the primary prevention, that's a really, really great point and CDC has been engaged in that with drug awareness campaign literature and stuff. Also, some of

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the other things, the prescribing guidelines themselves are, if you will, a type of primary prevention on the physician side and then the idea that limiting the duration of the prescription, limiting the MME, the morphine equivalent dose of the prescription, to less than 20, etc., the limitations on prescribers and dispensers. The American Pharmacy Association, the Pharmaceutical Association, has even come out supporting e-prescribing which links the provider who writes the prescription, the dispenser of the opioid and the patient so you know exactly who's getting what, and it would be a national type system. So some of these, a lot of these ideas are cooking around and I think your point about how we should look at what we can do about primary prevention in terms of education and training materials I think is extremely important.

DR. BUNN: Judith then Grace.

DR. MCKENZIE: Judith McKenzie. I really liked your talk and one of the things that struck me was the bullet that says, "Rates were higher among workers in occupations with lower availability of paid sick leave and lower job security," and in a sense that's primary prevention because I would think, or it seems, that if you don't have time to recover from an injury or stress or whatever it is going on at work, then you sort of put a Band-Aid on it and keep powering through. And I think that maybe in terms of education materials for employers, this might be one of the things that you might want to highlight or maybe this might be one of the things that should be researched more so. I think it's difficult too because this may be among workers who don't have full-time jobs, right, so the employer will say, well, it doesn't affect my bottom line. But if they are workers with full-time jobs, it will affect their bottom line in the long run when a person has to leave their employment and it's more expensive to hire somebody else. And so in the long run, if a cost/benefit analysis would be done, it will show that it does affect your bottom line. But then if they're not full-time workers then you just sort of pass them on to somebody else and grab the next able-bodied person to then go down that same road. So I think that might be one of the things that can be looked at more intently.

And also, Dr. Howard mentioned the restrictions on physician prescribing. I know that that's in many states in the country. Hopefully that will have us start seeing a reduction in the epidemic.

DR. BUNN: Thank you, Judith.

DR. HOWARD: Yes, and I think those are all good points. I'd also like to—for full disclosure, I think we should also put on the table, you know, after I wrote a blog piece in our science blog about the prescribing guidelines, etc., you know, the comments that I got were from people with chronic pain who are now being told by their physician I'm going to take you off of the opioid or I'm going to decrease your dose, etc. And this is a very difficult issue. These prescribing guidelines, as a pendulum, may have really gone quite far in one direction because physicians who are in managed care practices, etc., they're going to be looked at in terms of their

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prescribing history and they're afraid. So you know, there is that issue about where is—how do you take, how do you do this, how do you address this issue from the prescriber's standpoint without denying much-needed drugs to people who do have chronic pain?

DR. MCKENZIE: I think—Judith McKenzie—I think there may be two different issues and at least locally, in my sphere of where I've trained and where I've practiced, mostly East Coast, in general, for example in occupational medicine circles, we are very reluctant to give opioids. But if someone goes to the ED, they get a packet for this many days. You have shoulder surgery, your doctor says oh, you don't look like the type who will be addicted so why don't you take a month of this? Then you come back and they say oh, are you still in pain? Oh, not really. Well, take another month just in case. And then you have all this stuff in your cabinet that you're not taking.

So on the one hand, I feel that restricting the prescribers is excellent because now they have to think twice for giving opioids; the patient may not even want it then their kid might get a hold of it or their kid's friend may get a hold of it. But on the other hand, if someone has chronic pain and they're being treated by a physician who is certified or whatever the word may be, it's too bad that they might be affected. But I know they do the urine test to make sure that they're taking their medication, they're not diverting. So if they're in a bona fide, well-run program, hopefully they will continue to get the medication they need. But I think it's the new people who end up on opioids who don't need to be on opioids, in my opinion, that this prescribing restriction is really going to help. So any new people coming in.

DR. BUNN: More for acute pain, as opposed to chronic pain.

DR. MCKENZIE: Yes, or new...

DR. BUNN: Which I think is what the guidelines were intended for.

DR. HOWARD: And what is stimulating is a lot of studies now about especially postsurgical pain where a Tylenol and an Advil together, you know, will be just as effective as an opioid. So as you say, it was just the thing to do in the Nineties and throughout, to now. These studies are showing that these other ways of treating pain can be just as effective.

DR. BUNN: Thank you. Grace.

DR. LEMASTERS: Just a quick comment and a follow-up to Dr. Schenker's issue on primary prevention, I was struck by this figure on opioid-related overdose deaths by industry and occupation and really was surprised to see agriculture so high as, very close to construction, and a confidence interval even above construction. And so then my thinking was, well, if we're going to do primary prevention, we would have to really understand what are the risk factors. I mean, this is overdose deaths, you know. Opioid use has to be much, much higher, because the outcome here is death. So you know, what are the risk factors for these primary areas where the deaths are so high and the use must be very high? And if we

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could understand those risk factors in those two areas—construction and agriculture—then we might be able to get at some of that primary prevention issue.

DR. HOWARD: You know, thank you, this is John Howard. You know, that ag thing has always bothered me because you know, the SIC code is ag, forestry and fishing, and I have no idea because I don't know whether anybody has looked in the sub-NAICS codes to figure out where it... I just have this view that it's got to be in logging and it's got to be in some other areas than a farmer, you know. But I don't know because I haven't seen any data going further. So that ag thing is always a little weird to me.

DR. BUNN: Marc has.

DR. SCHENKER: Yes, this is Marc Schenker. I have an article about agricultural workers and the title is, "We just have to keep working," and that's the reality of farm workers. And we're not talking about farmers driving around in their trucks; we're talking about people who are bending for a full work day and you know, really don't have the options. And if they develop pain, it's easy to imagine—I don't have any data, we've never studied it—but this is one of the things you do to be able to keep working. So, you know, my only comment on the research, and I agree with Grace, it's fine to look at industry but you know, where are the case control studies? Where are the individual risk factors? Where is the understanding of who is really at risk for this that's going to help us target the prevention that we need?

DR. HOWARD: Right. This is John Howard again. I think that's where we want to stimulate researchers to look further because you know, from where we've been, which is nowhere, to now today, at least we have a comprehensive sort of look at it. But as Lore mentioned, we have one group that's just looking at where the gaps are, who's going to fill it, and we don't have a bunch of money, you know, that's been given to us especially so we have to try to convince CDC that's getting all the money that, you know, can you put some in this area. So we have to have a well-developed strategic research plan and I think what you're saying, and what you're saying, Marc, is an example, and the others about, you know, the insurance are where we need to now find some answers. So there's way more questions than we have answers.

DR. BUNN: Okay, we'll take three more comments and then I think we're going to have to break. We're a little bit behind schedule. Ted.

MR. COURTNEY: Ted Courtney. I remember my team's, when I was at Liberty Mutual years ago, writing about this stuff. Like even 20 years ago, we were talking about opioid overprescribing so this has been a problem kind of rolling at us for a very long time and just getting more focus now from the global public health community in the United States, which is great.

I want to echo points about just making sure that NIOSH is adequately plugged into the state surveillance programs and local public health departments because

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I think that's, the state-to-state variation that we saw simply in prescribing practices were epic, even in some cases, neighboring states could be vastly different. So just to reinforce that point.

The other thing I wanted to point out was—

DR. HOWARD:

But before you jump to this, so this is John Howard here. You know, we're plugged into the Workers' Compensation Insurance Institute in Boston and they have done, they do yearly reports and their state-by-state variation of opioid use by MMEs, etc. is absolutely startling, with New York, Louisiana and a few other states way at this 3,000-4,000 MME level and these other states are way, way down here. So we've seen that, and that's where we want to focus, you know—of course they're coming down. I mean, everything's coming down because of these restrictions that we're talking about and greater physician awareness. So we are plugged into looking at that, so thank you for bringing that up.

MR. COURTNEY:

Sure, so just the rest of my point was to do with the social determinants because just listening to the conversation, seeing the presentation, it's not my research area but the impression one gets is that social determinants may be a particular part of this—job insecurity, lack of resources for individual level employees in a particular group of industry settings. So I wonder about too, one of the things that we saw with the Workplace Safety Index, when the downturn happened—I'm sure a lot of people at BLS did too—is that when we had the economic downturn in '08, '09, '10 and '11, we had this very significant inflection because employment is protective against occupational injury. No shocker. Unemployment, that is. And so does that give us an opportunity to look at, potentially on a time series basis, look at what changes occurred in opioid use by the middle-aged and older/younger worker groups that show up as being more at risk? Was it the—because you got a big inflection in job insecurity right at that point that gives you kind of a natural experiment opportunity to look at that as a potential influential risk factor in this.

DR. HOWARD:

So, you know, one of the comments I wanted—this is John Howard again—that I wanted to make with regard to that is sort of the thing that I was impressed with recently in reading a book called *Dopesick*, which is written by Beth Macy, who was a reporter for the Roanoke newspaper, and looked at the issue of opioid overdose deaths in Western Virginia primarily. And what all her stories were about, and this takes us away from a bit of the worker issue and the social determinant issue, it was 15- to 20-year-olds and the experience that they've had and the loss that parents have felt in this. So, you know, we can't forget that however you get exposed to these drugs, these are very physiologically addictive drugs and they often, you know, the work issues and the social determinants, these are good students in high school, in the best high schools. In her book, she talks about this Hidden Valley High School which is in a very evidently, very upscale socioeconomic area of Roanoke, Virginia. But yet they have this tremendous opioid problem there. So we also have to balance some of this out

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with the power that these drugs physiologically have.

DR. BUNN: Ron.

DR. STOUT: Ron Stout. Dr. Howard, you've mentioned or asked some questions, made some comments on the opioid-affected worker and insurance and just perhaps as a placeholder and something to think about and to state explicitly, I would posit the opioid-affected worker, more likely than not, doesn't have insurance or has a high-deductible plan. And if they enter the healthcare system, it's often following a work-related injury and they're attempting to use workers' comp. And as you know, many states give the employer the opportunity to deny workers' compensation, any coverage, if there's a causal relationship between their opioid status and—I say causal—if they come back, drug-test positive for opioids. So as you think about this, and you mentioned working with these, I would ask you to think about how you work on the workers' comp issue, which is the insurance of last resort for many of these people.

DR. BUNN: Okay, one last one, was it Karla, I think you had a question?

DR. ARMENTI: No, I...

DR. BUNN: Oh, Mark then.

DR. NICAS: No.

DR. BUNN: No, okay.

DR. HOWARD: Chris has a question.

MS. LASZCZ-DAVIS: Might I, just real quickly.

DR. BUNN: All right, last question.

MS. LASZCZ-DAVIS: Yes. I don't know how much we know about the agricultural industry. I mean, we talk about it but I mean from my standpoint, I could certainly use an overview of the agricultural industry. You know, I think about, being in California, it's one of the biggest agricultural economies in the world, and I'm even on California's Standards Board, but I'd be misguiding you to think that I'm knowledgeable about agriculture and what it entails and the injuries/illnesses and the evolving business models there. Just a thought perhaps for all of us.

DR. HOWARD: Well, we have ten—it's John Howard again—we have ten Agricultural Safety and Health Centers and we have a coordinator who is in Alaska and we've asked Brad to give us an update on our ag program. We have our former Ag Center Director sitting next to you. So we can certainly do that. Who is the Ag Center Director at UC Davis now?

PARTICIPANT: Kent Pinkerton.

DR. HOWARD: Ah, Kent Pinker.

DR. BUNN: Okay, so it is time for a break. We're just a little bit behind so I have 10:28 so if we could be back by 10:38 to start, that would be great.

[Break.]

DR. BUNN: Okay, just a couple of announcements before our next presentation. Marc Schenker had said that he is going to be traveling to Dulles Airport after the

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meeting. If anyone else needs a ride or wants to share a ride with him to Dulles, you might want to contact him, so. Another announcement is Alberto has left a list of lunch options in front of you so that you can choose a restaurant over, to go to over lunch. And then the last announcement is that we have—actually, I didn't realize this—six members whose term ends at the end of December, which is, well, more than almost one-half the Board.

MR. GARCIA: Right, so most likely, we're going to ask, we had a FRN to get new nominations that closed on August 1 and we're going to be looking at these but most likely, we're going to ask the six members that are rotating off to see if they can extend their term for 180 days while we complete all the paperwork. So I would hope to see you guys in the spring meeting again.

DR. BUNN: Yes.

DR. MCKENZIE: Do the six people know who they are?

MR. GARCIA: I can tell you. We have a spreadsheet with all the Board Member appointment dates.

DR. MCKENZIE: How time flies, huh.

PARTICIPANT: I think that's my term.

DR. BUNN: Okay, so we are ready for our next presentation, which will be on the 21st Century Surveillance Report and I guess, Margaret, are you going to be giving that presentation?

DR. KITT: I am, yes.

DR. BUNN: Okay.

DR. KITT: So thank you. So as opposed to the presentation you just heard from Lore which was on opioids and the sort of emerging issue that we're dealing with, surveillance has been with us for a very long time at NIOSH at other places. And Terri Schnorr is on Adobe with us and is on the line. Terri and I oversee the implementation plan for this National Academies report. Terri is, of course, with DSHEFS in Cincinnati and she's really our surveillance lead for NIOSH, so we'll be asking her to help with some of the questions at the end that I'm sure you'll have.

But I wanted to go through the National Academies report items over the next few slides to sort of lay the stage of where we are now with this National Academies report that we've received, because I do believe that this is just the first time you'll hear about this but you'll hear many more times over the course of the next couple of years as we develop our implementation plan and get further advice. So this is sort of just the initial presentation on the National Academies report.

And just to give you a little bit of background, you know, most of you I think know that NIOSH pulls its occupational safety and health surveillance information from a number of different sources. You know, we have a number of surveys where there is industry and occupation information available. We also have a number of sources that are available through OSHA and BLS. And so we try to pull this occupational safety and health information together in order to analyze it, interpret

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it and disseminate that information out to all of our stakeholders and workers, etc. But for a long period of time, we've really spent a lot of resources on surveillance. In some ways, we try to piece together some of the surveillance information that's out there and fill the gaps that certainly exist in surveillance information in occupational safety and health. And because of that, as well as the fact that in our previous National Academy evaluations that we had conducted about ten, I guess maybe ten, twelve years ago now, almost always in those National Academy reports of our programs, it would emphasize, you know, you need to do more surveillance. But there was not a lot of information other than that that was specific. So what kind of surveillance? How should we resource that? So that was one of the drivers, as well as the fact that we're moving into a much more technologically savvy age and are there opportunities to pull in some of the newer technologies to create better surveillance information for occupational safety and health. So that was all of the drivers.

So we got together with BLS and OSHA and asked the National Academies to put together a panel, which was compiled of members from academia, labor departments, health departments and employers, and we gave them a very vast evidence package, information that we supplied to them in advance, and then they met over the course of about, I think it was maybe close to two years between the beginning and the final report that was delivered to us.

And so last April, of 2018, of this year, the National Academies pulled the committee together and delivered their final report to us, and we were able to meet with them in person to go over the recommendations that they made, and they did make 17 recommendations to the three agencies that were the sponsoring agencies—NIOSH, BLS and OSHA.

So the next slide is kind of small up here but I did give you a larger copy; it's in your slides. But this goes through the 17 recommendations, and we're going to talk a little bit more detail about them. At the bottom, I also included the link which is available to the full report. It's also on the last slide of this presentation. But this gives you a little bit larger view to look at.

So first and foremost, there was this overarching recommendation that the National Academies made, and they were calling it a meta recommendation, in that it was essentially that the Department of Health and Human Services, in support of—with support of the Secretariat, Labor, should really direct NIOSH to sort of be a coordinating body to advance efforts in occupational safety and health surveillance. And this included developing—you can see what the coordinating entity should do—but that they should update national occupational safety and health surveillance strategic planning and that NIOSH should be sort of the lead in this effort, and design and evaluate systems of OSH surveillance for dissemination, which was a clear message that they were trying to say, to give us, about the importance of timely dissemination of information. Publish a report on a

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strategic plan that could be developed by all these three agencies combined and certainly not to do this in a vacuum but to engage our other partners, including state agencies and other stakeholders.

So the 17 recommendations that they made were broken into 4 discrete categories, and we felt that these recommendations had some overlap with one another, as I'll go into in a little more detail, but the 4 categories were: one, to prioritize and coordinate occupational safety and health surveillance; to improve data collection measures; and importantly, was to expand biomedical informatics use and capabilities, and that touches into a little bit more of the technology that might be available; and fourth, to strengthen the data analysis and information dissemination which was, as I said, a clear message throughout this report about getting timely information out.

So we took those 17 recommendations, one of which was that meta recommendation that was really meant for the Department of Health and Human Services. There were three recommendations that really were not given the lead to NIOSH; they were given the lead to either BLS or OSHA. So we took the recommendations where NIOSH was made the lead and grouped them into, tried to prioritize them into those same four categories that the National Academies had grouped them into.

And what we've done is we've established four corresponding workgroups to look at each of these different areas and the recommendations, and these workgroups were really formed from a combination of NIOSH experts in surveillance, a core group, but then we also wanted to bring people in that were not necessarily embedded in our surveillance activities, people that had a lot of expertise in exposure assessment for one, and others that were involved in communication or had special IT skills or informatics skill so that we could build these workgroups to bring in other ideas and other technologies that may be available so that it wasn't just the surveillance folks in NIOSH all talking to the surveillance folks in NIOSH. But they formed really the core group of each of these four workgroups because obviously they have the expertise in surveillance for the institute.

So the first workgroup on prioritizing and coordinating occupational safety and health surveillance is being led by Jennifer Lincoln, who is in our Western States division, and we assigned them five of the recommendations, and I'm not going to—you can obviously read through these all yourself but just to sort of highlight where the meat is of these five recommendations. One is NIOSH really working with the states to better coordination and prioritize surveillance activities for fatal and non-occupational diseases using multiple data sources. Two, which was recommendation C, was really to work with BLS and OSHA as well as the states once again, to establish and strengthen state-based occupational safety and health surveillance programs. Some states have much stronger surveillance programs than others. To build where there is not a lot of strength and maybe

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focus on some regional strengthening that could be done with the states. The third recommendation was really to, as an ask to HHS and to try to encourage them to build industry and occupation as a real core demographic variable that should be in every federal survey, that should be in every surveillance system that's conducted by the government, and to really encourage that insertion of industry and occupation, which we know is a big ask. Next, that NIOSH should maintain a robust internal capacity in biomedical informatics, and this has been something that we had already been talking about but I think is a real key factor for us going forward. We do not have a lot of biomedical informatics expertise within the institute and this workgroup, as well as one of the other workgroups, is really trying to strategize as to how we build that capacity among our stakeholders and within our own NIOSH walls because that's a gap that we truly have at this point in time. So, and then the last one for this workgroup was really to consider how NIOSH, OSHA and BLS would work together to encourage capacity-building within our education and training programs in different disciplines such as epidemiology and biostatistics, which certainly currently exist, but also once again to build that biomedical informatics capability.

And, the second workgroup that was put together was being, is on improved data collection where we have Lauralynn Taylor McKernan, who is with Terri's division in DSHEFS, she's the Associate Director for Science, and she's leading this workgroup which is looking at really two recommendations on how NIOSH, in collaboration with OSHA, should explore and promote the expanded use of workers' compensation data. And we heard earlier about our Center for Workers' Compensation in, also again in Terri's division in DSHEFS, and that's been a center that was developed probably now about four years ago or so, that's really been a driver for many of the surveillance data sources that we have. It's primarily with the State of Ohio but it's expanded to a lot more states now since it was begun with the State of Ohio. And we have already started to look at the multitude of ways that that office can expand our capabilities with surveillance, including interventions as well, but surveillance activities. And so this was one of the areas where they asked us to further explore worker's compensation. The second recommendation that they're looking at is the issue of exposure surveillance and you know, I think once again that's an area where we have tried to build better surveillance programs and hazard or exposure surveillance, but I think it's also a gap that we currently have. And this was an issue, as I recall, particularly that our labor folks on the committee were trying to push forward, the idea of really better developing our exposure surveillance and hazard surveillance, and so this group is trying to look at ways for us to do that, and that's one of the areas where we've incorporated our industrial hygienists and our toxicologists to try and help with that piece.

And then the third group is being led by Marie Sweeney, who is also in DSHEFS

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and one of our surveillance experts within the institute, and this group is taking on some overlapping recommendations that we've already mentioned, which are G and J, so I'll skip over those, but also to look at if there's an opportunity for NIOSH to work with the National Library of Medicine to incorporate some of the core terminologies of industry and occupation into the Unified Medical Language system. And so that's one aspect that they're exploring, as well as looking at efforts to establish data standards and software tools for coding in electronic health records. And some of you may be aware that NIOSH, for the past probably seven years or so, has been very involved with trying to move forward activities to incorporate industry and occupation into electronic health records. It's been an extremely arduous process to be a partner with the Office of National Coordination and others across the electronic health record industry and across the health system to convince the importance of industry and occupation in electronic health records. It's involved a very long interaction with multiple groups to verify the importance that this has in clinical decision-making because an electronic health records system is very focused on what value added this has to the clinical decision-making as one of the pieces. So we've moved pretty far down that path and convinced a lot of people, but we're not quite there yet so we're still working on that piece with electronic health records pretty actively, so. And then the last recommendation that they're working on is that NIOSH and BLS essentially work together to further the state-of-the-art analytical tools for processing free text into coding occupational safety and health. And that's also an area where Terri's group has been working in the last four or five years to develop that free text coding system which we call NIOCCS, and it's been working very effectively to bring in surveillance information and autocode it and so that it's available to many of our partners.

And then the fourth workgroup is being led by John Myers, who is in the Division of Safety Research, and the recommendations that they're looking at really have to do with incorporating economic and health burdens. Our economists are involved with that workgroup, to bring their perspective into the occupational injury and disease surveillance information that's available at the national level. In addition to the economists being heavily involved with that piece, as you know, NIOSH over the last several years has really been moving into a process of determining its priorities based upon the BNI method, the burden, need and impact, and so we've been trying to incorporate our ideas related to burden information into this recommendation as well. The second recommendation that this group is looking at is really the timely analysis of case level data that is often collected by states and other surveillance systems, to provide more real-time sharing of information. And then, as you'll see, the third bullet here really talks about analyzing more comprehensive information and timely dissemination. So a big dissemination piece is part of this workgroup's efforts.

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There were three recommendations that were not included in any of our workgroups to look at because they really were not directed at NIOSH, and these recommendations were A recommendation, which on your big sheet says that it's really applicable to BLS and OSHA related to their own surveillance systems that they have in place; recommendation D which was for BLS that they should place priority on implementing their plan for household surveys; and then E, which was specifically for OSHA to develop plans to maximize the effectiveness and utility of its electronic reporting initiative for surveillance. So we did not take those three on specifically. We took the others that I've talked about so far.

So there was the 13 recommendations where NIOSH is playing either a key role or a lead role, and then of course the meta recommendation, and with these other 3 that makes the 17.

So you can see this was, there's a lot of recommendations here. I think when we met with the Academy workgroup, as Dr. Howard said to them, so you don't have a magic bullet for us, huh, for us to be able to figure this out so easily, and they said no. No, we don't have a magic bullet but maybe with, through all these recommendations, some of them were not very foreign to us, hopefully you can... I think that one of the messages was they really wanted us to work more closely with BLS and OSHA, that this was a partnership. NIOSH had a critical role to play in leadership here but we really needed those partners along with the states to sort of pull everything together.

Now, so far, we have not had our discussions yet with OSHA and BLS. Our workgroups are putting together their draft implementation plans, and Terri and I have been meeting with each of the four workgroups to see where there's some overlap and to provide them with format as to how we would like them to present their draft implementation plans so we can coordinate across all four groups. And the areas where we've asked them to focus on are, in this area, what are we already doing, where do we stand right now with this recommendation? What can we do in the short term and what are the longer-term—because that will help us sort of prioritize where we need to put our resources and work more with our partners.

We thought that after we had a draft implementation plan, then we would go to BLS and talk to them and sort of coordinate what their thinking might be in the areas where we have overlap with them. We're not sure where they are in the process yet of trying to put together their plans to deal with the surveillance recommendations. We also have been kind of waiting to see if there was going to be a new OSHA Director appointed to really put some meat behind our interactions with OSHA. So we'll have to sort of gauge that when we have our implementation plan, what we do at that juncture in combination with OSHA. Maybe MaryAnn will have some advice for us at that point.

So we're still working through those draft plans and pulling it together and then

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we'll have our discussions and present the plan to Dr. Howard, and then we'd like to present the plan to you all for your input at that juncture. And then I'm sure we'll be periodically reviewing our progress, because you know, surveillance is a very important issue. It drives our research priorities. It provides the opportunity for our stakeholders, including our very important state stakeholders, to focus their attention. And we know that we have to focus on the biomedical informatics piece because it is a real gap for us within the institute that we're trying to, we have been trying to build, but it still is a big gap for us. So with that said, I'd like to see if Terri has anything that she would like to add. Are you there, Terri?

DR. SCHNORR: Yes, I'm here. Can you hear me?

DR. KITT: Yes.

DR. SCHNORR: Oh okay. So no, I would just sort of add to your comment about the biomedical informatics recommendations, and those sets of recommendations are the most exciting ones but they also present the greatest challenge to us. However, they are key to many recommendations and the success of moving forward in these, with addressing this document.

DR. KITT: Thanks, Terri. You know, I think for our four workgroups, it's taken them a little while to get their heads wrapped around some of these recommendations, especially those folks that are not surveillance experts themselves, to see where they can fit in and try and help the institute move in a common direction. But I think what we've seen so far, we've had some really interesting ideas that they've come up with. Some of them, I think, maybe scare Terri a little bit but I think there's been some exciting discussions anyway. So that's where we are with this but you'll certainly here a lot more, but if you have some questions for Terri and I now, we'll be happy to answer them, so.

DR. BUNN: So I think first, because I did not do this the last time, are there any questions from board members on the phone? Okay, so Ted?

MR. COURTNEY: So this is something that is my research area. So I'm very excited about this, and we'd actually recommended some folks for that committee when it was composed originally by (MES @ 02:36:13). So it's exciting to see this being engaged. The things I would just throw into the mix are, having been on Surveillance Study section before, one of the things that we'd run into even when you try and do something new or stimulate new—so I've got this labelled as “old states/new states”, not to be Dr. Seuss, but the whole idea being that there are well-established states, one of whom we've already given a great report from that came out in August. Really well-honed and nicely developed cores, are good to support and keep going because they're doing great things. Then there are people who are, you know, barely getting out of the barn basically, and those fare poorly when competed against those already established older states in surveillance. So setting up some way of stimulating new state initiatives that allow those very

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underresourced states to sort of grow out without necessarily having to go head to head with the very well-established programs.

DR. KITT:

Yes.

MR. COURTNEY:

You don't want to lose those well-established programs, you want to maintain those, but just something that allows you to do that.

Then the other thing is something that we were confronting in the different ways we were looking at surveillance back in my old team at the Center for Injury Epidemiology, that you have this situation where I call retreating federal surveys. So among other circumstances, people don't really answer their phones any more and all you have to do is pop that question into your Google search and it will show up, and no one's going to answer their phone pretty soon because there are so many, basically, fraudulent calls. So that's gone away as a modality, largely. You have NCHS basically walking back detail levels and granularity in their surveys, so we were using for many years the NHIS for occupational injury surveillance and they basically got to the point where they kind of dropped most of the granularity out of that, even with a lot of feedback from people saying please don't do that. Just cost, you know, constraints. So traditional, very fully framed or framework systems are in decline, I think it's reasonable, for different reasons but that, to me, is an opportunity to look at non-traditional forms, right.

So if you think about data streams, big data streams, particularly—and I know John's heard me talk about wearables before but in this particular case, it's a little bit different. You can take, say, Fitbit users for example, not exactly a perfect randomized sample framework, but you can take Fitbit users, you can go to an aggregator like Fitabase—Fitabase for the record—and those kinds of companies are aggregating Fitbit detail. They will let you go out and do a study. You pay a participant something on the order of \$20 per data month, and the participants get a solicitation note with disclosure, opt in, and then basically, the data is basically streamed to you out of that Fitbit user population. You could use that to do population-level sleep surveillance on a fairly broad cross-section of people across different territories and regions, things like that. So just different ways of creatively using the new data streams—appropriately bounded, you know, for privacy—to enhance the surveillance picture as you're going and enhance that kind of informatics, which is going to lead into an informatics question about non-standard approaches when you don't have the perfect framework when you have this kind of fractional or partial framework.

And then just a last point to do with fractured work, which is something we were getting very aggressively into the last ten years. Just not to lose that. It connects back to our earlier topics in the opioids about job insecurity and things like that, but just, you know, I was thinking as we were talking in that section just about the social network or the market connector type companies that don't really have employees where they have, like, 100 employees but they're \$100 billion

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companies basically. So what happens in those kinds of situations to surveillance where you're not able to follow someone as an employee now of someone. They're kind of independent contractors. So again, are there ways to connect into those types of data systems or go after some of those enterprises and say hey, if you're going to do this, you're interested in—they keep saying—in public health benefits, like underserved territories, getting better transportation services and things like that. What about providing some data stream to allow us to look at your driver population or your tasker population to assess, right, a non-traditional population that we could follow? Because I think all of those opportunities are there.

DR. KITT: Thank you. And getting back to your first comment about the states, that is one of the things, the items that one of the workgroups is taking up is exactly that, is how can we further invest in those states that are marginally producing surveillance information. You know, does it mean we ask them to follow just a small subset of occupational health indicators, we sort of change the overall approach? So those are some of the things, because that's definitely an important point, and so thanks.

DR. BUNN: Judith?

DR. SCHNORR: And this is Terri. I just want to add, yes, I appreciate your comments, particularly about the aggregation of data and new approaches, which is one reason why we're very excited about the use of biomedical informatics and increasing our skill sets in those areas because that can allow us to do a number of things that we can't do now with the traditional methods.

DR. BUNN: Okay. Judith?

DR. MCKENZIE: Judith McKenzie. I was involved recently in this study, (both in Drexel @ 02:42:07) researchers look at how long it would take a PSR or an MA to ask about the industry and occupation during the intake in the emergency department. It took minutes. And I was just thinking how amazing it would be if—Epic is used by so, EMRs are used by so many now and Epic I think kind of dominates the market—if they actually had a click where you can actually include industry/occupation just the same way that you would have to verify allergies or medications or, because... Like a dropdown menu for it, is that...?

DR. BUNN:

DR. MCKENZIE: Yes, like a dropdown menu or you know, they have pillarboxes on the side where you have to verify your—note that you reviewed the allergies, review certain aspects of a person who comes in. But occupation is important too, at least as far as we are concerned, right, because that's why we're here and it would be amazing if these EMRs would actually include that where it's actually an accepted part of what you ask your patient when they come in the door. So when they first come in, what are your allergies, what are your medications, what do you do? If it was actually a part of the EMR itself, it would help to increase...

DR. KITT: You know, the group that we have that works on the electronic health records,

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they have been developing a coding tool, and Terri can fill in a little bit more. This is, obviously I'm not an expert in this. But they have actually been, they've had three scenarios, three clinical scenarios, where they worked to sort of pilot this as to how it would move forward, one of which was diabetes, one was musculoskeletal disease and I'm blanking out what the third one was. Was it cancer?

DR. SCHNORR:

Return to work.

DR. KITT:

Oh, return to work. And so they wanted to do sort of these demonstration areas as to what the clinical decision, how it would influence the clinical decision-making. And I think that those three efforts were pretty successful but they were just small, small efforts that they had.

But we have now a person that's working with us on electronic, this electronic health record industry and occupation coding that has worked for companies like Epic in the past, and I think having her knowledge of how they, you know, think about these things and what they're going to put in and where—and her connections maybe through the industry may help us do some larger demonstrations as to why it's important and how it can help. So, did you want to add anything, Terri, about the EHRs?

DR. SCHNORR:

No, just that the EHR system is very complex and so those who have been working on it have done a lot of work to try to understand sort of how to not only get the various committees to be interested in inclusion of these data, but then also the logistics of it. So they've been working very hard on that.

DR. KITT:

Boy, yes, it sure would sort of turn things around for us if it was there.

DR. BUNN:

Very good comment. Ron.

DR. STOUT:

Ron Stout. A question on the EHR piece again. Are you talking about the Epics and the Global Hospitalization Standards or are you talking also about the occupational health electronic health records or?

DR. KITT:

It's mostly to get it into sort of the primary care...

DR. BUNN:

Emergency.

DR. KITT:

General hospital systems, because we think we would capture a lot more information that way. I think the occupational health systems probably already do a fairly good job, a fairly good job of capturing some of that information. Or should. But it's certainly a lot better than what we get from general health record information. But same thing I would think could be used in both systems, but...

DR. HOWARD:

And you know—this is John Howard—I wonder how reliable, inclusive, comprehensive those occupational safety and health systems are going to be in the future given the erosion of the standard employment relationship and the fact that the employer, whoever is responsible for having that system, doesn't really include a lot of people who are working in that particular area. So, you know, it may be a 20th century thing that is not going to work so well in the 21st century.

DR. BUNN:

Very true. Marc.

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- DR. SCHENKER: Marc Schenker. Several years ago, there was a proposal to eliminate the National Agricultural Worker Survey, and I wrote one of my other creative articles, which was called, "What You Count Counts," basically making the point that agricultural is a hazardous industry and if you stop the survey, it doesn't eliminate the injuries; you're just not seeing them. And so I totally support these efforts to enhance surveillance because if we're not looking, if we're not capturing the data, we're not seeing what's going on. And the other experience, just to mention one, the Census of Fatal Occupational Injuries, I'm not sure why it did this but it captures place of birth of fatal occupational injuries, and I use this all the time to emphasize that immigrant workers have higher fatality rates, and you wouldn't know that without asking the question about where the workers were born. And it's just one question, it couldn't be in much more detail, but it emphasizes this point again. Without us looking, we're not going to capture what's going on, where the high risks are, and other things that we need to enhance our efforts.
- DR. BUNN: Very true. Very true. Any other questions? Yes, Karla.
- DR. ARMENTI: Just getting back to the electronic medical record, you know, being one of the surveillance states, we're pretty familiar with NIOSH's efforts. My understanding is that oftentimes, and maybe many of you have experienced this, upon registration they might ask you your occupation and who you work for, that sort of thing. From what I understand, again, is the registration systems don't always talk to or end up in an electronic medical record. So I think there have been some pilot studies, actually one in New Hampshire at Dartmouth-Hitchcock Medical Center and one in California, Bob Harrison I think that started looking at that. I know you're familiar with it, I'm sure. But is that part of the issue?
- DR. KITT: As to where the information is taken in versus registration versus...
- DR. ARMENTI: Yes, kind of.
- DR. KITT: Yes.
- DR. ARMENTI: I mean, you know, Epic is the system that manages the medical record with all of the medical information in it, so asking it twice isn't going to help, you know, registration and in the doctor's office.
- DR. KITT: Yes. You know, the conversations that I've been in with our electronic health records folks have focused on possibly the technician or nurse asking it as part of a dropdown menu, not necessarily as part of the registration piece but...
- DR. ARMENTI: In the office.
- DR. KITT: As they're bringing the patient in to see the clinician. But...
- DR. ARMENTI: But it may already be there in the registration, yes.
- DR. KITT: In the registration piece so...
- DR. ARMENTI: And I would not recommend a dropdown menu. We've got experience with our Poison Center. People don't know where to put an occupation. Just text it and it gets coded later on.
- DR. KITT: Yes, I would have to defer to our experts that are working in that to know where

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- exactly, what direction they're going. I don't know, Terri, do you have a comment on that?
- DR. SCHNORR: Yes, well, just to say that we're looking at the different options to see what works best, partly too to minimize the burden on the vendor who has these systems that we're trying to convince to incorporate this information. But we do think that, you know, trying to get this with each office visit won't solve things immediately but over time, if it's recorded at every visit, one would have a pretty good occupational history in one's medical record. So it's one of our long-term objectives to obtain complete work histories in the medical record system.
- DR. KITT: I can't remember the last time anybody asked me what my occupation was other than on a visa application, so...
- DR. BUNN: Okay. Just wanted to make a comment myself in response to Karla's comment. We actually published a study here a few years ago where we did exactly that in the University of Kentucky Medical Center looking at the intake data versus what was actually billed and we found that, as you suggest, especially construction and agriculture, if you just strictly look at workers' compensation as the expected payer field, that way undercounted the number of injuries in both construction and in agriculture especially. The other industries as well, but really, really saw in construction and agriculture. So if—and I'm not sure with, you know, the EMR systems now, if they can talk. But if they can then that would be a good suggestion that if that information, I mean still, when I've gone to the emergency department they always ask, or even a primary care provider, what is your industry and what's your occupation. If it's not verbally asked, it's asked in the paper documents, so it is already recorded somewhere. Okay, sorry, who's next? Judith, yes.
- DR. MCKENZIE: Judith McKenzie. I was just going to make a comment that I do see your point in terms of registration versus clinical care, so registration is used mostly for billing, and then clinical care. So it would be ideal if that information could pass over so that when the clinician sees the patient, they can actually incorporate that in what they're doing.
- DR. BUNN: Exactly. They need to talk to each other.
- DR. KITT: Yes.
- DR. MCKENZIE: I mean, that's a good point. It's already there in a sense but it's probably on some paper form somewhere else or—so how do you access it?
- DR. KITT: Well, I'll check with our folks to see.
- DR. SCHNORR: Yes, and just a comment on—this is Terri again—so one of the requirements to get anything incorporated into the electronic medical record system is that it has to have meaningful use to the clinician. So we're considering that, that the information that we collect has to be there for the physician to look at when you're meeting with the patient. That's built into the considerations; in order for something to be approved, it has to do that.

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DR. KITT: Or they won't even consider it, so.

DR. MCKENZIE: And we all know it's important.

DR. KITT: Yes.

DR. BUNN: So any other questions, comments? Yes, Kyle.

MR. ARNONE: Excuse me. Kyle Arnone. I'm wondering if you might see this be implemented more easily in a managed care setting where you have the insurer that has a direct relationship with the employer and they would know, at the very least, the industry and also possibly the occupation of all the people they are insuring, and then filtering into a provider system. So Kaiser Permanente comes right to mind as a provider where there's much more integration on the insurer and provider side where this information is probably monitored.

DR. BUNN: Yes.

DR. KITT: So that's a good point, and I think one of our pilots, Terri, wasn't it with Kaiser? Do you recall?

DR. SCHNORR: I think one of our early efforts. I'm not sure if we implemented a test system but we did work with them a bit but...

DR. KITT: Thanks.

DR. BUNN: Any other questions? All right, well, thank you, Margaret and Terri. Sorry, did you want to say something?

DR. HOWARD: No, I was just going to add, thank you, Margaret, for doing—it's a lot of work. And you know, to Marc's point about the surveys and Ted's point, you know, one of the impetuses that we wanted to do this was to actually kind of see if we could come up with different ways of doing it, is that these old style 20th century surveys are really, for us, becoming way too expensive. You know, to add a question to a NCHS type thing costs a million dollars, you know. And so, you know, whether it's the ag workers' survey or anything of these other things, it is just an enormous amount of money can be spent on getting a few questions in some of these national surveys. And then, as you pointed out, Ted, the national surveys itself are precarious to begin with. So, you know, when we went to the Academy, we wanted, you know, ideally new, bright, shiny, inexpensive, quick—you know, all these wonderful ways of doing it using social media...

DR. BUNN: Right.

DR. HOWARD: And all the other things that are going on with AI and etc. I'm not sure we got that. And so, so now I think we have to sit back and figure out how we can do a lot of this, figure all of this out on our own. So, you know, we're going to have to look at some of these new technologies with mobile phones and other things, and figure out how can we really do this in the future. So we didn't necessarily get it out of the Academy and saying, you know, biometrics, that's great to say that word. It sounds really trendy. But you know, there's a lot of work that you'd have to do. And so I see this as a multiyear issue and we hope at some point to engage with BLS and OSHA, but OSHA doesn't have a permanent Assistant Secretary and

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BLS I don't think has a confirmed Commissioner. And so, you know, acting people are not going to, you know, commit to these long multiyear type strategic things. So I see us here in NIOSH really working this issue and we really would value your continued input. So I think the next time we do this, we'll have more information from our group, but I think we're going to be really searching for ways to do this. The old ways are just, are too expensive, regardless of their longevity, and we've got to figure out some new ways here. So we really rely on you all to help us in this regard.

DR. KITT: So more to come.

DR. BUNN: Right, thank you for your comments, Dr. Howard. I think we're, yes, we're pretty much right back on schedule so I think we will be breaking for lunch now. Like I said, Alberto left lunch options on your desks, so we will return again and start at...

MR. GARCIA: I think that 12:30 should work.

DR. BUNN: We will return and start again at 12:30.

[Lunch.]

DR. BUNN: Okay. I guess we're ready to start again. I'd like to know who is on the phone with us now. Anyone on the phone?

PARTICIPANT: On mute?

DR. SHULTE: Paul Shulte.

DR. BERRY: Ann Berry with NIOSH.

DR. BUNN: Okay.

DR. HOWARD: Charles is gone. Sharon's...

MR. GARCIA: Do we get Charles and Sharon on the phone or no?

DR. COOPER: Yes, I'm on the phone. If you hear me, this is Sharon.

MR. GARCIA: Yes.

DR. BUNN: Yes, we can hear you, Sharon. Okay, so this is the public comment section. There was a letter, and it's in your packet, from the National Safety Council and I guess I would just make one last request. Is anyone from the National Safety Council on the phone to comment on the letter?

Okay. So yes, this is in your packets. That was submitted August 22 in reference to their free drug employer kit that they have produced, the National Safety Council, that contains a bunch of resources. They've got a substance use cost calculator, but are there any comments from members on this letter from the National Safety Council?

All right. Since there were no comments, would you like to say anything, Dr. Howard, on that?

DR. HOWARD: Sure. Yes. I was just going to say, you know, obviously the National Safety Council—I should have mentioned them before when we were talking about partnerships and all that—we have an MoU with the National Safety Council and we participate every year in their activities. And Debbie Hersman, who's the

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President and CEO, often comes by when she's in Washington and we exchange a lot of collaborations.

The one big one that we're working with them on is in distracted driving and other types of issues, because the National Safety Council has been a leader in driver safety, etc. and they obviously are interested in the area of fatigue and of driving, and then they've recently developed these materials in the opioid prevention area, which I think a lot of them go to the issue of best practices and so we're... And they collect a lot of information from their membership about what the membership's doing. So I think it's going to be a great resource for us to understand what the large number of employers, which tend to be large employers for the National Safety Council, are doing in this area. So I think, as Laura and I were discussing, we've reviewed their materials and we're trying to figure out how we can continue to get data from them about what their membership is doing in best practices.

DR. BUNN: Thank you. Any comments? Okay. Well, I guess we're ready to move on to the first presentation or, I guess, in which, the only presentation this afternoon, Dr. John Piacentino will be speaking on Enhancing the Transparency of NIOSH Science.

ENHANCING THE TRANSPARENCY OF NIOSH SCIENCE

DR. PIACENTINO: Great. Thank you, and thank you, folks, for an opportunity to talk about how we try to enhance the transparency of our science, and I think that this engagement today with Federal Advisory Committee is a very good example of how NIOSH has opportunities to bring its science in front of individuals and really get engagement and also bring transparency to the process. And so hopefully, during today's talk we'll have a chance to kind of go through how we undergo our science and create opportunities not only for transparency but also for engagement. So today I think I'll focus maybe on three areas and there'll be time for questions, if there are any, and one is I'd like to just touch on the role of science in occupational safety and health policy. And I use the term "policy" in a very sweeping way. I'll give examples of what I mean when I talk about occupational safety and health policy. I think that there are certain challenges to moving science policy to practice, and we can touch a little bit on that. And then, finally, transparency and engagement as opportunities or resources for overcoming these challenges.

And so briefly, I'm for trying to describe what we're doing in terms of bringing policy to light, if you will. On the left side you'll see the gears, and the gears are really meant to talk about NIOSH in terms of the machinery of how you generate science and information. And so NIOSH has a couple of different ways or activities that we do this. I highlighted in the green gear, you can see the term "research", but beyond research, we do all sorts of things like field investigations, we come conduct multiple analyses.

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And so the discovery of information and the discovery of science is that it can take the form of many different activities and it happens both intramurally, meaning by people who are within the NIOSH walls, and extramurally as well, and NIOSH using funding to produce outputs, if you will. And so following the arrows you can see that any individual project, and this is a scale issue, so you'll have to think a couple of dimensions here. You could think about any particular research project is producing an output or multiple outputs, but you can imagine then if you are interested in elaborating something called an occupational safety and health science policy you would want to consume these outputs to answer important questions around worker safety and health.

And so the consumption of these outputs, you might take that information and try to stratify it according to whether or not these outputs come to you from human data, animal data, I have mechanistic data. There are multiple ways that you might configure this, but suffice it to say that any given scientific activity can yield outputs, and then when it comes time to figuring out what your occupational safety and health policy is around this, you'd be consuming those. And then, presumptively, then using this information you could actually influence workforce protection. And so the idea that a federal agency or scientific agency is generating information as a way to influence behaviors is a common approach that happens not only at NIOSH but at other federal scientific agencies as well.

So I touched a little bit in terms of occupational safety and health policy and perhaps you might think about what it does and so in the first bullet here where I talk about generating indicators of public health problems, here, perhaps, the banner example might be surveillance. And so if you think broadly about occupational safety and health policy is, which would be, say, the issuance of national statistics. There are national statistics that recognize or count problems and provide official numbers, if you will. That's a good example of a generating an indicator of potential public health problems. We can also think of occupational safety and health policy as characterizing public health problems. Perhaps telling you whether or not exposure to a substance is associated with an adverse health effect. You could think about occupational safety and health policy in terms of whether or not it helps you test policy responses to those problems. And so one can imagine intervention effectiveness research, asking questions about I wonder if personal protective equipment is effective in reducing on the incidence or a particular disease or injury, if you will. And, lastly, occupational safety and health policy can help advise and influence stakeholders and decision-makers on their own policy choices. And so as a result of NIOSH, say, creating policies, occupational safety and health policy, then those policies could be transitioned locally into practice. And so it could come at the advice of, say, an employer reconfiguring a process based on knowledge that was generated by NIOSH. So I thought I might offer up some just basic examples and they seem really

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basic, but there is a load of science that goes behind each of this and so here's a very attractive infographic that talks about noise, and here the infographic states 73% of the time, construction workers are exposed over the NIOSH recommended exposure limit. And this is a good example of NIOSH producing information that's intended to call attention to a proportion of construction workers who might be exposed over a recommended exposure limit. And there's a lot of science that goes into figuring out whether or not that's the right number, what is the number, and also think about the science that you might develop to actually develop a recommended exposure limit.

Another example, businesses spend \$242 million annually on workers' compensation due to hearing loss. Okay. Here's another. And this last one I'm talking about protecting workers against heat stress, another infographic that talks about developing an acclimatization plan. And, collectively, if you think about these three infographics, one basic way to think about occupational safety and health policy is that perhaps NIOSH might be interested in understanding whether or not a particular exposure causes an adverse health effect. That would be, say, Part 1 of the policy. And then the second part, now what should you do about it? So now that that this particular exposure may cause an adverse health effect, here's a plan for how you might—or information for how you might mitigate or prevent that effect. And so taken holistically that's maybe a nice heuristic to think about occupational safety and health policy.

So how about some challenges in moving science to policy and policy to practice. and so developing occupational safety and health policy you might think about it generically according to three major processes. And so one process might be generating and collecting inputs, another process would be developing the drafts, and finally would be disseminating the final reports. This process that I'm representing to you is something that I would say applies to us internally. So NIOSH, in some instances, as an institute we could actually be the generator of the initial input. We might have a research project and commissioned a research project, and use that as a hypothesis-driven research project. We might collect other people's inputs and so it might not be enough for NIOSH to do its own science. NIOSH may actually have to consume somebody else's science. And then based on how we develop all of these inputs and amalgamate them, we develop a draft of the policy and then finally that draft policy would turn into some final report and. It's an attractive figure, it kind of breaks it down into three nice little boxes, but the fact is this is no easy process, and when you think about the difficulties you might think about these difficulties at least in four dimensions and they're probably others.

I'll start out with the same cognitive applying technical knowledge and experience is very difficult. Understanding deep scientific issues, cognitively it takes some work to be able to do this. Procedurally, although I've outlined three basic steps, I

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can guarantee you that there are many more than that.

Organizationally, within any organization you can imagine that working across organizational boundaries, inside and outside of the organization, has a certain amount of complexity, and also environmental. And so that the environment in which these policies are not only developed but where these policies will be utilized can and does change in making sure that you meet the needs of decision-makers in these environments is something that's on plastic and keeping track of that can affect your policy development.

So I'll take these each and kind of give some quick examples. In terms of cognitive complexity, the questions that we asked an occupational safety and health are inherently difficult. It's not easy to figure out how many workers are ever exposed to any particular agent or process, and that complexity can be due to the fact that we may have limited counting systems. We may have limitations and understanding which workers are potentially affected. There is uncertainty and constraints within any set of scientific literature. The technical knowledge across disciplines is hard. So you're not only working within, say, a field of industrial hygiene you could be also incorporating other fields, and it also relies on a certain amount of professional experience.

Procedurally, many of these steps are what I describe as interlocking, meaning you do your part and I'll do my part. So in some ways it feels like it could be sequential, but there's also backflow within this system. And so you produce a draft document and somebody reviews it, and it could get sent back to you for a certain amount of revisions, and you could get involved in a vicious cycle of review and revision, and that does happen. It's not always virtuous, sometimes it's vicious. I mean virtuous would be better, right? But sometimes complex problems are hard to solve and you can get back and forth in these issues.

Organizationally, there are natural tensions within any given organization. There are power structures within organizations. And so at times there could be a tension between the scientists who believe that a certain relationship is true and that we need to bring that relationship forward, and there could be limitations in terms of what that science is showing or not showing and that creates a natural tension with people who actually are empowered with reviewing that same work. And so the tension would be if you're reviewing my work, but you're not recognized as a subject-matter expert within my field, there's only so much that I will tolerate from your particular review, and if you actually get too deep within my discipline, perhaps, I might rebut your review based on the fact that I don't recognize you as a similarly situated colleague or subject matter expert. And so that's a good example of a natural tension that happens within organizations and that certainly plays out with the NIOSH.

And I'll just touch a little bit on environmental because in some ways this is a bit of a—sometimes this feels unanticipated or it feels almost random, but it's not

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necessarily random. And so I'm going to touch on the last one, decision-making criteria. The occupational safety and health community specifically will take regulatory toxicology as a community, has many practiced ways of thinking about whether or not science evidence is reliable. And these practice ways rely on whether or not evidence comes from human evidence or animal evidence or even mechanistic evidence. But you can imagine that advances in technology creates other streams of evidence. There's modeling, there's computational sciences, etc., and how these new modes of understanding these relationships then play out in a regulatory toxicology circle is uncertain. And so if you were a decision-maker responsible for elaborating a national occupational safety and health policy you might have some reticence to wage that policy on the basis of a newer innovative technology because you would be on unfamiliar ground. It's not something that's been happening in the past and so there's no precedent. And so that would be a good example of an environmental condition that would affect your policy or scientific policy apparatus.

So let's talk about, say, you were able to overcome all of these challenges, how would if you're actually putting forward a good occupational safety and health policy? And I'll speak to it from the NIOSH perspective, but I would argue that perhaps these measures of success would apply more locally if you were doing it on, say, behalf of an organization or a community, or at the local level. And so one item that we look for would be whether or not the underlying science has a cogent argument attached to it. So we would want to make sure that any occupational safety and health policy that we put out presents a cogent scientific argument, not only to peers but also to decision-makers. And they're often time can be gaps between what peers will accept and know versus decision-makers. Peers often work in heuristics. There's a certain word or a term of art that carries with it lots of nuance and interpretation and, perhaps, less is more for peer's whereas decision-makers may need more filling in the blank or even since they sit outside of peer circles are more likely to challenge fundamental assumptions that peers take at face value.

Beyond just presenting a cogent scientific argument, you have to actually communicate effectively to your intended audience and so no matter how smart your occupational safety and health policy is, if it fails to come across the register you might as well have not put that out. And so you can't develop scientific messages that are so complex that your intended audience, it just fails to resonate.

And the third characteristic is whether or not this particular policy is likely to transition to health practice and so publishing, if you will, a tome of occupational safety and health policies would stay on a bookshelf and never transition to practice, certainly wouldn't be successful for us, especially given that the very first couple of slides I presented, the importance of using information to influence

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behavior and so if the information never gets to practice it'll have no chance of influencing any sort of behavior.

And, lastly, it's important that anything that we produce meet procedural requirements. And procedural requirements goes to the issue of whether or not we use quality scientific practices to produce our occupational safety & health policies. That includes things like peer review, it can include opportunities for engagement. And so why don't we transition then to some of the tools that we utilize to ensure, say, procedural adequacy but also make sure that we hit the other three bullets as well.

So think about this: we're trying to make an occupational safety and health policy. We want to make sure that this policy is scientifically sound, communicates to the intended audience, is likely to transition to public health practice, and meets procedural requirements. That's a success mode. So that's what we have to do, so how do we do it? So there has been a push for a transparency, at the very least, in science and public health policy. And I used this term "transparency" separate and apart from engagement because I think they are different.

Transparency is simply telling you or letting you know what's going on. It's taking a black box, or if you want to think about it as opening a window shade, and you can look in. Engagement is different though. Engagement is you actually have an opportunity to do something. And so I'll try to point out where there's transparency and where there's an engagement, but if we can agree that they're separate, you know, then I think that would sort of help our understanding of the issue.

And so I just point to a series of bulletins that come from around data management and data quality. And these are bulletins that are elaborated by the Office of Management and Budget, and these bulletins go to the issue of whether or not you have transparent peer-review practices, whether or not you have transparent data management practices, and whether or not you're plain writing, whether or not you're writing in a language that's understandable by others.

Okay so let's focus—now this graphic, if you recall—let me go back. We're going to take this graphic, this process, come to this graphic now and think about it. All right. Excuse me. So left to right. The beginning of science production, the end is some sort of workforce protection, and there's this big stuff in between. So we're going to take this graphic in three chunks.

So chunk number one. So in the area of science production, NIOSH is thinking about during research. NIOSH might get into a particular area. I wonder what the right question is to ask. You know, these are the early stages of science production. And as an agency NIOSH has many opportunities not only for transparency but also for engagement, and Board of Scientific Counselors is a very good example. I think earlier today it was suggested that if you're going to be planning a particular project we'd like to get involved with that project sooner rather than later. Right? That's the sentiment. If you're planning something, now is

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the time to interact.

We have National Occupational research agenda which many folks may be familiar with. This is our partnership to stimulate innovative research and improve workplace practices. We set priorities and that can include the number of workers at risk for a particular injury or illness. We may try to gauge the seriousness of a hazard or the probability that new information and approaches will make a difference. Perhaps, that's not the issue, but that's quite—it's sort of a value of information argument there.

Within science-production. We also say, once a science research project is conceived there's an additional opportunity for transparency and engagement and so we may engage peer reviewers to review that particular science project to make sure that at the conception stage it's configured properly. For those folks who have participated on our study section this is a prominent feature when we commissioned extramural research. It's also a feature of when we use intramural research as well. Once that science project has been resulted we produce a whole bunch of data, and I'm not sure that folks are aware of this, but NIOSH has a data and statistics gateway. The data and statistics gateway is where we make our data available and so we might produce a research dataset, we have surveillance, data and we have other data resources as well. So if you were interested in examining a particular dataset that we've collected, this would be the place where you would go to gain access to our data.

Now some of our data might not be appropriately available to you as a public use dataset, right? So some of our data might actually have to be more restrictive use for the purposes of protecting privacy or some other issue. That data can be made available through a research data center. NIOSH has experience using research data centers as well.

During the development of occupational safety and health science policy we would actually—this is where you start to accumulate all of this information and develop draft documents. Example documents include the risk assessment document that was referenced earlier today, the nanosilver document that was also referenced earlier today. These draft documents are now available on our peer review agenda website and they're also available for public review. What that means is, from a transparency perspective, you now have an opportunity to see what questions NIOSH is asking from the peer reviewers, that's the charge to peer reviewers. You would have an opportunity to see who NIOSH invited to be a peer reviewer, and when this document is complete you will get a chance to see what the peer reviewers said without attribution to an individual and what NIOSH did in response to the peer review comments. In addition, there's an opportunity for folks to engage on a public—to provide your own comments. And so perhaps you say, "Well, it's not enough to let the peer reviewers know this. I think that I want to also comment as well." And so you could write in a comment and you

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could launch it with our docket, and we would review your comments and you would get a response.

I wanted to touch a little bit on systematic review as well, because I think that systematic review is a tool that is becoming increasingly utilized for the purposes of ensuring that when you're looking at these types of complex problems you've appropriately evaluated not all the literature, but the relevant literature and it's not an all the literature argument. All the literature may not be necessary. It's the relevant literature to your question at hand. And so systematic review is a way that you can do this and here you're defining a question. Developing a research plan through an analytic framework. And, in doing so you're learning people to your method for examining this body of literature for the purposes of answering your question, and that's another way to be very transparent. That same process can be very engaging because you might, in fact, take comments on your systematic review plan before you actually execute the review.

So you've planned your review, you haven't executed it, but you would invite people to comment on a review plan before you execute because somebody might say, "I think you missed a population." "I think you have a poor conceptualization between how exposure does lead to an effect because they could be mediated by some factor like adherence to PPV or some other," and your plan fails to take that into consideration. Sometimes we get into questions about who actually is an expert because I've sort of described two different ways people can interact with NIOSH science. One is your identified as a peer reviewer and the other is your identified as either a stakeholder or some other. So here you're not recognized as a peer reviewer, but you could be recognized in another class. And so folks say, "Well, how do you know who's an expert?" And you could look at scientific peers, extended pure network, stakeholders, publics. Can't all these people have expertise in your area? Why would you discount somebody's expertise? And that's mainly the question that comes. And it's not a question of discounting expertise, it's actually about identifying some other factors associated with what we think distinguishes peer reviewers from others who reasonably would want to interact with that work. And so expertise is part of it, but the other parts that we look at include things like independence and conflict of interest. We might look at bias and impartiality. And so even within peers, if you have a peer that has a long-standing point of view that you think is somehow immutable toward your work, you would want to know that when soliciting peer reviews, so you can understand the nature of the comment. And so these are factors that we consider when identifying peer reviewers, and that's not to say that stakeholders and members of the public don't also have expertise and also can't contribute, if you will, productively to our work.

I mentioned previously that we maintain a peer review agenda and I just wanted to show you a snapshot from our website. This is a transparent way that we let folks

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know when we have documents undergoing peer review. This is a list of the documents that are currently open for public comment. So this is separate from the peer review agenda, but if your question was which documents is NIOSH made available for public comment, you would come to this part of our website. And I touched briefly on systematic review. I don't know if you need something so medicinal that I would go through all of these steps, but suffice to say there are many steps to go through for a systematic review, and we're very interested in making sure that when we conduct systematic review that we're able to follow these steps. It's a way of not only being transparent, but you could imagine, as I said, that there are opportunities for engagement along the way.

Finally, once you have your occupational safety and health policy then I think it's time, as I said, to start to transition it into practice and workplace protection. This is where NIOSH really is very dependent on its partners. We depend on our partners to, hopefully, view the information is good and good enough that you would actually use it. Transitioning to practice can include any assortment of dissemination strategies like through social media, etc., but I would highlight that the first bullet in terms of partnership engagement really seems to facilitate the process the best, and that is that if you've engaged your partners at the beginning of the process exception and adoption is facilitated at the end. And so trying to push a rock uphill, if you will, is a little bit more difficult than having somebody eagerly awaiting your occupational safety and health policy.

So as I've thought about my experience developing occupational safety and health policy certain things that I might call attention to is that I often start with the science. I think it's important to have sound science at the very beginning. I do think the transparency and engagement is very fulfilling for our policy. It's not just a matter of fulfilling requirements, if you will, it's really about ensuring some transition between policy development and practice, and also elaborating the best policy. It's hard for us to know everything, and so we rely on others to help us. And that leads to the second to last bullet which is it's really very much a team sport and it's important to engage decision-makers early. If you don't do that then I think it can be difficult to make sure that a policy actually gets enacted the way that you intended.

I have some questions for general discussion if you want to ask these questions or I'm happy to entertain comments in other areas. I would be interested to know if you've ever participated in the development of occupational safety and health policy, whether or not something went really well it didn't go so well, and be interested in sharing that and, if perhaps, you have any suggestions for NIOSH to engage others in the development of our own occupational safety and health policy. Answer these questions or take your own, either way.

DR. BUNN:

Thank you, John. Great presentation and great description, I mean, on the whole development of policies here. So wonderful presentation. Are there questions

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- from the members, comments? Yes, Mark.
- DR. NICAS: This is Mark Nicas. Actually, I've been involved with the (ENC @ 00:30:02) committee, although it might be transferring itself to some other organization that had to do with devising a scheme that NIOSH might want to use for the acceptance of—acceptable fit of (inaudible @ 00:30:17) respirators because currently when they're custom-certified there's no kind of evaluation of the fit in the general population. So the issue came up really regarding transparency and the transparency issue is this, that in the past, and as proposed by most people on this committee, they thought that a binary decision was just fine. In other words, a test or a DENT, and the user-public need this to know, a test or a DENT. And I thought that that was not adequate, that in fact it would be informative if the user-public could understand what the results were; what percent of the panel passed and didn't pass. In other words, you know, if anybody had the choice of a potentially better fitting respirator that would fit more people than one that maybe just passed, or like advertising miles per gallon. Wouldn't you want to know that when you bought a car? And I'm not aware though that in the past, NIOSH actually has made available on a public site and what the results of, let's say, PPE evaluation had been. The only thing I know that my test certifies for PPE are respirators, and the only thing I can think of that really would be informative to the public at this point might be the filter penetration tests that are run under different classes. But now you have something new, this is like what percent of a test panel will have been acceptable fit and therefore shouldn't that be advertised. So it's a question I have for NIOSH. I mean, do you think that that information—percent of a panel that who passes a test in order to have your respirator test-certified—should that be available to the public online? And not even going through Freedom of Information Act. I mean, why should you have to go through all of that? The test result is not confidential, just post it online. To me that's sort of a question of transparency in the process, you know, and also transparency of the results to the user.
- DR. PIACENTINO: Sure.
- DR. NICAS: That's been a pet issue of mine.
- DR. PIACENTINO: Yes, I understand. One thing I didn't talk about was how would whether or not transparency is helpful, and I think that might be underlying some of this question which is from your perception you think the greater transparency has usability or would meet preference needs of consumers. And so how do you gauge whether or not consumers really want this information. And then that triggers another thought in my head which is how would you resource that activity and how would you figure out the answer to that question. I mean, I don't know that I have a particular view in terms of whether or not NIOSH should do this or routinely do this so much as I think that that's the value of transparency, and I think bringing that type of question to NIOSH or to any other, that's how I think it would take the form.

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I think it would take the form of to the agency, how do you know what consumer preferences are around this particular aspect of your testing and do have any activities to gauge that? I mean, I think that's a great question. NIOSH does have—oh, I don't remember. NPPTL has a personal protective technologies, I think. I don't remember the name of their ongoing activity with National Academies. But I think that this issue, reasonably, could go within that activity. So they have an ongoing activity with the National Academies of Science where they look at issues related in personal protective technologies ongoing and I think that that might be one avenue where they might get that question, feed it into them. Also Board of Scientific Counselors is a perfect way to feed that into NPPTL for some consideration.

DR. NICAS: Well, Mark Nicas again. (Inaudible @ 00:34:05)

DR. PIACENTINO: Yes. No, I get it. Yes, Howard, go ahead. Help me out.

DR. HOWARD: I had a whole bunch of—no, I'm not helping you out. I just have a totally different question.

DR. BUNN: You're on your own.

DR. HOWARD : I just have a totally different take of what he said.

DR. PIACENTINO: Oh, really? Go ahead.

DR. HOWARD: Yes. I thought what you were saying is that when a respirator comes in for evaluation for certification, okay, and it goes through test A, B, and C, and the results of A are 95% good, and the tests of B are 45% good, and the tests of C are 55%. And then NIOSH, at the end, says certified or not certified. So my understanding of what you were saying is you would like to know, one, what the results of each of the tests are and what the pass/fail, what the cutoff is for us to say that something's passed, so that at the end when respirator Z of manufacturer X comes out at the end then all of that would be available. That's what you're talking about, right?

DR. NICAS: I mean, basically I see the minimum requirements are really spelled out sort of like a ton of information, so that's not a mystery, but what is not provided to the general public are the actual results of the test.

DR. PIACENTINO: Of that particular thing. Yes. So that's what I understood you to say. So I got that right. So I think that's a very interesting question. I agree with your assessment that that would be very interesting to put in front of the National Academy Standing Committee which NPPTL has, and sort of tee-up that question and see what people think about that. Then it would be interesting to see whether or not the Office of General Counsel looking at the reg which spells out, I think, the end outcome which is it certified or not, whether or not delivering that kind of internal management information that goes to that is permissible, legally or not, then the manufacturers would be very interested in that issue because the same type of respirator Manufacturer A, Manufacturer B, let's say, there are three tests, the scores look better. They came closer above the cutoff than the other

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manufacturer, so then that goes to the marketplace. So to me, there would be a lot of issues involved there. Again, I think it would be interesting to say to the Standing Committee at the National Academy, you know, "We're talking about transparency and this is a transparency question, what do you all think about it?" so I agree with your bottom line, but you, Mark, to be talking about something very specific associated with respirator approval system that we do.

DR. NICAS: It is true. I don't know the history of the miles per gallon notices about how your car does. I don't know the history of that, but maybe it's really entirely analogous because I know that most manufacturing respirators would be adamantly opposed to revealing the results of that testing because they don't want their respirators rated in someone else. All they want is the NIOSH stamp of approval, right.

DR. HOWARD: Right.

DR. NICAS: The top performing respirator would love you to advertise their result, but most of them, in general, would not want those results posted because they don't want to be compared.

DR. HOWARD: Right. And that goes to the issue of the nature of the relationship that NIOSH has with manufacturers. One of our big challenges in that area which, again, is another topic for the committee is a presentation about respirator certification system, is our certification requirements are performance requirements. Okay. So we don't say the thing should be designed this way. We depend on the industry to innovate and design, and we can help them in the research part of NPPTL and we have a project to try to design the new N95, for instance, and stuff, but those are engineers and innovators out there in the real world.

So it's a relationship that requires a lot of sensitivity, and I think that's another factor in that question about how we keep the pipeline going because in some of the markets our respirator market, for instance, in mining respirators is very, very small and some of the times we worry is that with an escape respirator that we may—if the manufacturer leaves the field then workers are not protected. So it's a very delicate kind of relationship.

MS. LASZCZ-DAVIS: Chris Laszcz-Davis, perhaps a comment and maybe a question, that with relation to your first question, I mean I've had the opportunity to be involved in state, national, and international policy so I've had a chance to work on all three fronts. At least it's been my experience that what works best is to make sure you've got some constructive tension in the system. You don't want a real homogeneous group, for one. It makes it more difficult, but absolutely critical, and then to have some—make sure that in terms of the stakeholder group you've got small, medium and large enterprises involved. Of course, the whole concept of—I don't know if the gig economy is the right concept, but when you look at what's really going on from an employment or lack of contractual relationship I think the ability to get the right stakeholder groups is going to be tough.

The only other thing that—and it's been, I think, a long-standing dilemma. I'm not

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sure if I have an answer to this, but having been in industry for years I can say that oftentimes when the call came out for information we certainly didn't put it out. I mean, it's a little bit to Mark's comment. Industry puts it out transparently, they get sued. So there's a there's a lot of information that's available with industry, but the truth is I don't know how much that you ever get to or have free access to. I don't know that'll ever change, but if there was some way to mine that I think it could be pretty powerful. I just don't know that we'll ever get to that, that's the tough part.

DR. PIACENTINO: Well, that's a very good point. We do have trade secret protections that we can offer which sometimes is an inducement. They take a long time to negotiate with the industry attorneys, but we do have that kind of a thing available. So it isn't totally, you know, we have to give up the ship. I mean, there are ways that we could, perhaps, do that to get that data that you're talking about.

DR. BUNN: Yes. But that's an important consideration that I'm not sure that we've leveraged as well as we could have.

DR. HOWARD: Right. And that's a transparency issue.

DR. PIACENTINO: It is, sometimes that plays out so on the other side that may play out with needing to use a research data center. And so there are times when people want to be able to recreate an analysis, and here it's not confidential business information, but here you're worried about somebody's privacy or privacy protected information and, yet, for people who are going to be affected by your occupational safety and health policy they might ask, "I think I would like to be able to do an analysis," and so how do you resolve that? NIOSH has utilized research data centers in those instances to enable some interaction with the data while still having some protection there.

DR. BUNN: Marc.

DR. SCHENKER: Yes. I want to make two points. The first one is your discussion really focuses on NIOSH as an agency, and in academia there are real burdens to faculty getting involved in policy because, basically, it's not rewarded. And I was associate vice provost for outreach and engagement and my whole challenge was how to get faculty to engage to work on policy, to work on these things. It's an uphill battle because the system doesn't reward, you know, put it simply. So that's my first point.
The other one has to do with transparency, and John just started to bring this up. You have to be careful with data, that it isn't misused. I and many other scientists have been the subject of hired analysts to discredit our work. If they're using the same data and they're claiming something different, it's obfuscation, it's misleading, and basically the intent is discredit something that they see is going to cost or not be in their interest. So just two points to add to the discussion that I don't know what your thoughts are.

DR. HOWARD: Well, yes. I mean, John just talked about the reanalysis issue which I think what

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you're raising. We don't have that, you know, 100 studies, you know, 1 may have that kind of an interest. The one that I can think of which we had to do the secure data enclave, so we put the data there. It was the diesel study, but that had clear policy implications for industry and it ended up being used by the UN agency on cancer, and stuff. So that took quite a bit of effort, but I would say that's a rarity for us.

DR. PIACENTINO: I agree I also think that in terms of trying to gauge someone's intent for what they want to use their data is something that's very difficult to do. I don't understand how we would be able to do that. That being said, I understand that analyses can show differences between the original analyses, but where I see that play out is in the scientific literature. I think that having scientific communities weigh-in on whether or not they find one analysis to be more competent or compelling than another or any limitations, that's where I see much of that playing out and there's back and forth, and that happens with letters to the editor and then there's analysis of the reanalysis. So I see a scientific community certainly getting into that.

DR. HOWARD: But, you know, I was just going to add that the diesel study was done by us and National Cancer Institute, so it's government. The tax payers paid for that study. Now in a cooperative agreement, public assistance grant, where you own the data as an extramural researcher, that's an entirely different transparency question. whereas for us, as John said, we're under obligation to make it available. A lot of government agencies increasingly are under more obligation and the EPA is trying to figure out how to do that more often and they published transparency in science Federal Register notice on that issue, too.

So I think transparency question is a little different depending on whether you're an intramural or extramural researcher.

DR. SCHENKER: scientific debate is great, and that's the way the process is supposed to work, but it's often not a level playing field. You have some well-funded company intentionally trying to discredit your work. You've gone on and you don't have funding. I mean, I'm just raising this as an issue, and it is a different world because it's not agency data, but just a sort of sensitivity to this issue that we run into with transparency.

DR. HOWARD: Oh, yes. Yes, definitely. I think it is different for an extramural researcher who may not have additional monies to be able to defend. For us, at least in my view, we have to withstand it no matter what's going—we have to have done good science no matter who is going to reanalyze it and it's up to us to defend it. We can put resources into that defense work where an extramural researcher may not have that ability.

DR. BUNN: Okay. Mike.

DR. BEHM: Hi. Mike Behm. I just want to comment about some of the NIOSH, the NORA process. I've been on the Construction Sector Council for quite some time and

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been through two iterations of the NORA research agenda, and also on the Prevention Through Design national initiative. What I thought worked well about all those things is that you do try to bring a very diverse stakeholder group to the table, and there's a really nice process that people can get involved, public comments, meetings, and things of that nature to really have the group not only learn about what some of the issues are, so there's an educational piece to get everyone thinking, but then they bring their own personal experiences based on who they are representing. Those processes, at least from my experience, have been really positive. But, of course, you never get all the stakeholders that you really want. For example, in the Prevention Through Design we want architects to, you know, I think in the construction sector, although there's union representation, you know, really talking to the worker and getting the worker view I think, to me, that's still kind of missing and maybe it's too far and maybe you have to rely on the union kind of representative to kind of bring that forward, but I think sometimes it will be nice to hear directly from the people who are facing the issues that we're talking about. And so adding that extra lens of validity to it, if there's some way to do that, I think that would go a long way.

DR. HOWARD: Well, a lot of times we have to depend on researchers who are talking to workers. That really is great, great data inputs.

DR. PIACENTINO: And often that conversation is best when it happens at the beginning of a scientific endeavor, right? So you're building in that perspective at the very beginning so that when you're finished people are willing to take up whatever it is that you've just completed.

DR. BEHM: But the NORA process, to me, seemed like a very good process. I'd be interested to know what your thoughts about, you know, some improvements to the NORA process.

DR. PIACENTINO: Well, Lore has been in that for quite a while in preparation for the third decade. And one of the major purposes we're trying to characterize the NORA Council as a mini town hall, you know, the ability have WebEx and Adobe Connect and phone lines, and all that are really helpful because it broadens the conversation and we're just a co-host of these things. It really it has to depend on the people that come to the town hall can contribute.

MS. JACKSON-LEE: So I guess you're probably aware of the third decade. We continue the industry approach which, I think, we felt was really successful in the second decade really being able to address the unique hazards and interventions for each industry, and sort of connecting with people right where they see themselves, and that kind of thing. In the third decade we've added the cross sectors which are the health and safety outcomes, which so far has been interesting because they, of course, are not as far along as sort of these other areas that have existed now for ten-plus years, but I think it is pulling in a slightly different group of stakeholders, maybe more academic in nature. This is kind of a gross overgeneralization. But the other

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thing that we're finding is that we're seeing some cross-pollination between the sectors and across sectors that we didn't necessarily anticipate happening the way that it is, and we're also finding now in the second decade sectors looking to each other about best practices. For example, services is looking at doing some kind of safety stand-down similar to what construction has done. So there have been some things that have come from that. As for what Dr. Howard said, I mean, we really do see ourselves as a convener of NORA, but one of the things. One of sort of the dreams is that actually people will pick up opportunities to work together in the context of NORA, maybe even without NIOSH at the table. I mean, that would be great if people were actually interacting together on their own.

DR. BEHM:

I think that happens.

MS. JACKSON-LEE:

It does. It definitely does.

DR. BUNN:

It does. It does happen.

MS. JACKSON-LEE:

It does. And we're trying to do a better job of tracking those, too.

DR. BUNN:

Okay. Thank you, Mike. Ted, do you have a comment?

MR. COURTNEY:

Yes. Ted Courtney. My thought was I echo Mike's comments about just commending NIOSH for the NORA process being involved in operational end of NORA 1 and then the startup end of NORA 2, particularly myself. When I reflect on those questions that you have up on the board I think of to two standards, processes, or promulgations that one was voluntary, one was federal. Both of which had a kind of ignominy starts, and I think NIOSH had done a good job to avoid those. One was, we'll get the best and brightest in the room, and the best and brightest got in the room and it was a room full of scientists who all had a common language and didn't have any mis-interpretive issues, and could haggle back and forth over p-values. There was not an attorney in sight for at least two years, and then gradually that whole balance shifted. And so then eventually that that voluntary standards just went right into the bank. I think, in part, because threats that were identified by others, but, in part, because we didn't necessarily get people on board early from a broad enough constituency. The other one was a meeting I went to where I turned out to be the only non-governmental employee in the room—I didn't know until I got there—sponsored by the assistant secretary of labor for OSHA, which I had to explain to like a roomful of government employees and me, was not going to achieve like a broad-based industry appealing policy decision by any stretch, and kind of encouraging them to reach out to like the professional societies. So I think the things I've seen that kind of go bumpy have been things like that, where it seems like a great idea, but then if you don't start with them with a broad enough constituency you could wind up people feeling like there was a cabal of some sort; a science cabal, a policy cabal, something that was kind of preordained and then as opposed to a real conversation, and I think that's what NORA has done very well, is keep that constituency broad, but without it getting too much derivative focus to achieve

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that.

The other thing I wanted to point out here that I think it might be an opportunity, we're talking about informatics. John's favorite word. But systematic reviews, just looking at the potential role for automation, semi-automation in systematic reviews because one of the bugbears of all systematic reviews is everyone hates reading all that stuff. So if there's ways to use narrative text methodologies to knock that down and sort of extrude, you know, in an appropriately systematic way, extrude quality data that can be looked at by fewer eyes or by less time on it with eyes, then that I think makes systematic review more appealing, you're more likely to get people to engage in it, right, they were like, "I did one, I never want to do it again," you know, those types of issues. So just think about that in your informatics mix of how you can potentially incorporate automation in the process of doing systematic reviews.

DR. PIACENTINO: Sure. So I'm going to make a comment on the informatics one. Because NIOSH is starting to work with some of the software for distilling—I'm using one of the terms. I think it may be called distilled, I'm not sure. But finding literature and assessing it. I think you're right, that automation does represent a real opportunity for systematic reviews where previously it was very much almost accounting exercise and two readers read everything, and it was very labor-intensive. Beyond automation, though, and beyond thinking about it in terms of informatics, my experience is that working with scientific teams, they have deep knowledge in whatever area they have, but there's something to be said for staffing, or at least somebody that has expertise in systematic review of methodologies. And so having that person get on to a team and be the keeper of what a valid methodology is, how to work the various databases inclusion/exclusion criteria, I think is a unique skill that you embed within these other multidisciplinary teams. So I agree. I think automation is part of the process. I also think that recognizing the methodologist, if you will, and its own expertise is another, and we're starting to do that intramurally and I'm looking forward to see that grow within the institute.

DR. BUNN: Judith.

DR. MCKENZIE: I actually just have a comment that I love your slide on systematic review, a little synopsis. That's my comment.

DR. BUNN: We think in sound bites.

DR. PIACENTINO: Yes. Well, and we worked on that and Dr. Howard wrote a really great paper with me and others on systematic review. I mean, I think, and that's where those steps come from, as I said, we're trying to get more facile with using that to really gauge and describe occupational safety and health issues, and they can take the form of doing a scoping review, something very rapid versus if you think you have a mature literature, and then assessing a very mature literature. So there are different varieties of systematic review.

DR. BUNN: Grace.

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- DR. LEMASTERS: Just one or two comments. In relationship, are there additional opportunities, your last comment. Well, I was thinking, okay, after your policy is developed what about evaluation of how well has it been implemented. I mean, it seems like there should be another arrow pointing to policy evaluation and did we make a difference.
- DR. PIACENTINO: Yes. That's a great question. We do, do evaluation projects. I think at times not. So NIOSH makes a recommendation: I think that you should use personal protective equipment when you do when you handle hazardous drugs. I'll give that as an example. And NIOSH has done research in that area asking, "Did you use personal protective equipment, and what were the reasons why you didn't use personal protective equipment?" And usually the evaluation takes the form of whether or not somebody's following the recommendation. I suspect that you might widen the lens and think about was the policy itself somehow effective in triggering the behavior as opposed to taking if for at face value that the policy was configured just fine and looking at some other reasons. So I don't know if any examples offhand of where we've actually looked at the recommendation configuration.
- DR. LEMASTERS: Well, your noise thing, I mean, only 73% were adhering—when I saw that slide, you developed the noise policy, but only 73% are achieving that. I mean, 27% are achieving that. Someone did evaluate that, but it seems like with all policy development there has to be the next step...
- DR. PIACENTINO: Some evaluation.
- DR. LEMASTERS: At least a year later or some kind of built-in issue. I was thinking about your—the other issue was the systematic reviews, and I was thinking the framework that I think of with systematic review is if you've ever done a meta-analysis of multiple studies, and hopefully you've never suffered through that, but you have to do very systematic reviews and you have to have grounding in what criteria are, and that's a nice framework for systematic reviews, I think.
- DR. PIACENTINO: I think so too and meta analyses are great because—I think, first of all, I think meta analyses are a great example of what a systematic review is. So they certainly fit within the pantheon of systematic reviews. What I like about the meta-analysis is when it comes time to integrating data you have a quantitative method to do this. I think it's much harder when you're integrating various data streams, but you don't have quantitative method and you're making qualitative decisions. There the integration is very different and it's a challenge. I don't know if...
- DR. LEMASTERS: But you could set up, still, framework for qualitative, you know.
- DR. PIACENTINO: Sure. Absolutely.
- DR. BUNN: Ron.
- DR. STOUT: John, good presentation. Food for thought, I reflect back on some of the work that I've been involved in, the JNC process for hypertension, some of the preventive guidelines, etc. I think about to what we were taught in medical school, half of

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what we're learning, half the science we're learning is false, we just don't know which half it is.

The comments that you made on the appropriate selection of what's in and what's out from a science perspective, all that's true and I think the scientific process for the layperson has lost a lot of its currency as we have these battles over what is science. One camp captures the science today and then the next day you have a different group with the same set of science, so to speak, saying something totally different. So I would agree with you that science should be the basis of policy, but which science? And, particularly, when you have all these different special interest groups and you have industry, for better or for worse, doing agenda-driven science. I think there might be a couple layers beyond that you might want to think about; think about what is the science. How do you select the science out?

DR. PIACENTINO: Right, right. No, it does.

DR. BUNN: Like the rigor of the science?

DR. PIACENTINO: Do you think then the feedback from peer review community helps address that issue? I think you're getting at the issue of how you bound the record, the record to be examined, right? Let's use this terminology. There's a whole bunch of science out there you potentially could consume to answer a particular question. I think Ron's setting up the standards of how would you know whether or not you've got the right science, and I argued early on that it's not a matter of getting all the science, it's relevant science, and how you put in acceptance and what goes in and what goes out kind of determines what you're actually going to examine. I think about that in terms of getting a check from peer review communities, and I'm wondering is the issue that you're describing the peer review communities fight with one another? Is there worrying that's happening? I don't quite understand it.

DR. STOUT: The answer's yes, John. Ron Stout. There are battles that go on, on a daily basis. Once again, thinking about hypertension. You've got the specialists and the ACA, and American Heart Association on one side of the battlefield and you have the internists and the family physicians on another coming up with different standards, different policy positions based on the same science. So it often ends up appearing almost the policy is defined by what science is deemed appropriate and inappropriate by whoever's developing the policy.

DR. PIACENTINO: Right. I have to think about that. I don't know. I don't have anything more to say on that. I'm thinking about the application of community and whether or not they're different communities applied to in the science, and whether or not it's strictly a decision based on science or some other factors for consideration. I don't know. It's a good question.

DR. BUNN: I would just like to add something on that; just on the whole peer review process. I mean, a decade ago how often were you asked to recommend reviewers of your work? And now, I mean, you can't submit it without including your peer reviewers. So I mean, is it really peer-reviewed or is it friend-reviewed? I mean, just

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- something to think about. Sorry, I'm not sure who was next.
- DR. MCKENZIE: I'll just quickly say, to comment on what Dr. Stout—Ron said, and then John then said—I can't remember who said it, but in any event, what I was thinking is if the ACA says one thing and the family docs say one thing, then one of the things that we need to do as critical thinkers is understand why does the ACA say one thing and the family docs say something else. Does it have to do with quality of life? With the family docs, does it have to do with the end result of long-term hypertension on the body? So for example, the American Cancer Society may say they want to cut off here and the family docs may say they want to cut off here, and the family may say we're going to cut off here depending on what's going to happen to themselves or their spouse or whatever in terms of quality of life. So I totally get that people may come up with different policies based on their backgrounds, what they expect. I don't use the word "advises." But that's really what happens. So then it's up to the public who may not have the knowledge to make the decisions, but it's up to the critical thinkers to sort of understand why people come up with and why they come up with. They're not just taking everything at face value because the policy says this, we should do this, but understand what's the background of the people writing this policy. Does that make sense?
- DR. PIACENTINO: Yes. I think, Judith, what you're...
- DR. MCKENZIE: It's not very—it's not...
- DR. PIACENTINO: It makes me think of the method fits the environment. And so if you're going to consume the systematic review you should understand the underlying method and make sure the method maps to your environment. So I think that's what Judith points out with her contrasting for hypertension example. And so they're different communities with different blood pressure set points based on a variety of considerations, and so running to somebody's guideline, you would want to know what their method is because that method would have to match your decision environment.
- DR. LEMASTERS: And what that blood pressure level will do to that individual. If it's too out of control there may be socioeconomic personal reasons that they can stick to that whereas a cardiologist may be more of a pure and say, well, this is what we want because we don't want these outcomes to happen.
- DR. BUNN: Marc.
- DR. SCHENKER: Marc Schenker. I think it's naïve to think that science is objective and clear, and presented in one way. It's very well-recognized that how you present things makes a big difference, and I'm looking at this noise slide and thinking it's the most impressive slide that's gone up all day. Somebody worked on this, figured this out, you know, graphically, communications, expertise, what have you, to make this dramatic point. If the goal is policy, the question is do you have people who think about how you present things even systematic reviews, but any of the science?

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Because it does make a difference and it's received differently, and its reacted to differently depending on how that's done, and that's not to say you're being manipulative; you're just be smart.

DR. PIACENTINO: Sure. And so the short answer is yes. I mean we have, (conductive @ 01:08:32) science has a lot of information in it and scientists, scientific communities want you to understand as much information as you can with all the nuances and caveats associated with it. I don't know if you recall one of the slides I showed was efforts toward plain language. Plain language is transitioning technical language into something that feels very plain and understandable, but beyond that NIOSH has plenty of efforts to even create distillation and reduction to simple messages, and there's a real art to doing that and there's real power. That's why I chose the infographics because I think the infographics, to me, can they very important curated information in a powerful way, and it's easy to look at that—it's easily accessible, but then you understand behind it the amount of work that went into it and it's very powerful, and it's a lot of effort to get there.

SUMMARY & WRAP-UP, FUTURE AGENDA ITEMS, MEETING DATES, CLOSING REMARKS

DR. BUNN: Any other comments, questions? As my program officer at CDC Injury Center says, "Emotional outbursts?" Okay. All right. Thank you very much, John, for a very informative presentation. we've heard a lot of great presentations this morning and to know the great work that's being done as far as the opioid work, presentation of the Academy of Science report as well as the Transparency of the NIOSH Science. So I guess I would like to just in wrapping up, you guys have given a lot of great ideas for future meetings. Are there any other thoughts on the meeting today, what you would like to see in future meetings? Yes, Karla.

DR. ARMENTI: I would just add maybe Total Worker Health. I know they had a successful symposium in May, and it might be interesting to review how Total Worker Health is kind of morphed, you know, into what it's doing now around integrating health promotion worksite wellness in safety and health.

DR. BUNN: Okay.

MR. COURTNEY: I just wanted to, and we may have looked at this, I'm trying to recall if we looked at this recently, but one of the things is just thinking about anticipation, how can NIOSH best anticipate what the landscape of the future's going to look like as much as we would talk about share economy, and those kinds of realities. Are there ways looking at projections of the number of jobs that are going to be automated in the future, not mechanically, but electronically, how that will shift potential employment trends. If you believe Dave Autor at MIT, we shifted into a very low-paying, high-populated environment and a very high-paying, very selectively populated environment and there's not a whole lot happening in the middle. What are those future demographic trends and how can NIOSH best position itself to understand what the, then, emerging risks might be that aren't traditional risks. They're novel to those changes.

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- DR. BUNN: Thank you. Would you like to comment on that, Dr. Howard?
- DR. HOWARD: Well, I wrote a paper on it which was published in January of 2017, and if you'd like to come to Williamsburg, Virginia I'm giving a talk to the International Association of Industrial Accident Boards and Commissions. The title they gave me was, "It's Not Standard Anymore; 21st Century Job Arrangements". So I'm actually very excited about it because it does give you an opportunity to talk about the challenges ahead when you have a standard employment relationship which really isn't that old. It's basically a World War II phenomenon and sort of started dying in the 1980s. Now we pretend like it's always been there, but it really hasn't. And so the growth in the temporary worker category and the new independent contractor, you know, that used to be a very small percentage in the Sixties and Seventies, and they were fully capable of taking care of themselves. They were very advanced salary people, and all that. Now the new independent contractor, if you believe Uber's attorney, they're independent contractors. If you believe that argument, they're entirely different sort of people. If you believe some other folks, they're not independent contractors at all, they're employees. So that argument is going on. And so in that group with the temp employers who still come under the Occupational Safety and Health Act because they do have an employer, they just happen to have two of them, that this larger group growing which BLS will produce a special report on. They released a report June 7th, 2018 on the contingent temporary workforce. The nomenclature is all screwed up all over the way place. So that smaller group of so-called gig or, again, independent contractors, if you work for Uber, that's a very interesting erosion because those people are not going to be covered anywhere by the social safety net or by OSHA, or anybody else. So that really is a challenge, I think, to people in occupational safety and health who are not going to be hired by Uber to take care of them because they're not employees. And so how do practitioners provide services to them and how does government protect them, is the real challenge. It's a real challenge.
- DR. BUNN: Yes, Marc.
- DR. SCHENKER: Yes, interesting discussion. I just lectured to the medical students on occupational health this week and I completely changed the lecture to talk about the changing workplace, and basically what Ted's talking about what you're talking about, from the old lecture which was basically Paracelsus, dose equals disease, you know, to the changing reality of the workplace. That's what we need to be...
- DR. HOWARD: Well, that doesn't even work. That's the work arrangement that's changed. The work that you're talking about where you need, you know, in 1980 it took like 25 employees to generate a million dollars of productivity, now it takes five because you got all of these automated machines to do the—that's a whole other thing. That's how the work is changing. And that's, hopefully, our issue with regard to the robotic center gets at, some of those issues of what are the safety and health issues associated with a more automated workplace. The issues about the lesser

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- number of workers that are needed to produce something or deliver a service, those are large economic issues that we're sort of watching.
- PARTICIPANT: I just think we're going to see big sea changes in sort of what's occupationally big and small over time because of the—and even things that we might not have envisioned yet may be coming. So just how best to plug you guys in addition to your own foretelling the future, other sort of futurists and folks who we plug into to sort of help NIOSH...
- DR. HOWARD: But, you know, and it's not all dark because, you know, as I pointed out even if you go to an advanced manufacturing plant and you have the new manufacturing techniques which involve powdered nanomaterials and lasers that end up creating something in an additive as opposed to a subtractive way, you still got tons of polymer, tons of—you still got all that stuff there and if the machine releases something, if you have to clean it, I mean all of those testers are still there, it just looks real fancy because it's a 3D machine the size of this building or something making washing machines at P&G. But all the stuff that's going into it has hazard potential.
- DR. BUNN: Any other comments? Questions? Okay. Well, like I mentioned earlier, there are six members that their term is up at the end of the year and I believe—Sharon, are you still on the phone?
- DR. COOPER: I am.
- DR. BUNN: I wanted to thank you for your service, but I believe you wanted to make comment as well.
- DR. COOPER: I did. Thank you. I asked for this opportunity because it's probably my last meeting. And I've been in a (favored @ 01:17:48) time and I have been lucky enough to have that work arrangement for four years, and on September 1, I fully retired from University of Texas after many years. So I was wondering how I could thank a large bureaucratic institution like NIOSH for the impact it made on me personally.
- So I wanted the opportunity right now to thank Dr. Howard, who represents NIOSH. And all of you know that NIOSH serves as an anchor for research for occupational and health and safety to protect individual workers, the workplace, and community. But what you may not realize is the impact it's made on universities and their faculty staff and students. So I just wanted to take a second to let you know how it's affected me personally. It's provided a community of colleagues such as yourselves, and some lifelong friends during my participation in our ERT, our ad center, research grants, serving as a reviewer. And do I believe that NIOSH was primarily and uniquely responsible for my career creating this community that made research fun and meaningful, for providing my students an occupational health pathway, and actually it's impacted how I interact with workers that I come in contact with in my day to day life. So as a worker myself, I want you to know that you've increased the quality of my life, but more importantly

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I really appreciate the excellent work that NIOSH does. Thank you.

DR. HOWARD: Well, thank you, Sharon. We don't recognize the R word any more, so that doesn't mean that you're free from being called upon to serve on additional NIOSH committees. Okay?

DR. COOPER: Okay.

DR. BUNN: Silence.

DR. HOWARD: Yes, she probably left the room.

DR. BUNN: Well, on that note I don't think there's any way that I could ever top that summary and very nice expression of gratitude to NIOSH; very, very nice. I guess the next thing is to discuss the future meeting dates, and with the move to the new building, I guess, it's pretty well up in the air.

DR. HOWARD: Well, usually we don't meet in the October/November timeframe because it's a very busy time for everybody. So usually we talk about maybe the spring, you know. And in Washington April is better than March. And so that may be something that we want to consider, but it takes a gargantuan effort on Alberto's part to throw out some dates, and then have all of you go no, no, I can't do it then. No, I can't do it then. So I think it's probably best to just look at that late March/April timeframe and look at the dates.

DR. SCHENKER: Well, as early as that determination can be made, the better. It's appreciated.

DR. HOWARD: Right. Exactly. So we could get right to it and figure out dates that we have. This was a Thursday. People seem to like Wednesday or Thursday. They don't like Mondays or Fridays. One time we had a Friday one and it was hard. It's just more airplane travel and all that. So Wednesday or Thursday we'd probably look at, and maybe we can start out with all the Wednesdays and Thursdays from late March through April. There's Easter, there's Passover, there's things we have to knock out there. It's the spring break time. Sometimes academics are in Bimini instead of at Hopkins, you know.

PARTICIPANT: We don't get spring break.

DR. HOWARD: So we just have to keep trying the dates. So we'll do that as soon as possible.

DR. BUNN: And I'd also like to thank Pauline too and Alberto for arranging these meetings on a regular, smooth basis. So we very much appreciate it. All right, so I guess, oh yes, Ron.

DR. STOUT: I heard something about an agricultural center in Anchorage as being an ideal meeting space.

DR. HOWARD: Yes, right. It costs a lot of money. It was funny, who's that guy that owns the Mavericks basketball team? He's on the **Shark Tank.

DR. BUNN: Mark Cuban. He did some kind of a list of government travel years ago, maybe five, six, seven years ago, and it had all government employees by how much money they spent in government travel. And this poor gentleman at NIH who does their international work was like at the top with like 500,000. But our employee George Conway, at the time, who was stationed in Anchorage had to fly from

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Anchorage to Washington for all of our meetings, and he was in the top ten because of the cost. It's a very expensive trip. Although, Margaret, you've been to Alaska recently, right?

DR. KITT: Yes, just a few months ago.

DR. HOWARD: Our Western Denver, Spokane, Alaska we do once in a while, but the poor folks in Alaska for our quarterly meetings in January we do it by phone because it's a struggle to get out of Alaska in January. Great idea.

DR. STOUT: I tried. I really tried.

DR. SCHENKER: How is the process for new members on the committee?

DR. HOWARD: It's lengthy. If you get it in front of me, lengthy.

DR. SCHENKER: Sent in to you for consideration?

DR. HOWARD: Oh, you have an idea for a member?

DR. BUNN: A nomination?

DR. SCHENKER: No, I'm just trying to understand the process.

DR. HOWARD: Well, Paul, you need to explain it a little bit about...

DR. MIDDENDORF: The process for getting new members, well, first off, we have to put out a Federal Register Notice. So that takes about two months just to get it prepared through all the channels that it has to go through. Then we announce it, then we allow usually six weeks, two months for names to be nominated. Once we get that list of nominees we go through it and look against the charter for the particular faculty that we're dealing with because there's a certain balance of members. Like on this particular committee we want academia, we want to industry, we want labor. So we try to balance it and make sure we get enough of each kind of perspective on the committee. So balancing off the committee, and that may take us another six weeks, two months to just kind of work through all the CVs, what the needs are for the committee, and then we give it to Dr. Howard who says yes, I like it or no, I don't like it. Let's just make changes to it. Once that is finalized, it goes to CDC. They look it over, they do their evaluation. That can take another six weeks to two months. Then it goes to HHS which can take quite a long time.

DR. SCHENKER: Seriously?

DR. MIDDENDORF: That's the process.

DR. HOWARD: So when is the next Federal Register Notice? I think that would be what Marc would be interested in.

DR. MIDDENDORF: Yes. Alberto, when did we put the last one in?

MR. GARCIA: The last one actually closed on August 1. So we put it in three months before, four months before then.

DR. MIDDENDORF: So next spring we'll put...

DR. HOWARD: Put another one in.

DR. BUNN: All right. Thank you, everybody.

[END MEETING]

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G L O S S A R Y

ABPM	American Board of Preventive Medicine
ACGME	Accreditation Council for Graduate Medical Education
AIHA	American Industrial Hygiene Association
AOHP	Association of Occupational Health Professionals
ASSE	American Society of Safety Engineers
BSC	Board of Scientific Counselors
CDC	United States Centers for Disease Control and Prevention
COSH	Conference and Exhibition on Occupational Safety and Health
DART	Division of Applied Research and Technology
DOE	Department of Energy
DOL	Department of Labor
DOT	Department of Transportation
EPA	Environmental Protection Agency
ERC	Emergency Response Center
FACA	Federal Advisory Committee Act
HELD	Health Effects Laboratory Division
HHS	US Department of Health and Human Services
HRSA	Health Resources and Services Administration
IRB	Institutional Review Board
NACOSH	National Advisory Committee on Occupational Safety and Health
NIH	National Institutes of Health
NIOSH	National Institute for Occupational Safety and Health
NORA	National Occupational Research Agenda
NPPTL	National Personal Protective Technology Lab
OMB	Office of Management and Budget
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment

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Appendix A

**Department of Health and Human Services
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health
Board of Scientific Counselors (BSC)
Agenda: Seventy-first Meeting**

NIOSH Offices
395 E Street, S.W., Suite 9000
Washington, DC 20201

Conference Number: 888-397-9578
Participant Code: 63257516

<https://odniosh.adobeconnect.com/nioshbsc/>

Thursday – September 27, 2018

Time	Topic	Presenter
8:30 am	Welcome and Introduction Meeting Logistics	Mr. Alberto Garcia DFO, NIOSH
8:40 am	Agenda, Announcements, and Approval of Minutes	Dr. Terry Bunn Chair, NIOSH BSC
8:50 am	Director's Opening Remarks	Dr. John Howard Director, NIOSH
9:20 am	NIOSH Confronts the Opioid Crisis	Ms. Lore Jackson-Lee Associate Director Policy, NIOSH
10:20 am	Break	
10:30 am	21st Century Surveillance Report	RADM Margaret Kitt and Dr. Terri Schnorr Deputy Director, OD, NIOSH; and Division Director, DSHEFS, NIOSH
11:30 am	Lunch	See Lunch Suggestions on Folder
12:30 pm	Public Comments	Mr. Alberto Garcia DFO, NIOSH
12:45 pm	Enhancing the Transparency of NIOSH Science	Dr. John Piacentino Associate Director for Science, OD, NIOSH
1:45 pm	Summary & Wrap-up, Future Agenda Items, Meeting Dates, Closing Remarks	Dr. Terry Bunn Chair, NIOSH BSC
2:30 pm	Adjourn	

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Appendix B

**Board of Scientific Counselors
Washington, D.C,
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Budget

Dr. Howard will present the most current budget information at the time of the meeting.

Organizational and Personnel Announcements

Ainsley Weston, former Associate Director for Science, Respiratory Health Division, has retired. Jean Cox-Ganser is the new ADS.

Josh Harney is the new Deputy Director for the Division of Surveillance, Hazard Evaluations, and Field Studies.

Sarah Unthank is the new Deputy Director for the Education and Information Division.

New Programs and Initiatives

Fentanyl

NIOSH signed an Interagency Agreement with the National Institute of Justice to conduct a research project entitled "Fentanyl and Fentanyl analog detection for Public Safety and Remediation." The goals of this project are to enhance the safety of law enforcement, forensic scientists, medical personnel, and environmental responders to crime scenes that may be contaminated with fentanyl and other synthetic opioids, as well as to protect public health. This project includes partners of NIOSH and the U.S. Environmental Protection Agency who are performing research related to safeguarding worker and public health. It builds on completed and on-going projects by U.S. Drug Enforcement Agency and U.S. Department of Defense.

Office of the Director (OD)

International Conference

NIOSH, the World Health Organization, and the Vietnam National Institute of Occupational & Environmental Health co-sponsored the 5th International Scientific Conference on Occupational and Environmental Health held September 10-12, 2018 in Hanoi, Vietnam. The theme of the conference was “*Occupational Health and Environment: Challenges and Opportunities in Sustainable Development*”. Four NIOSH staff participated in the conference which hosted about 300 participants from 16 countries.

Division of Applied Research and Technology (DART)

Biomonitoring

BD Medical has formally launched a direct reading test for the detection of the anti-cancer drugs, methotrexate and doxorubicin on surfaces in health care facilities—HD Check system (available at <https://www.bd.com/en-us/offerings/capabilities/hazardous-drug-safety/hd-check-system>). This commercial product is based on a DART technology developed by Jerry Smith, Deborah Sammons and Shirley Robertson and collaborative research between NIOSH and BD Medical. This technology will allow health care providers to sample surfaces for contamination and analyze results in minutes. Traditional methods require complex analytical equipment and typically take days for results to be returned.

Division of Surveillance, Hazard Evaluations, and Field Studies (DSHEFS)

Styrene

NIOSH researchers recently authored an article in the *Journal of Occupational Medicine* that updated the mortality experience of NIOSH’s boat builders’ cohort. This study examined exposure to styrene used in reinforced plastic in two boatbuilding facilities and its effects on cancer mortality. The study found an association between duration of styrene exposure and increased leukemia mortality. This study was considered at the March 2018 IARC Monograph

meeting investigating the carcinogenicity of styrene. Studies of workers in this industry are considered most informative due to high styrene exposures and lack of confounding exposures.

Health Hazard Evaluation (HHE) Program

The HHE Program has released the 2017 Annual Report. The last 3 years of Annual Reports are available at <https://www.cdc.gov/niosh/hhe/annualreports.html>.

The HHE Program has conducted eight evaluations concerning work-related exposure to opioids. Worker groups evaluated include first responder groups as well as other ‘non-first responder groups.’ The HHE Program is trying to learn more about potential exposures and resultant health effects among first responders. Although NIOSH has interim guidelines for emergency responders related to fentanyl and its analogues (<https://www.cdc.gov/niosh/topics/fentanyl/risk.html>) based on the best available data, the available data are limited. Field studies and other activities may generate information to fill gaps in the guidance used to protect first responder groups across the country. The HHE Program has also performed evaluations of other groups who are not first responders who may have the potential to be exposed to opioid drugs in the course of their work, such as medical examiner personnel and transportation security screening workers.

Surveillance

NIOSH recently reestablished monthly surveillance of health-related workplace absenteeism using population-based data from the Current Population Survey. This surveillance system provides health and economic impact measures during an influenza pandemic and health situational awareness during the inter-pandemic period. It can also be used to evaluate the impact of pandemic control measures and to inform future pandemic preparedness and response planning. Monthly surveillance reports are routinely shared with the Community Interventions for Infection Control Unit within CDC’s Division of Global Migration and Quarantine.

With colleagues from Indiana University, NIOSH researchers recently co-authored a review article in the *American Journal of Public Health* (AJPH) suggesting consideration of occupation as a social determinant of health. The article was part of a special section featured on the cover of the March issue. It included an invited editorial and two accompanying essays by a former OSHA administrator and the Safety Director of the United Steel Workers. AJPH also posted a podcast featuring the authors. The review article is in the top 5% of all research outputs scored by Altmetric.

Noise

High blood pressure and high cholesterol are more common among workers exposed to loud noise at work according to a NIOSH study published last month in the *American Journal of Industrial Medicine* (available at <https://onlinelibrary.wiley.com/doi/full/10.1002/ajim.22833>). NIOSH researchers analyzed data from the 2014 National Health Interview Survey to estimate the prevalence of occupational noise exposure, hearing difficulty, and heart conditions within U.S. industries and occupations. They also looked at the association between workplace noise exposure and heart disease. The analysis showed: 25 percent of current workers had a history of work-related noise exposure; 14 percent were exposed in the last year. Twelve percent of current workers had hearing difficulty, 24 percent had high blood pressure and 28 percent had high cholesterol. Of these cases, 58 percent, 14 percent, and 9 percent, respectively, can be attributed to occupational noise exposure.

Division of Safety Research (DSR)

Center for Occupational Robotics Research

The Center is finalizing detailed research needs based on public comments. The research needs will be posted on the Robotic website (available at <https://www.cdc.gov/niosh/topics/robotics/default.html>). They complement and provide more specificity to robotics-related goals in the NIOSH Strategic Plan: FYs 2019–2023 (available at <https://www.cdc.gov/niosh/about/strategicplan/default.html>).

NIOSH staff will present information on the Center and associated work at several upcoming conferences, including the International Occupational Hygiene Association Conference, RoboBusiness, and the International Robot Safety Conference. Additionally, NIOSH is partnering with the Human Factors and Ergonomics Society to develop proceedings from an October 1, 2018 symposium on exoskeletons.

National Occupational Injury Research Symposium

The symposium is scheduled for October 16-18, 2018 at the Morgantown Marriott at Waterfront Place in Morgantown WV. The conference theme is “Advancing Worker Safety in the 21st Century Through Research and Practice.” Co-sponsors include National Safety Council, American Society of Safety Professionals, Society for Advancement of Violence and Injury

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Research, Board of Certified Safety Professionals, and West Virginia University's School of Public Health, Statler College of Engineering and Mineral Resources, and Safety and Health Extension. The agenda has been posted to the NOIRS website (available at <https://www.cdc.gov/niosh/noirs/default.html>) and includes opening and closing plenaries, workshops, tutorials, thematic research sessions, and a poster session. Registration is free (see <https://www.cdc.gov/niosh/noirs/2018/registration2018.html>). As of August 21, 306 persons are registered to attend, already exceeding expectations.

Literature Review on Emergency Vehicle Crashes

The July 2nd, 2018 issue of *The Journal of the Human Factors and Ergonomic Society* included a NIOSH-authored article, *Preventing Emergency Vehicle Crashes: Status and Challenges of Human Factors Issues*. The article authored by Drs. Hongwei Hsiao, Joonho Chang, and Peter Simeonov was based on a broad review of the literature. It identified major risk factors for emergency vehicle crashes, included a discussion of current countermeasures and interventions, and made suggestions for future research.

Education and Information Division (EID)

Small Business Conference Proceedings and Special Journal Issue

The October 2018 issue of the *Annals of Work Exposures and Health* will be dedicated to manuscripts resulting from the October 2017 Understanding Small Enterprises (USE) conference, the first international conference held in the U.S. on occupational safety and health in small businesses, sponsored by NIOSH and the Colorado School of Public Health. Other presentations from the USE conference will be published in a NIOSH proceedings document which is in production.

Framework for Productive Aging at Work

In the May issue of the *Journal of Occupational and Environmental Medicine*, Paul A. Schulte, James Grosch, Juliann C. Scholl, and Sara L. Tamers of the NIOSH National Center for Productive Aging and Work presented bibliographic support for a framework for productive aging at work with the goals of maintaining productivity and health in older workers and preparing younger generations to remain healthy and productive as they age. The paper was widely promoted in the electronic media.

Nanosilver Recommended Exposure Limit (REL)

NIOSH has developed a proposed REL for silver nanomaterials. A revised draft document, *Current Intelligence Bulletin: Health Effects of Occupational Exposure to Silver Nanomaterials*, was released in response to peer and public review comments received on the January 2016 draft NIOSH document. This revised draft document provides an updated scientific literature review of information about occupational exposure to silver nanomaterials including the toxicological effects of exposure to silver nanomaterials in experimental animal and cellular systems, the effect of particle size and other properties on the toxicological effects of silver, and NIOSH recommendations on the measurement and control of occupational exposures. NIOSH used data from subchronic inhalation studies in rats which showed adverse lung and liver effects associated with exposure to silver nanoparticles as the basis of the NIOSH REL. The proposed REL applies to processes that produce or use silver nanomaterials. In addition, NIOSH continues to recommend its existing REL for total silver (metal dust and soluble compounds, as Ag). A public meeting will be announced for late October or November 2018.

Draft NIOSH Risk Assessment Guidance Released

The draft document, *NIOSH Current Intelligence Bulletin: NIOSH Practices in Occupational Risk Assessment*, was released for public, stakeholder, and peer reviews. The draft document describes the underlying science and general approach used by NIOSH researchers when conducting high quality, scientifically sound assessments of the health risk associated with workplace hazards. An online public meeting was held September 13, 2018, from 1-4pm to provide the opportunity to discuss the contents of the draft document and to solicit public comments. Additional information is available on the NIOSH Docket webpage, NIOSH Docket 316, CDC-2018-0060: <https://www.cdc.gov/niosh/docket/review/docket316/default.html>.

Cumulative Risk Assessment Mini-Symposium

On July 31, 2018, EID convened a mini-symposium with a panel of experts in the field of cumulative risk assessment from government, academia, and consulting, to provide a series of diverse presentations, followed by an open forum discussion. The presentations and panel discussion focused on considering how occupational and non-occupational exposures to multiple stressors, including chemical, biological, physical, and social stressors, may result in more severe health effects as a result of combined action among stressors. A NIOSH science blog including a recording of the mini-symposium will be posted on the NIOSH website.

Nanotechnology

The Nanotechnology Research Center (NTRC) held its biannual science meeting at the Hamilton Laboratory in Cincinnati, April 12, 2018. Special guests included Dr. Lisa Freidersdorf of the National Nanotechnology Coordination Office, Washington, DC, and Dr. Saber Husain and Dr. Rick Salisbury from Wright Patterson AFB, Dayton, OH.

Chuck Geraci received the Jeffrey S. Lee award from the Foundation for Occupational Health and Safety and delivered the Jeffrey S. Lee Memorial Lecture, “Big Bangs and Black Holes – Past, Present, and Future Opportunities and Challenges for Industrial Hygienists”, at the American Industrial Hygiene Conference and Exposition, May 2018, Philadelphia, PA.

The nanotechnology team continues to expand into Advanced and Additive Manufacturing including presentations at the Ohio Safety Congress in Columbus, OH; Indiana Safety and Health Conference & Expo in Indianapolis, IN; Toxic Use Reduction Institute (TURI) Spring 2018 Continuing Education Conference in Marlborough, MA; and the first in a series of webinars on 3D printing for U.S. NASA Industrial Hygienists and Safety Professionals throughout the US. A webinar on “Moving from Nanotechnology to Advanced Manufacturing: Did We Learn Anything” was presented as part of the interagency series on emerging technologies sponsored by the University of Massachusetts Lowell Center for Sustainable Production. The AIHA *Synergist* featured “21st Century Manufacturing and Challenges for the IH” in the January issue. The NTRC renewed its research task with the Science and Technology Policy Institute to develop foundational information on Advanced Manufacturing.

OSHA-NIOSH Heat App

The OSHA-NIOSH heat safety tool app is a useful resource for planning outdoor work activities. The cobranded app was introduced in 2017 and since then has been the most frequently accessed CDC mobile app with more than 7,198,000 page views. The heat app and more information is available at <https://www.cdc.gov/niosh/topics/heatstress/heatapp.html>

Emergency Preparedness and Response Office (EPRO)

Pandemic Flu

NIOSH participated in the CDC Pandemic Flu Exercise as the lead for the Worker Safety and Health Team, Sept 12-14. Pandemic Flu remains a focus area for CDC in preparing for an

emerging infectious disease. Respiratory protective device availability is a priority activity in this year's exercise.

Hurricane Response

The CDC Emergency Operations Center was activated for Hurricane Florence on September 12, 2018. NIOSH is staffing the Worker Safety and Health Task Force. Currently NIOSH is disseminating key health and safety guidance to employers, workers, and volunteers including recommendations for driving on wet roads, personal protective equipment, gasoline powered tools, and responder immunization. Key messages can be found in the NIOSH document Hurricane Key Messages for Employers, Workers and Volunteers at <https://www.cdc.gov/niosh/topics/emres/flood.html>. This document is available in English, Spanish, Chinese, and Vietnamese. NIOSH is also developing guidance to protect workers from livestock and poultry wastewater and sludge following flooding.

Health Effects Laboratory Division (HELD)

Mold Immunotoxicology Research

Mold contamination in various sectors can result in occupational exposure to aerosolized fungal particles. Workplace mold exposures can become extreme particularly after hurricane-associated flooding as was observed following hurricanes Katrina, Sandy, and more recently, Harvey. The accompanying media coverage has resulted in broad public concern regarding potential adverse health effects of fungal exposures. To date, the immunotoxicological consequences that follow workplace exposures remain uncharacterized for many occupationally-relevant fungal species.

Fungal exposures were nominated to the National Toxicology Program (NTP) for investigation to address the knowledge gaps. Through an Interagency Agreement with NTP, HELD researchers were selected to address this issue because they developed a state-of-the-art exposure system that simulates natural exposure by aerosolizing dry fungal spores and delivering them to mice housed in a multi-animal nose-only exposure chamber.

HELD is utilizing this exposure system to test a series of fungal species for the NTP. Subchronic inhalation exposures (13 weeks) using *Aspergillus fumigatus* and, most recently, two strains of *Stachybotrys chartarum* (black mold) have been completed. Repeated exposures to spores derived from these species showed the major tissues effected were the larynx, lung, and bronchial

lymph nodes. The lungs of *A. fumigatus* exposed mice demonstrated allergic inflammation that was dependent on the viability of *A. fumigatus* spores. In contrast, mice repeatedly exposed to *S. chartarum* showed that allergic mediated responses were dependent on the strain and the production of fungal fragments.

These early studies are showing varying pulmonary immunological responses between species and strains. Unexpectedly, pulmonary arterial hyperplasia has been consistently identified in mice repeatedly exposed to all tested fungal strains to date. This is a unique histologic finding highlighting the potential for fungal exposures to modulate cardiovascular endpoints, such as pulmonary hypertension and right ventricular dysfunction. This rather striking finding is the focus of current research efforts.

The results of this cooperative research between NTP and NIOSH are providing an improved understanding of the pulmonary immunotoxicological and the pathological responses associated with sub-chronic exposures to fungi using a model that better replicates worker exposure to mold.

National Personal Protective Technology Laboratory (NPPTL)

Project JET FIT (Elastomeric Respirators in Healthcare)

NPPTL received funding from the National Center for Immunization and Respiratory Disease, Influenza Coordination Unit, Office of Public Health and Preparedness Response (\$3.2M total internal and external funds) for the Just-in-time Elastomeric Training and Fit-Testing (JET FIT) project. This project consists of three research studies to explore the feasibility of using elastomeric respirators in healthcare facilities in the event of a pandemic or other emergency event. Researchers will evaluate the feasibility of rapid, “just-in-time” healthcare worker fit-testing and training, elastomeric respirator cleaning and disinfection, and routine use of elastomeric respirators for patient care.

NPPTL Participation in CDC Influenza Exercise

On September 12-14th, 2018, NPPTL participated in a CDC pandemic influenza exercise. In preparation for this event, NPPTL staff organized recommendations and talking points on control banding, extended use and re-use of N95 respirators and the use of elastomeric respirators in healthcare settings. To assist with decision-making during the exercise, NPPTL also provided data from the PPE PRO surveillance system. PPE PRO is a prototype for a national system to monitor PPE supply and usage in healthcare facilities. Using PPE PRO data, exercise

participants will be able to monitor and understand the impact of PPE shortages from a national perspective.

Respiratory Health Division (RHD)

Coal Workers' Pneumoconiosis

A study conducted by RHD investigators and recently published in the *American Journal of Public Health* (available at <https://ajph.aphapublications.org/doi/10.2105/AJPH.2018.304517>) found that the national prevalence of Coal Workers' Pneumoconiosis (CWP) is increasing, and that the prevalence of CWP among coal miners with 25 years or more of tenure exceeds 10%. In addition, a report was published in the August 3, 2018 *Morbidity and Mortality Weekly Report* documenting an increase the mean years of potential life lost attributable to CWP, likely due to an increase in the severity and rapid progression of CWP (https://www.cdc.gov/mmwr/volumes/67/wr/mm6730a3.htm?s_cid=mm6730a3_e).

Indoor Environmental Quality

RHD investigators within the Field Studies Branch were recognized for their work by the American Industrial Hygiene Association (AIHA), Indoor Environmental Quality (IEQ) Committee, who awarded them with Lila Albin IEQ Paper Award for work* on characterizing emissions from desktop 3-D printers. This award goes to the paper deemed best publication on indoor environmental quality by the committee that appeared in the *Journal of Occupational and Environmental Hygiene* in 2017.

*Stefaniak et al. [2017]. *Characterization of chemical contaminants generated by a desktop fused deposition modeling 3-dimensional printer. J. Occup. Environ. Hygiene. 14:540-550.*

Asthma

A report was published in the April 6, 2018 *Morbidity and Mortality Weekly Report* documenting the prevalence of asthma, asthma attacks, and emergency department visits for asthma among working adults between 2011 and 2016 (<https://www.cdc.gov/mmwr/volumes/67/wr/mm6713a1.htm>). The major industry group with the highest prevalence of current asthma was health care and social assistance (8.8%) followed by educational services (8.2%), and the major occupation group with highest prevalence was healthcare support occupations (8.8%).

Total Worker Health® (TWH)

Research Methodologies

TWH published in the *Journal of Occupational and Environmental Medicine (JOEM)* the Proceedings from the 2016 Research Methodologies workshop, which was convened by the University of Iowa's College of Public Health and the Healthier Workforce Center of the Midwest, a TWH Center of Excellence. The aims of the workshop were to 1) respond to two of the eight recommendations of the Independent Panel of the 2015 NIH Pathways to Prevention Meeting (TWH: What's Work Got to Do With It?) and 2) to address one of the research intermediate goals of NIOSH's National TWH Agenda. The proceedings paper provides examples of different TWH research approaches and outlines principles important to developing research evidence on TWH.

Worker Well-Being

TWH published in *JOEM* the paper, "Expanding the Paradigm of Occupational Safety and Health: A New Framework for Worker Well-Being." The paper describes the process undertaken by NIOSH and RAND to develop a conceptual framework for worker well-being. As there is currently no widely-accepted model for worker well-being, this paper address a crucial gap in the literature. NIOSH hopes that this framework can be applied by researchers, policymakers, employers, and workers to understand the domains of worker well-being.

In coordination with the NIOSH Office of Policy, Planning and Evaluation (OPPE), TWH has been leading NIOSH's Opioids Coordination Team, comprised of divisions, laboratories, and offices across the Institute. NIOSH's goals are to determine the antecedent factors for opioid overutilization among workers, identify opioid use conditions that affect workers, develop strategies for protecting workers involved in the opioid crisis response, and develop methods for opioid detection and decontamination of workplaces.

Western States Division (WSD)

New fishing safety success story: I reached over and hit the estop

Entanglements in fishing gear and deck machinery are a leading cause of injuries in commercial fishing. Fishing Safety Success Story: I Reached Over and Hit the E-stop is a short video documenting how a fishing crew used an emergency stop (E-Stop) on their deck winch to prevent

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an injury to one of their deckhands while salmon seining in Alaska. It is available at <https://www.cdc.gov/niosh/docs/video/2018-153/>.

IFISH5—June 2018

In cooperation with Memorial University of Newfoundland, Northeast Agriculture Center, and Food and Agriculture Organization of the United Nations, NIOSH co-organized the 5th International Fishing Industry Safety and Health conference, which included sessions on occupational safety and health research in commercial fishing, aquaculture, and seafood processing. There were more than 175 participants from 25 countries, as well as important international organizations such as the International Maritime Organization and International Labor Organization. The conference featured more than sixty hours of presentations, workshops, panels, and other activities dedicated to worker health and safety. A pre-conference workshop outlined the current state of global occupational safety and health (OSH) in fishing, detailed the many new conventions and initiatives to improve safety and health in the fishing industry, and discussed fisheries management and its various intersections with worker OSH. A post-conference workshop gathered most of the researchers in aquaculture safety and health to discuss the state of the field, the gaps in knowledge, the challenges and barriers to research, and set priorities for the future.

Outcomes from the conference already include: an electronic forum for personal flotation device studies and resources coordinated by the Northeast Ag Center, an Aquaculture OSH network and listserv created by researchers from Johns Hopkins, a proposed position paper on seafood bioaerosols, and an Arctic network of OSH researchers focusing on these maritime industries.

We are working on a proposal for a special edition of the *Journal of Agromedicine* dedicated to papers from IFISH 5.

Social Presence Statistics

NIOSH continues to expand its presence on social networks.

Social Media and Public Outreach	August 2017	August 2018
Facebook	129285 likes	134899 likes

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Social Media and Public Outreach	August 2017	August 2018
Twitter	@NIOSH account 325728 followers	@NIOSH account 306746* *Twitter deleted all inactive accounts in July 2018
Instagram	1077 followers, 770 posts	1870 followers, 1272 posts
YouTube	196 videos, 417901 views	215 videos, 605629 views
LinkedIn	567 members	713 members
Website Views	1252322 site views in August 2017	1396605 site views in August 2018
eNews Subscribers	67493	72692
TWH Newsletter Subscribers	73961	79660
Research Rounds Newsletter	65282	69931
Science Blog	Total blog entries: 423 Total comments: 6976 Blog site views (August 2017): 34778	Total blog entries: 501 Total comments: 7823 Blog site views (August 2018): 34765

NIOSH Publications

May 2018

[What Wildland Fire Fighters Need to Know about Rhabdomyolysis](#)
[Rhabdomyolysis in Wildland Fire Fighters: A Patient Population at Risk](#)
[What Structural Fire Fighters Need to Know about Rhabdomyolysis](#)
[Rhabdomyolysis in Structural Fire Fighters: A Patient Population at Risk](#)

June 2018

[Design, Testing, and Modeling of Environmental Enclosures for Controlling Worker Exposure to Airborne Contaminants](#)

July 2018

NIOSH Program Performance One-Pagers

- [Healthy Work Design and Well-Being Program](#)
- [Engineering Controls Program](#)
- [Center for Workers' Compensation Studies](#)
- [Surveillance Program](#)
- [Nanotechnology Research Center](#)
- [Health Hazard Evaluation Program](#)

[Chemical, Biological, Radiological, and Nuclear \(CBRN\) Respiratory Protection Handbook](#)

August 2018

NIOSH Program Performance One-Pagers

- [Services Program](#)
- [Respiratory Health Program](#)
- [Cancer, Reproductive, Cardiovascular and Other Chronic Disease Prevention Program](#)
- [Personal Protective Technology Program](#)
- [NIOSH Small Business Assistance Program](#)
- [NIOSH Safe•Skilled•Ready Workforce Program](#)
- [NIOSH Mining Program](#)

NIOSH Division Fact Sheets

- [NIOSH World Trade Center \(WTC\) Health Program Fact Sheet](#)
- [NIOSH Respiratory Health Division \(RHD\) Fact Sheet](#)
- [NIOSH National Personal Protective Technology Laboratory \(NPPTL\) Fact Sheet](#)
- [NIOSH Health Effects Laboratory Division \(HELD\) Fact Sheet](#)

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- [NIOSH Division of Surveillance, Hazard Evaluations, and Field Studies \(DSHEFS\) Fact Sheet](#)
- [NIOSH Division of Safety Research \(DSR\) Fact Sheet](#)
- [NIOSH Education and Information Division \(EID\) Fact Sheet](#)
- [NIOSH Division of Compensation Analysis and Support \(DCAS\) Fact Sheet](#)
- [NIOSH Division of Applied Research and Technology \(DART\) Fact Sheet](#)

[Preventing Deaths and Injuries of Fire Fighters Working at Basement and Other Below-Grade Fires](#)

September 2018

[A Guide to Air-Purifying Respirators](#)

Certification Statement

I hereby certify that, to the best of my knowledge and ability, the foregoing minutes of the September 27, 2018, meeting of the NIOSH Board of Scientific Counselors, CDC are accurate and complete.

October 18, 2018

Date

/Terry L. Bunn/

Terry L. Bunn, Ph.D.

Chair, NIOSH Board of Scientific Counselors