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

SEVENTY-FOURTH MEETING

BOARD OF SCIENTIFIC COUNSELORS

(BSC) MEETING

April 28, 2020

The verbatim transcript of the

Meeting of the Board of Scientific Counselors

Meeting held on April

28, 2020, 8:30 a.m.

C O N T E N T S

April 28, 2020

P A R T I C I P A N T S

(alphabetically)

LAUREN BARTON, MD - BOARD MEMBER
TERRY BUNN, PhD - BOARD MEMBER
LOUIS ANTHONY COX, PhD - BOARD MEMBER
CRISTINA DEMIAN, MD - BOARD MEMBER
MARY DOYLE - BOARD MEMBER
MICHAEL FOLEY - BOARD MEMBER
ALBERTO GARCIA - DESIGNATED FEDERAL OFFICIAL
JESSICA GRAHAM, PhD - BOARD MEMBER
DR. HOWARD, MD - DIRECTOR
GRACE LEMASTERS, PhD - BOARD MEMBER
STEVEN LERMAN, MD - BOARD MEMBER
PATRICK MORRISON - BOARD MEMBER
TIINA REPONEN, PhD - BOARD MEMBER
ROBERT ROY, PhD - BOARD MEMBER
MARC SCHENKER, MD - BOARD MEMBER
JUDITH SU, PhD - BOARD MEMBER

MS. PAULINE BENJAMIN
DR. KEVIN DUNN
DR. KENNY FENT
DR. MATTHEW GROENEWOLD
DR. EMILY NOVICKI
DR. JOHN PIACENTINO
MS. KYLA RETZER
DR. ALLEN ROBISON
MS. JANICE SCOTT-BLANTON

WELCOME AND INTRODUCTION, MEETING LOGISTICS

MR. GARCIA: Well, good morning. This is Alberto Garcia. Let's see, we have 27 people in attendance right now on the phone. We have 29 online. Let's get started to keep the meeting on track, and go down through the agenda on the times that we were stipulating.

Again, good morning. This is Alberto Garcia. I want to welcome everybody to the first ever online NIOSH Board of Scientific Counselors. Due to the COVID-19 restrictions, we decided to do this meeting online and I know that we will have a very successful meeting.

I want to thank all the folks that go into preparing for these meetings, especially Pauline Benjamin, Janice Scott-Blanton, Dr. Paul Middendorf, Emily Novicki and Dr. John Piacentino. And I want to remind you that this is a Federal Advisory Committee so we are subject to all the FACA rules and we will need to follow those during the meeting.

We will have to do a roll call to make sure that we have a quorum for the meeting. I know that you guys just recently filled your OGE 450 updates, but we still have to get it on record for any conflict of interest. When I do the roll call, if you can state your name and any conflict of interest, that would be great.

And another thing that I want to remind you is that we are also recording this meeting, so everything that you say will be transcribed verbatim, and that will be a great help for us to keep track with the minutes. If you don't mind when you're speaking, when you start speaking, please say your name before you make the comment so the transcription service can pick up that for the record.

I think that that's all I have as far as comments. I'm going to start just going down the list to see who we have in attendance and who is not in attendance yet. I see Cristina Demian.

DR. DEMIAN: Hello?

MR. GARCIA: Hi, is that Cristina?

DR. DEMIAN: Hi, good morning. This is Cristina Demian.

MR. GARCIA: Do you have any conflicts of interest, Cristina?

DR. DEMIAN: No conflicts of interest.

MR. GARCIA: Okay, great, thank you. I see Grace LeMasters.

DR. LEMASTERS: Yes, Grace LeMasters. No conflicts of interest.

MR. GARCIA: Thank you. I see Jessica Graham.

DR. GRAHAM: Hi, Alberto. Jessica Graham. No conflicts of interest.

MR. GARCIA: Thank you. I see Judith Su.

DR. SU: Present. No conflict of interest.

MR. GARCIA: Thank you, Judith. I see Lauren Barton. I see that she is online, maybe having trouble with the audio so we will check back with her in a second. I see Marc Schenker.

DR. SCHENKER: Hi, good morning. No conflicts of interest.
MR. GARCIA: Thank you, Marc. I see Mary Doyle.
MS. DOYLE: Good morning, Mary Doyle here. No conflict of interest.
MR. GARCIA: Thank you, Mary. I see Michael Foley.
MR. FOLEY: Good morning, Michael Foley here. No conflict of interest.
MR. GARCIA: Thank you, Michael. I see Patrick Morrison.
MR. MORRISON: Hi, good morning. No conflict of interest.
MR. GARCIA: Thank you, Patrick. I see Robert Roy.
DR. ROY: Good morning, Robert Roy. No conflicts of interest.
MR. GARCIA: Thank you. I see Steve Lerman.
DR. LERMAN: Good morning, Steve Lerman here. No conflicts of interest.
MR. GARCIA: Thank you, good morning. I see Terry Bunn.
DR. BUNN: Good morning, this is Terry Bunn. I have no conflict of interest.
MR. GARCIA: Thank you. I see Tiina Reponen.
DR. REPONEN: Good morning. I don't have any conflicts of interest either.
MR. GARCIA: Thank you. Let's circle back with Lauren Barton.
DR. BARTON: Good morning. No conflicts of interest.
MR. GARCIA: Okay, great, thank you. Do we have Tony Cox online?
DR. COX: Yes, good morning. This is Tony and no conflicts.
MR. GARCIA: Great, hi Tony. And then do we have Kyle Arnone online? I know, that he might not be able to participate. But otherwise, we have one, two, three, four, five—we have fourteen members. We have quorum. Quorum for the BSC, which is nine, so we have quorum and we can proceed with the meeting.
At this time, I'm going to pass it to Dr. Bunn.

AGENDA, ANNOUNCEMENTS, AND APPROVAL OF MINUTES

DR. BUNN: Thank you, Alberto, and thanks, everyone, for being flexible and able to participate in, as Alberto says, our first virtual meeting of the NIOSH Board of Scientific Counselors.
I guess before we get going, is Lauren Barton on the phone? Is she on the line now, able to see—say whether she has a conflict of interest?
DR. BARTON: Yes, I'm on the line. I'm on the line and I can see.
DR. BUNN: All right, so you have no conflict of interest either?
DR. BARTON: No, I already said that.
DR. BUNN: Okay, thank you. Thank you. I'd like to introduce four new members to the NIOSH Board of Scientific Counselors, and I'll start with you, Dr. Barton. I know that you are with the—
DR. BARTON: Yes, Chrysler Automobile.
DR. BUNN: Yes, automobile—
DR. BARTON: Yes. So yes, Chrysler Automobile.

DR. BUNN: Oh yes, Chrysler, okay.

DR. BARTON: Right, right. We're here in Auburn Hills, Michigan. We're located in Auburn Hills, Michigan. I've been practicing occupational medicine with Chrysler, which has had several names over the years, for about 20 years. Among my other duties has to do with OSHA regulation, so I'm intimately involved with that, and right now, we are consumed with COVID protocols and policies to best protect our workforce and their families.

DR. BUNN: Thank you very much, Dr. Barton, and yes, very necessary in these times. I'd like to next introduce Michael Foley, who is with SHARP in Washington. Tell us a little bit about yourself.

MR. FOLEY: Hi, good morning. Yes. Mike Foley, I am a researcher with the SHARP Program in Washington State Department of Labor and Industries. My research interests are relevant to temporary workers, and also with the population of occupational safety and health inspections and consultations, as well as long-term consequences—economic and social consequences—of injuries.

DR. BUNN: Thank you, Mike. Our third member is Dr. Tiina Reponen with the Department of Environmental Health in University of Cincinnati, if you'd like to say a few words about yourself.

DR. REPONEN: Yes, hi. Hi, everyone. So yes, I'm a professor of environmental health. I teach in the Industrial Hygiene Program and I am also the Director of the University of Cincinnati Education and Research Center. My research interest are dealing with exposure assessments and particular focus in aerosols and bioaerosols.

DR. BUNN: Thank you, Dr. Reponen. And our last new member is Dr. Robert Roy, who is the lead toxicologist with 3M, if you'd like to say words, a few words about yourself.

DR. ROY: Good morning, everybody. Robert Roy from 3M. I've been there about 23 years in the 3M medical department as a toxicologist. One of my areas of special interest is occupational exposure limits. I chaired the committee at 3M for over 20 years, and also an adjunct professor at University of Minnesota and Indiana University in their toxicology and product stewardship programs. And again, very happy to be on the Board of Scientific Counselors.

DR. BUNN: Thank you very much, Dr. Roy. Next on our agenda is I would like to know if everyone had a chance to review the minutes from our last meeting, and if there are any corrections to be made?

Okay, well, hearing no call for corrections to the meeting, do I have a motion to approve the meetings from the last—approve the minutes from the last meeting?

DR. LERMAN: So moved. Steve Lerman.

DR. BUNN: All right. Do I have a second?

DR. LEMASTERS: Second. Grace LeMasters.

DR. BUNN: Thank you, so the agenda minute—or the minutes from the last meeting are approved. Next I'd like to ask anyone if they have any announcements?

Okay, hearing no announcements, next I'd like to just kind of go over our agenda for today. It looks to be an exciting set of presentations. We'll be hearing about peracetic acid that's used as a sanitizer in the field, in the healthcare industry and in the food industry as well. And then next we'll be hearing about the Center for Motor Vehicle Safety and their updated strategic plan, which I'll be excited to hear about that presentation too. Our third presentation will be on new tools that have been created for the coding of industry and occupation in-field surveys. Just like to say that we—and it's using the NIOCCS program that NIOSH developed, and I do know that we, at our center, use NIOCCS actually on a routine basis for our databases, to code those industries and occupations. And our last presentation will be an update of the National Firefighter Registry, so we'd be anxious to hear about that presentation too.

I'd like to, before I turn it over to Dr. Howard, would like to thank NIOSH personally for all of the work that they've been able to do in a very rapid session on the development of the website and webpage for the COVID-19 response. We've had multiple enquiries in Kentucky from employers, and that page has been found to be very, very useful for timely information on response to COVID within the workplace. So I will turn it over to you now, Dr. Howard.

DIRECTOR'S OPENING REMARKS

DR. HOWARD: Well, thank you, Dr. Bunn, and good morning to everybody, and we're plowing new ground obviously today, with our first virtual BSC meeting, so appreciate everybody's patience and you know, there's a whole virtual etiquette that goes on with these calls, and I myself have learned several times the value of the mute button as we go through these meetings. So thanks, everybody, for bearing with us. I also wanted to thank Pauline and Janice and Dr. Piacentino, Alberto, Emily for getting this meeting going, and as Alberto says, I'm sure it's going to be successful.

The second thing I wanted to do before I start my short presentation is to welcome Dr. Barton and Michael Foley and Dr. Reponen and Dr. Roy. Thank you very, very much for stepping up on your busy, busy schedules and work life to be able to devote some time to NIOSH and to help us, and to provide any advice that you have on our science portfolio. And as Dr. Bunn mentioned, I think we have some really terrific presentations for you today.

So my comments, and just to explain to the new members, are put into a handout that should be on your invitation, and I do not go over every item but you're certainly welcome to ask any questions about the items that are listed. The way we do this is to go to each division, laboratory and office in NIOSH, and ask them if they have any contributions for the BSC members, and then we put this, right now it's a ten-page, handout together, and it gives you some highlights about

some recent activities since the last meeting that NIOSH folks have been doing. So that's the purpose of that. Fear not, I'm not going to read my way through it. But I do want to highlight a few things. First of all, I always start with the budget. As you know, we are preparing for fiscal year 2021, which starts this October and then goes through September 30. This is the federal fiscal year through September 30, 2021. The President released the proposed budget in February, February 10, and no surprises here, as we've seen the last couple of years, the President proposes a reduction in the NIOSH budget of some $152.8 million. As you know, the President's budget, I always emphasize, is a proposed budget. It's the Congress that actually appropriates funds, and we see, as the President's proposed budget goes through the Appropriations Committees in the House and the Appropriations Committees in the Senate, and then we see what it's like at the end. We've been fortunate in the last couple of years that we have not seen the President's proposed budget reduction actually be actualized or accepted for NIOSH by the House and the Senate. So we'll wait and see what happens here for FY '21.

I just wanted to also draw your attention to some leadership changes. Dr. Matetic has been appointed to the position of Associate Director for Manufacturing. We have had associate directors for construction, associate directors for mining, and associate directors for agriculture—big industries—and we've sort of been lacking in the manufacturing area, even though we have a very active NORA sector council in manufacturing. And as some of you know, we've been doing a lot in the area of advanced manufacturing, but we lacked an associate director in this area. So we're happy that RJ has stepped up to that, and he is also helping us with the transportation, warehousing and utilities sector as well as the hearing loss prevention cross-sector program, so he's a busy guy.

As our Associate Director for Agriculture for many years, Brad Husberg, retired this January, so Jennifer Lincoln, Dr. Jennifer Lincoln, is our new Associate Director for the NIOSH Office of Agricultural Safety and Health. As you know, we have 11 Agricultural Safety and Health research centers throughout the United States, and Jennifer is our liaison to all of those centers. Also, she leaves a bit of a gap in the NIOSH Center for Maritime Safety and Health, and so Lieutenant Commander Alice Shumate is stepping into that role. So we're very happy that Jennifer has accepted the new responsibilities, as well as Lieutenant Commander Shumate.

Dr. Lauralynn McKernan was recently appointed to the position of the Director of the Division of Field Studies and Engineering in Cincinnati. Teresa Schnorr retired in November of last year, so we're very happy that Lauralynn is filling that important slot in a very important division at NIOSH.

The other thing I wanted to mention, as many of you know Christine Branch, she

was our Associate Director for Construction for many years, and she recently retired in February of this year, and so those of you that follow construction will be happy to know that Scott Earnest is our new Acting Associate Director for Construction, and we hope to be able to appoint a permanent Associate Director for Construction quite soon. So we're looking forward to that.

I did want to mention a couple of things within the handout that was given you, with regard to a lot of the things that NIOSH are doing in terms of publications and projects, and you're going to hear about some great presentations today. I did want to point out a couple of things that have to do with the Total Worker Health Program. As you know, before the pandemic started, we were very active, and are still active, in the issue of opioids overdose prevention in the workplace. And one of the things that we did recently is to put out a Federal Register Notice, a Request for Information, which opened on February 26. Now, this Request for Information was expiring, I think, yesterday April 26, but it's been extended and in your handout on page 7, it still says April 26. So if you could replace that with July 27. We're very interested in receiving comments on the topic of workplace-supported recovery, in other words, how a workplace, how employers can assist in opioid overdose prevention, and by developing a workplace-supported recovery program. This is something that we join our other federal partners at SAMHSA, the National Institute on Drug Abuse (NIDA) and other federal agencies including OSHA, MSHA and other agencies, in trying to figure out how we tackle this problem from the workplace perspective. So I draw your attention to that. If you are interested, go to the Federal Register and we ask a number of questions, and we're very excited about getting any interest and response that you have. So far, we've gotten some very good comments and we are very excited about this, and hopefully you'll be able to contribute also.

In addition to that, we've also recently joined the CDC cannabis working group working on a draft cannabis strategy. As you know, cannabis doesn't have the very, very narrow margin of safety that some opioids have, like fentanyl, but it still is an interesting problem in the workplace, chiefly because of the conflict of laws situation. As you know, the Drug Enforcement Administration with the Controlled Substances Act, marijuana is listed as a Schedule 1 drug, meaning that it has no medical indication. And yet, states have, as you know, adopted and passed various medical marijuana access laws and recreational access laws, so that we have a conflict between federal law and state law. And that affects the workplace, and a lot of employers are struggling with that issue from many different perspectives, including the workers' comp perspective, including their Drug-Free Workplace programs which often includes urine drug testing, etc. So I just want to let you know that if you have an interest in that, please let us know, and it's an interesting initial activity, if you will, in that area.

So what I wanted to turn to now in the brief time that I have is a bit of an overview which I think you might be interested in in what we're doing at NIOSH with regard to the COVID-19 pandemic that we're all living through right now.

The first area—and I want to thank Dr. Bunn for commenting on our website, and we're happy to receive any comments that anyone has on that—as you know, the White House has a Coronavirus Task Force, which you sometimes, if you are tuning in in the evenings, you'll hear a presidential briefing with some of those members.

And then, the next structure that is below the Coronavirus Task Force at the White House is the National Response Coordination Center (NRCC). And that is a center run by FEMA. As you know, the President designated FEMA as the agency that would coordinate the federal government's response.

Within the National Response Coordination Center, the CDC's Emergency Operations Center functions, and that is headed by CDC's Principal Deputy Director, Dr. Anne Schuchat. And our role in that is in the workplace safety and health team that is headed by Captain Lisa Delaney, who also serves as the NIOSH Associate Director for Emergency Preparedness and Response, and she is then the individual who coordinates within the CDC EOC.

We also have within NIOSH what we call a Virtual Emergency Operations Center headed by Todd Niemeyer, and that helps us organize ourselves in terms of all the activities that we're doing feeding into Captain Delaney's role in the CDC EOC.

Some of the activities that we've been doing in this area have, in the beginning, and primarily still, occupied a lot of our time having to do with personal protective equipment. As you know, NIOSH is home to the National Personal Protective Technology Lab (NPPTL) and their job, as many of you know, is to evaluate the sufficiency of respirators from all of the various varieties—filtering facepiece respirators to half-face/full-face elastomeric respirators, powered air-purifying respirators, SCBAs.

So they have been extremely busy of late and, as you know, there is a supply issue that's affected the country and the world with regard to filtering facepiece respirators and their use to protect healthcare workers. So our NPPTL and NIOSH has been very involved in that issue.

We have put out recommendations on how to optimize the supply of N95s by using all steps in the hierarchy of controls. We have also put out recommendations about alternatives to an N95 or a filtering facepiece respirator using elastomerics or other powered air-purifying respirators. We have also put out recommendations about the use of stockpiled respirators, which unfortunately many have expired in terms of their designated shelf life, and so we have put out guidance about that. We've put out guidance about complying with international

standards, especially for states that are considering buying respirators, KN95s from China. We've also put out guidance extending the use of N95 respirators and we've also put out, most recently, guidance about decontamination of N95s. Now, lest anybody get excited and say, well, NIOSH has gone off the rails here, remember that these are crisis recommendations and they arise from the severe shortage that exists. Certainly if healthcare institutions are able to get a supply of filtering facepiece respirators, they don't need to look to our guidance, which is basically crisis guidance. We have not abandoned any of our science, but unfortunately we are in this situation right now.

The other thing that we participated in is with CDC guidance. As you know, CDC has issued a lot of guidance, and we have been critical authors of some of that guidance, having to do for instance with critical infrastructure workers, so-called essential workers, and how they can be kept safe.

We also recently have begun to work on what is called reopening guidance, which may be a misnomer since many industries have not closed and continue operations. And many industries sometimes have closed, like restaurants and other things. So there are some industries that are really reopening, true reopening, and there's others that are continuing to operate but thinking about maybe expanding their operations. So we have general reopening guidance, which we hope to get out very soon—it's in a final clearance—and we have a lot of factsheets that are industry-specific, and we are working on assistance for reopening industries safely, depending on the particular industry specific that we are talking about.

So I just wanted to give you that overview of where we're at in terms of the pandemic, because it has, to be honest, occupied a lot of, hundreds of people's time at NIOSH, both in office settings, now our office is in our homes because we're doing 100% mandatory telework. That has interrupted or paused many of our laboratory type experiments. We've also been sending people out in the field to look at meat and poultry processing plants, to provide recommendations and our guidance on that, which was cobranded with OSHA, was published yesterday. And so we have probably since January had a bit of a pause for many people at NIOSH in our normal science portfolio.

So I'm going to stop there, Dr. Bunn, and see if anyone has any questions for me.

DR. BUNN: Thanks, Dr. Howard. I do see in the chat box there is a question from Steve Lerman asking if it is known when the industry-specific guidance will be released.

DR. HOWARD: Well, our general reopening guidance, which Dr. Piacentino and his team have been chief authors on, I believe is in final review. And Dr. Piacentino may want to give us an update.

DR. PIACENTINO: I'm not sure that I have—thank you, Dr. Howard. I think that is the update for it. We continue to be in review.

DR. HOWARD: Okay.

DR. PIACENTINO: So I don't have an estimate in terms of—I don't have a timeline estimate. Thank you.

DR. HOWARD: Well, thank you. And just so you know, when we say "in review", if you could put that all in caps with about four or five underlines and maybe some highlighting around it, you would get the general impression that I am trying to convey, which is that we have many layers above us that review any guidance that now comes out on any topic. So we're hopeful that, Dr. Lerman, that it gets out as soon as possible because we've had a lot of requests. So, thank you.

DR. LERMAN: Thank you.

DR. BUNN: Thank you, Dr. Howard. We have two more questions. Marc Schenker is asking, "Can you comment on risk reduction among essential industry workers such as agricultural workers?"

DR. HOWARD: Well, that's a great question, Marc. Thank you very much for that, because it gives me an opportunity to say that Dr. Jennifer Lincoln, who is our Associate Director for Agriculture, is working very hard on the agricultural recommendations and information that we can provide.

You know, one of the things that we're trying to educate not us, but people outside the workplace, because we're interfacing with a lot of people as CDC and other parts of the government, that don't understand the difference between agriculture and food processing, which is really a manufacturing function. So we're trying to separate that out. And I don't know if Jennifer Lincoln is on the call today and if she is, she may want to comment so I'll pause a minute.

Okay, so I don't think Jennifer is on today but Marc, you may want to check with her about where that guidance and information is at.

DR. BUNN: Thank you. Our last question is from Mary Doyle asking, "Is there a webpage listing COVID-19 related research being done by NIOSH? Researchers at Hopkins have asked them so they're not duplicating efforts."

DR. HOWARD: Well, John may, John Piacentino may want to comment also on this. We don't have a portfolio of research per se, that I'm aware of, with COVID-19. We have, our guidance that we do with CDC is related to, you know, what an employer can do to protect their employees and all of that. So John, I don't know whether you wanted to comment on that issue.

DR. PIACENTINO: Well, thank you. I think, again, I think that probably summarizes where our efforts are presently. We presently don't have a research portfolio. Well, I guess I would say we don't have a research portfolio that's fully complete, and certainly we are thinking about developing one. I am wondering whether or not we might be able to look across some of our extramural projects and perhaps, you know, publish whether or not any of our extramural projects might be related to COVID-19.

DR. HOWARD: Right, and I think that that probably, Mary, is what we are doing. You know, we

are so deep into the response activities that I don't think we've been able to step back. Now, Allen Robison is looking at that issue of whether we can do an announcement—and certainly, and the June investigator-initiated announcement, one could apply COVID-19 projects to that. But I think we are so involved in the response that we have not had bandwidth for looking at research projects per se.

DR. BUNN: Okay, thank you. We have a couple more questions coming up. One is from Dr. Reponen asking, "NIOSH centers are current—" Oh, saying, "NIOSH centers are currently collecting info on COVID-19 related research."

DR. HOWARD: Well, that's great. We are very happy to hear that.

MS. NOVICKI: Dr. Howard, it looks like Allen Robison has raised his hand. He might have something to add.

DR. HOWARD: Yes, please. Allen, I didn't know you were on. I should have called on you. Please, go ahead.

DR. ROBISON: Hi, oh gosh, I can't—oh. Can you hear me?

DR. HOWARD: Well—yes.

DR. ROBISON: Can you hear me now?

DR. HOWARD: Yes. Yes.

DR. ROBISON: Okay, I'm sorry, that was—

DR. BUNN: I think—I think there's feedback. You may want to shut off your speakers within your computer if you're using them, so.

DR. ROBISON: Can you hear me now?

DR. BUNN: Yes.

DR. HOWARD: Yes, much better, Allen. Go ahead.

DR. ROBISON: Okay, great. I just wanted to add to the conversation. Dr. Howard, you of course are aware of the guidance we've sent out to folks about using the June receipt dates for their COVID-19 related research. I think, technically speaking, extramurally, we do not have a portfolio specifically related to COVID-19 of course, because it's just occurred. However, we do have projects related to infectious diseases, PPE, and respiratory health, and a variety of other topics. And we will pull together the information from the current portfolio, the projects that are currently funded. And of course, the Secondary Review Committee just met, and we have funding recommendations related to many topics, but we have funding topics related to COVID-19 related activities: respiratory health, PPE, healthcare workers, and things like that. So we're looking at that very carefully before we send you those recommendations. Thanks.

DR. HOWARD: Thank you, Allen.

DR. BUNN: Yes, thanks, Allen. And I would just like to add, and thank Allen for using the Raise Handset function beyond the use of the chat box, if you look in the upper left hand corner of your screen, you will see a figure with the hand raised. And if you just go to the drop-down list, there is the option to raise your hand if you have

a question. So at the end of the presentations, I will be looking for raised hands in the chat box. And right now, everyone's speaker is unmuted. So if you have a question, you are free to ask a question, although if there's a lot of feedback, then we'll probably have to mute those microphones.

Do you have anything else that you would like to add, Dr. Howard?

DR. HOWARD: I think somebody was trying to ask a question.

MR. MORRISON: Hi, this is Patrick Morrison with the International Association of Firefighters. I don't have a question. But with everything that has been going on in the last couple of months, I just wanted to let you know and compliment you. We have been working, the Fire Service has been working, very closely with NIOSH/NPPTL trying to get this information out to our members. And I can't thank you enough. I can't thank the staff enough. I can't thank the requirements coming out—this is something that has never happened before.

And the assistance, the guidelines, trying to really help us work through this maze with the PPE and the equipment coming over, how we are using it, how to distinguish between real and counterfeit—but anyway, Dr. Howard, I couldn't go without saying thank you to you and your staff. They really have risen to the occasion, and I just want to thank you on behalf of the Fire Service. I appreciate it.

DR. HOWARD: Well thank you, and I know they will appreciate that. You know, our folks in NPPTL have been working literally 24/7. That's probably the center of our activity, exclusive of the CDC's emergency operations center, and exclusive of our own virtual emergency operations center. NPPTL has been very busy and I'm glad that they're having such a positive effect on the Fire Service. So thank you.

DR. BUNN: Thank you. And I see Allen Robison has raised his hand.

DR. ROBISON: Can you hear me?

DR. BUNN: Yes.

DR. ROBISON: Okay, the one thing that I wanted to mention that I forgot is this—there are several survey efforts going on, one by the Industrial Hygiene Association, one by the Total Worker Health Center in Colorado, to gather information that could be helpful for COVID-19 work, including reopening America for business. And one thing that OEP is doing is going across the centers, all the centers, to confirm the people with certain types of expertise that could be available in the future for consulting with NIOSH on the reopening process. They are concluding that very soon. And then we'll also look across the current EMTs outside the centers to see if there's any special expertise there. Thank you very much.

DR. BUNN: Thank you, Allen. Is there anything more to add? Does anyone else have any questions? All right, thanks everyone for a wonderful discussion, and you, Dr. Howard, for really enlightening opening remarks.

DR. HOWARD: Well, thank you, Dr. Bunn.

DR. BUNN: All right. So we will move on to our first presentation. The first presentation is going to be on Peracetic Acid: An Overview of Analytical, Toxicology and Field Studies by Dr. Dunn with the Division of Field Studies and Engineering.

DR. DUNN: Thank you, Dr. Bunn. My name is Kevin Dunn. It's not on my slide, primarily because this is a large group effort, and not just made with one person. Can you hear me okay?

DR. BUNN: We can hear you fine.

PERACETIC ACID: AN OVERVIEW OF ANALYTICAL, TOXICOLOGY AND FIELD STUDIES

DR. DUNN: Thanks. So I will be presenting on the NIOSH research on peracetic acid, and I appreciate the opportunity to have this discussion with the BSC this morning about this important ongoing research project.

Peracetic acid is a chemical that is primarily used for cleaning, disinfecting, sterilizing, and as a bleaching agent in a wide variety of industries. It has a strong odor. It smells like vinegar. It is used in commercial solutions in equilibrium with hydrogen peroxide and acetic acid. Its use as a sterilant is projected to be the fastest-growing segment in the industry. It is mainly desired for its high kill rate of microbes in a short amount of time on surfaces to get good sterilization in fluid application because rinsing is not required. So it's a one-step disinfectant that doesn't require rinsing afterwards. However, it's highly corrosive and irritating to the eyes, skin, and upper respiratory tract.

It is used in a variety of different industries, including food and beverage, hospitals and healthcare, wastewater and sewage treatment, bleaching of textiles, pharmaceuticals, the oil and gas industry, as well as laundry processing, to name a few.

In food and beverage, as you can see, this is the key component of the poultry and meat industries' food tissue treatment. You can see it sprayed on, in those industries, on the carcasses as they are being processed, and a hard surface sanitizer to wipe down equipment and surfaces.

In healthcare, it's used for cleaning rooms and cleaning surgical suites, typically after the patient has moved out for a new patient to come in. It is also used as a high-level disinfectant for cleaning endoscopes.

As a water treatment, it is widely used in industry as a cleaning process treatment that's to clean out processed lines in between batches of different materials or between different runs. It is used to process water treatment as well. So these are a few of the industries, but certainly not all of them.

There are a few published and proposed exposure limits for peracetic acid. The American Conference of Governmental Industrial Hygienists, or ACGIH, has issued a short-term exposure limit, or a STEL, of 0.4 parts per million. The California OSHA Health Effects Advisory Committee has a 15-minute STEL of 0.4, which matches the ACGIH limit, an also an eight-hour permissible exposure

of 0.15 ppm. These haven't been promulgated yet, but they have just been proposed by the Health Effects Advisory Committee.

Also, the National Research Council publishes acute exposure guidelines, which are meant for the general population, not the working population, but the general population, which could include susceptible individuals. And the AEGL-1 is the concentration that is predicted in this general population that could cause notable discomfort and irritation. You can see that is a 0.17 ppm. And the AEGL-2 is the concentration where it is expected the general population that individuals could experience irreversible or other long-lasting adverse health effects. So these are some of the limits that are in place.

NIOSH proposed a value of 0.55 ppm as Immediately Dangerous to Life and Health in 2015. That proposal received extensive comments among our stakeholders concerning the concentration and several other concerns, namely that at the time, it was difficult to measure in air. The quality of data used was few—there were a few animal studies, there was only unpublished human data. And lastly, a concern about this distance between the ACGIH STEL and the proposed IDLH. They thought like, with the STEL at 0.4, and the shutdown and Immediately Dangerous to Life and Health being at 0.55, those values were very close and may cause some issues in industry, and had recommended the Peroxy Compounds Task Force, which is a group of manufacturers which had recommended an IDLH to be set to 1 ppm. So they felt like 0.55 was too low and was too close to the 15 minutes one.

So that's really how this NIOSH research was started. The purpose was really two-fold. One, to address the gaps identified by our stakeholders, including the ability to take more accurate measurements, to generate additional irritation data as the basis for our exposure limits, and to provide some exposure data. Secondly, to use this data to develop the IDLH value and other risk areas for guidance to help protect workers that are using disinfectants with peracetic acid. This is a large cross-divisional research project within NIOSH. It includes basic applied and field study research. And this shows a fairly team that are involved in this project at NIOSH. So I'm one small piece of this, but backed by the work of lots of different individuals. And we'll talk about each part of these studies today. So we'll start with analytical and we'll talk about our animal, in vitro, and field studies. I am doing work on the field studies, and helping coordinate and manage the project along with Dr. Paul Schulte, Dr. Sam Glover, and Dr. TJ Lentz.

And so just a quick overview of what we have done in this arena—there have been four health hazard evaluation reports where we have taken measurements and done symptom surveys in the field, specifically in two different industries. The first two reports were among poultry inspectors, so they are in poultry processing plants. The last two listed are among hospital employees using PAA disinfectants

to clean rooms. So those are the two industries that we've had some presence in through our HHE program. These reports are publicly available and posted on the web.

So really the backbone of all this work is really to develop an IDLH-2 of the gaps that were identified by our stakeholders. A little background about the IDLH is that there are several different conditions which the IDLH can be based on. In this case, we're focusing on a state of irritation. We know that peracetic acid is highly irritating. That's the key factor, that it does not seem to persist in the air. It breaks down fairly rapidly.

And so the data that we'll need to develop in this area include animal toxicology data, specifically short-term, short duration acute exposure, so we can look at the RD50, develop the RD50. And this is the concentration which produces a reduction in respiratory rate of 50 percent. So as animals become more irritated, they start breathing less frequently, and so the RD50 is an important metric for irritation.

We will also look at things like the airways damage, how long it takes for the animals to recover after exposure. And we'll also look at the second components of the PAA mixture. As I've mentioned, in the commercial mixtures of peracetic acid, hydrogen peroxide and acetic, and it's thought based on the research done to date that PAA is really the main driver. It's a much stronger irritant than the other component in this mixture.

The other data that helped inform our development of exposure limits include workplace exposure data, the development and assessment of air sampling and analysis methods that helps us gain confidence in the data collected, both in the workplaces and for use in the animal and cellular studies.

This is a picture that really tries to pull together all the different pieces of the research program and puts them in context. As you can see, the development and assessment of air sampling methods is the key to supporting both the laboratory and field studies. And the toxicology studies, the animal side of the studies will form the basis of the IDLH in any other real development work that might be done.

And now, with the rest of the presentation, I will walk through the various studies and where we are in that area.

With the analytical, the air sampling methods of studies, the objectives are—there are several goals to these studies. First, to evaluate the existing lab-based methods, but also to look at direct reading/monitoring methods. Secondly, to modify and improve the existing methods. Third, to investigate new methods that might have advantages over existing methods. And fourth, all of this work is being done to sort the accurate measurement of PAA concentration, both from lab based and field based studies. It's an issue that's come up in different groups;

one of the concerns with developing standards in general in occupational exposure limits is the ability to measure accurately. And that's been something that's been brought up by the industry and by the Cal OSHA Health Advisory.
So this is a look at the six different methods that we're evaluating. The top three in blue are commercially available peracetic acid monitors that are currently being used in workplaces across the country. These monitors give immediate feedback on exposures. You would note that two of these have a dual-range high and low sensors. And this is good for us because it allows us to measure both typical concentrations in the workplace, which would be less than about 1 ppm, as well as use in our animal toxicology studies, where we might get up to 20 or 30 ppm.
All of these methods are based on electrochemical cell sensing technology. The bottom three methods in white show lab-based methods, which are part of the samples that would be collected in the field and sent back and analyzed by a commercial lab. The first one is a colorimetric impingement method that is being developed at NIOSH using a commercially available analysis system. The second one, or the Hecht impinger method, was developed by a research group at the INRS in France. And this group also developed the last method, which is a more industrial hygienist-friendly servitude filter method.
And generally, industrial hygienists don't like impingers in the field because they are hard to use. Often times they are made of glass, which is allowed in food workplaces. So the servitude method addresses some of those issues. And it's the most frequently used method currently for measuring peracetic acid concentrations in the workplace.
So this is a look at some of the accomplishments to date. The first task of the study was to design and build an atmosphere-generating system for an environmental chamber that was capable of generating a range of peracetic acid contrast concentrations across a range of temperatures and humidities. This is really what took up most of the initial year of this study. After completing the chamber, we evaluated the three commercially available real-time monitors, which you can see at the bottom of the chart, across a range of different temperatures, conditions and humidities.
As you may have remembered from the last slide, a couple of monitors had high and low range sensors. For this permutation of low, medium, and high temperatures, concentrations, and a range of sensors meant that we have had to test in well over about 5000 different test conditions to evaluate each of these monitors. We put the monitors through their paces to get a better understanding of how they performed under a variety of different environmental conditions. And we assessed key monitor characteristics like response time, recovery time, zero span drift, as well as I mentioned, the temperature and humidity effects on that monitor.

So in this slide, you can see on the left a couple of the monitors attached to the glass sampling. That's a look inside our test chamber. In the glass column is where the PAA, that controls the different temperature and humidity. You can see the white caps are all the different sampling ports. So the yellow monitors, the PortaSens monitor that I mentioned, and the blue one below is the ChemDAQ SafeCide monitor, so they are both attached during the generation process here. If you look at the graph in the middle, you can see this is for one monitor. We're looking at stability. So you can see that they are stepped down from higher to lower concentrations, the stability of the readout of the monitor. And so that's one of the primers that we're looking at. And then on the right, you might be able to see how humidity affects the monitor from this cell. In this particular graph, we see that this particular monitor starts to show impact of higher humidities at higher concentrations. So what you would hope is that they would all along one line that would say across all the concentrations, and across all the humidities, we'd have really seen a difference. In this case, we have seen a difference in higher levels of humidity across this range of concentrations.

So these are the accomplishments so far. We have done several things. We have made a change in one of the sample prep steps on the most commonly used commercial method, the Hecht sorbent tube. That has improved the recovery of the analyte here in analysis. It makes that method more slightly able to lower the limits of detection that we are still looking at this point. We have really developed this new colorimetric impingement method that we think can be used in the poultry and meat plants, and we have a lot of interest among our stakeholders among our poultry industry. With the impingement method, we know it's going to be good at measuring this kind of mixed vapor and mist that is common in that workplace. Plus the method has low uncertainty, it is low-cost. These plants could purchase the equipment and do the analysis onsite, so they could get more immediate results. So we think that this is a method that has a lot of possibility for our stakeholders.

Lastly, we have developed a new servitude method, which we believe will have some advantage over the Hecht method, namely that we think it will allow for longer sampling duration. Currently the Hecht method has been assessed up to 30 minutes of time, so we want to find another method that we could collect samples for longer, and we think that this one looks like it will have that capability. We also think it's less subject to interference from other commonly used disinfectants. In many of these workplaces, they may use peracetic acid, but they also use chlorine-based disinfectants and that could affect the performance for some reason. And lastly, it's going to be cheaper and require a lighter sampling train, which is a boon to the workers and the industrial hygienists affected by its use.

So finally, for the analytical studies, where we're going, for the direct reading monitors, we plan to assess a performance with the interferences which I've mentioned like chlorine and bromine, which are commonly used disinfectants. So you might have a workplace where they are using PAA, but they are also using a chlorine-based disinfectant, and we think that might affect the use of these monitors, so we want to understand that.

And we also want to move on to the ability to look at these monitors' capabilities such as mixed-aerosol vapor and mist, exposures which might be common in meat plants where they are spraying the disinfectants throughout the plants. And for the lab-based methods, we are planning more evaluations, specifically to look at the Hecht servitude method for higher levels of humidity, which can sometimes be a problem for these faculties, and also looking at their ability to sample for longer than the 30 minutes duration they are currently stuck out to.

And we're coming onto some sample storage studies, and to assess the unlimited detection, or LOD, and limited quantitation, or LOQ, of hydrogen peroxide using the Hecht impinger method. And finally, we want to continue to assess this new NIOSH-developed sampling tube method. And specifically again, with all of these, looking at things like sample durations, the effect of humidity, and really developing the method figures in there, which included limit of detection/quantitation, bias and accuracy.

But moving on to the varying animal studies part of the research. The objective of this research is twofold. Number one is to assess the respiratory irritation response to the commercial mixtures of peracetic acid along with the acetic acid and hydrogen peroxide; and to assess the histopathological response of mice exposed to this mixture.

To address these objectives, we first had to generate a system capable of generating a controlled atmosphere at a known concentration and capable of measuring the breathing rates of unrestrained mice during these exposures. As you can see, in both of the analytical methods and the animal studies, there requires a fairly significant chunk of effort on the front end to get to the point that we can start these experiments. And then once that's done, we perform inhalation studies across a range of concentrations.

Next, we have to assess across a host of pathologies from samples collected immediately following the cessation of exposure, and also at 24 hours post-exposure, with the emphasis being on nasal histopathology. But we will also look at the tracheal lining.

We've completed the construction and validation of the exposure chamber and the integrated, unrestrained plethysmography system. We've completed the initial exposures of this PAA/acetic acid/hydrogen peroxide mixture and exposed mice to concentrations of 0, 3, 6, 12, and 24 ppm of peracetic acid. We have collected

the respiratory rate data and are analyzing the data to look at the calculation of the RD50 that I mentioned at the beginning. We have collected the histology samples and we are looking at seven sites from this little area of the nasal region, again, just after the end of exposures, and at the 24 hour post-exposure.

This slide shows a picture of the exposure chamber to the big box. In the picture on the right, you see a large box, and in the other equipment, you see the dosing and monitoring system. And then if you look at the figures on the right, in the upper right, you will see this line chart—it's an eye chart, sorry about that—that shows the data from the generation monitoring system, so you can look at the study of concentrations. And then in the bottom right, you see the eight different line graphs looking at the mice breathing detection. So you see this soft to jagged as the mice breathe in and breathe out. And so we are able to do this monitoring in eight different cages, unrestrained, in that system. So that's what those eight different line graphs would show.

So where we're going on this study is really to fill in one additional low dose between the zero and three parts per million. We're planning around 1.5ppm. We are going to repeat these exposures. We have used this unrestrained plethysmography chamber. So this is, we think, more natural to the mouse, or less stress, because they can sit and wander around. But the previous study done has used the head-out plethysmography chamber, where the mice is in it and only their head is in the exposure region. So we want to go back and repeat those exposures so we get an understanding of the comparison of the two methods—both the head-out plethysmography and what we think is the more natural unrestrained plethysmography system. We have the equipment to do that, and we're getting ready to do that once we do get back into the lab.

In the future, we are planning on doing repeated low-dose exposures. And then during exposures to the component parts of the mixture, acetic acid and hydrogen peroxide as well as pure peracetic acid. And then lastly, looking at this kind of mixed aerosol exposures we're calling it that include the vapor and the mist, to look at the potential for other health effects based on this exposure pattern.

So next, I would like to talk about the in vitro and cellular studies part of this research. The objectives are to assess the final toxicity of PAA vapors, primary, normal, human endothelial and epithelial cells using an air/liquid interface system. We just conducted acute exposure of 3, 12, and 22 ppm, which is similar to the mice studies that I just talked about. And finally, we conducted repeated low-dose exposures, again, similar to the animal studies so that the animal studies and the cellular studies are linked.

At the bottom of the slide, you can see the different steps of this air/liquid interface process, which we believe provides a more physiologically relevant

exposure system for respiratory research. It's a method used to mimic the animal in vivo environments. So it's something that will help us look at the crosstalk between cellular and animal studies.

It's a very time-consuming process. If you look at the steps at the bottom, these exposures from the time you take the cells out of the freezer to the point where you can do your exposure is over a month. So these are exposures that from start to finish may take up to 40 days to do the exposures.

This is a long list of the various endpoints that we are looking at—a few studies including cellular viability, markers of information, and histopathological changes, among others. So far we've completed exposures at the 12 and 22ppm, the mid and high range concentrations, and are planning the lower 3ppm exposures when we can get back into our buildings and into our labs.

An accomplishment so far is that we've confirmed that these NHDE cells can be exposed to filtered air for four hours with minimal loss of viability, which is an important baseline condition. These preliminary experiments were instrumental in helping us understand how long the NHDE cells could be outside of their normal environment without compromising their viability, and for up to 24 hours post-exposure.

So we've completed the cell exposures of the high and mid doses and I mentioned before and are currently planning expected experiments at the low dose. We have assessed many of the markers that I mentioned before, including cell viability, markers of inflammation at the 4- and 24-hour post-exposure time points. And we've assessed histopathology of these time points as well.

So the key findings are that we've seen, it does affect response of cellular viability and cytotoxicity. You could see the bar chart in the lower-right. On the right of that chart, you see the filtered aerosol, little loss of viability both at four and 24 hours. You can see the R-positive control, chromium-6, as expected, had significant impact on viability. And then you can see 12 and 22 ppm, so with the increase in concentration, it increased loss of viability with increasing exposures.

The figure in the upper right is a little hard to see, I'm sorry about that. But the A and D figures are what normal epithelium should look like. The red arrows are pointing at gauntlet cells or mucus production and down in the black areas is showing cilia. And what we have noticed at 12 ppm, there's an injury response, loss of cilia and an increase in the number of gauntlet cells and mucus going to the surface. At 22, we're seeing cell death and the loss of apical cells, the blunting of the epithelium, and the nuclei looking disorganized. So it kind of gives us a really nice—if we could blow that up a little bit—a really nice look at the actual impacts on these cells.

Our future plans for the study are to complete the electron microscopy inventory work in staining for all exposures and time points. And as I mentioned, we'll finish

the low-exposure dose of 3 ppm. In the coming years, we plan to do repeated low-dose exposures to PAA in concert with the animal studies we mentioned before.

But the field studies, it's the last of the slides that I'll be talking about today. The objectives are to assess exposures to peracetic acid and the other mixture components, acetic acid and hydrogen peroxide, in a variety of workplaces. We will conduct personal sampling for short-term exposures to PAA and hydrogen peroxide. We will assess sources of emission and facility ventilation to help us develop guidance and reducing work exposures to the disinfectant mixtures.

We will also be comparing sampling methods. I talked about this in the analytical methods section. In that environment, they are doing it in a very carefully controlled environment, and a carefully controlled way. In the field, we will be seeing a more complex and messy environment that changes from workplace to workplace, and this will give us more information on the performance on the individual methods in the real workplace setting.

So far, we have drafted the study protocol. We have completed peer and tripartite review. And just in February, we have received approval from the NIOSH Institutional Review Board to move ahead. We have conducted walkthroughs of four sites, including a pharmaceutical plant, a hospital, and two food production plants. We had discussions with additional facilities interested with partnering with us to get a better understanding of their workplaces, looking again at hospitals, pharmacies, and food production. And we plan to continue these efforts when it's safe to travel and get back into these plants again.

So just as a summary, with the analytical methods, we've done a lot of work on these real-time monitors, and we're analyzing the data so we have a better understanding of how well they perform, particularly related to the exposure limits that are in the workplace now and the idea is that they will be developed.

We have developed a new impinger method that we think will have applications certainly in workplace, but mostly in the meat and poultry workplaces. We have compared that impingement method to the Hecht, or the French impingement method. We have developed a new servitude method that we think will have potential improvements over the Hecht method, which will allow for easier industrial hygiene usage and easier on the workers, as well as cheaper analysis and studying sample times.

We have developed an improved processing of the Hecht method which, again, is the most used commercially available method. And that sample prep step will increase recovery, which will increase the robustness of that method, and may improve along with detection.

In the animal studies, we have completed the initial exposures, and are analyzing the data, the RD50 data for irritation. We are planning on doing additional

exposures, like one lower concentration below 3ppm, probably around 1.5ppm. For the cellular studies, we have again completed exposures of the mid and high concentrations. We have seen that peracetic acid decreases cellular viability. And here, while increasing cytotoxicity and markers of inflammation, the histopathology changes the mucus production in the cilia in the PAA-exposed cells compared to the cells that are in the controls.

But the other studies, we're getting more on the front end. We have started, we have a protocol that's been reviewed. We've identified several sites that are interested in working with us. We've done more walkthroughs as we have planned to start our site surveys in 2020. But we will see how that continues based on the ongoing COVID-19 crisis.

So the questions that we have, really, for the members of the BSC is whether we have the critical pieces of the project adequately covered. It's a pretty broad project with lots of different moving pieces that we want to make sure that all of these individual products adequately address the goal of developing the basis for the IDLH. That really was the starting point of the crux of this project. And also, we would like to ask if there are other areas of research at the BSC thinks that we should be focusing on, particular to these individual pieces in the goal of developing IDLH operational exposure limits.

So that's what I have for this morning, and I am happy to take comments or questions.

DR. BUNN: Thank you so much, Dr. Dunn, for this great presentation and a spectacular overview of all the work that's being done covering multiple areas, including the analytical, animal, in vitro, and field studies that have been done to date, as well as those that are currently planned.

So I do have a question in the chat box from Jessica Graham, who says, "Excellent and thorough overview, Dr. Dunn. Is there interest in using the data being generated to establish a NIOSH-recommended exposure limit for peracetic acid—or, if data is insufficient, to have an official occupational exposure band for PAA based on utilizing the NIOSH banding scheme?"

DR. DUNN: I'm going to give a brief response to that, and then maybe check with our quantitative risk assessment folks. Like I said, I am a part of this process, but not the—there's lots of folks supporting me. So currently, the goal is to develop an IDLH. We have discussed developing maybe a STEL, dependent on the data that we collect. We haven't made the decision to go beyond the IDLH. But let me let Chris Whittaker—Chris, if you're on, could you talk to that?

DR. WHITTAKER: Sure. The driving factor in doing this research has been the IDLH. So that's what we were focused on. However, early on we were thinking about how this data might be used to set a STEL. Now, an eight-hour TWA would be different because we don't know the more chronic effects of these substances, and the

research we're doing won't speak directly to that. That being said, others like Cal-OSHA have proposed doing that, and we're looking into that. So it's an area of interest, but we have not set, we have not made a plan to address the eight-hour time, the average recommended exposure limit. But we are interested in looking at a STEL if the data support that.

The protocol we will be using for the IDLH, which is the published IDLH protocol, and we have a lot of experience in looking at irritation and histopathological data to set an IDLH. And it would be something similar that we would use to set a STEL in that case.

As far as the banding part of the question goes, NIOSH has not used the banding tool to set official NIOSH exposure bands, because that was not the intension of the NIOSH banding tool. It is a tool that is provided to employers to use information to set their own limits based on data. And I was on the banding team as well; I am not sure that there are enough types of data that have been collected that would support an occupational exposure band with our current banding protocol. So that's my answer. I'm happy to take any follow-up questions.

DR. BUNN: Thank you. Our next question is from Tiina Reponen, who asks, "Have you looked at the long-term performance of the direct reading devices? For example, is there any drifting when in use for several months?"

DR. DUNN: I think I will turn to one of our analytical chemists. Angela, or Bob, if you guys could address it. Maybe start with Angela, if you wouldn't mind addressing what you guys have seen in the way of drifting and then how long have you looked for that.

PARTICIPANT: Yes, so a lot of these real-time monitors get recalibrated. One of them gets recalibrated every three months; one of them every year. We have started to look at the drifting over time, and it appears that they actually give better measurements the longer you use them. But yes, we have looked at that and we're still in the middle of looking at that, if that answers the question.

DR. DUNN: Yes, thanks, Angela. I think, as she said, this is somewhat unique among real-time monitors. Each one of these has calibration cycles that are under a year. Most pieces or instruments are typically calibrated on an annual basis, if that. But these require, as she said, every three months to every six months to be recalibrated.

And she has certainly worked with these monitors over a period of months, and she has gone through these different test conditions. As she said, so far we haven't seen a drift over a period of months. And hopefully, with the recalibration cycles being under a year, maybe this won't be an issue. It would be an issue if workplaces decide not to follow the calibration conditions that we use.

DR. BUNN: Thank you. Are there any other questions? If there are, I don't see any hands raised right now, but if you would raise your hand to ask a question, please do so

now.

DR. DUNN: I think I see one from Dr. Schenker in the chat box?

DR. BUNN: I think I just read that one.

DR. DUNN: Oh, okay.

DR. BUNN: Oh, did I miss that? Oh, sorry, excuse me. He says, "Very nice presentation vis-a-vis the field study. Is there any attention to the workers who do the mix or loading of PAA—for example, the handling and storage of the PAA?"

DR. DUNN: Thanks for that question, Dr. Schenker. We are specifically in the field studies going to look at that. There are a couple of ways these disinfectants are used. In some workplaces, they come as a ready to use, or RTU, formula, which is usually PAA down around the 0.2 percent. In other situations, you may see concentrations of up to about 20 percent, and they are diluted onsite down to the use level.

One of the things that we are concerned about in the field studies is this dilution, for a couple of reasons, as Mark as mentioned. It's when the workers who work with the most concentrated form of the PAA. So that will be usually pouring these as much as loading and opening up a buttonhole and a barrel and connecting up a pump that goes through a dilution system. But it is an opportunity to have the highest short-term exposure, which is of course what we're worried about because this is generally considered to be a short-term irritant. So it's a short-term, intermittent exposure but one that we're really interested in.

So as we do this—and dilution is done certainly at the meat and poultry facilities. It's also done routinely at hospitals. And so that's definitely something one of the tasks that we will be focusing on. Because again, considering that this is a short-term irritant, the opportunity to get high peak exposures is something that we're very interested in. So that's a task that we will be monitoring when we get up to the field.

DR. BUNN: Thank you. Are there any other questions? I don't see any hands raised.

So thank you very much for the presentation, Dr. Dunn. Next on our schedule is a break. So I think as to keep us on the overall schedule, maybe if we take a 15 minute break instead of a ten minute break, that will bring everyone back to the virtual meeting at 10:15. So if you could return at 10:15; I know the screen says 10:30, but let's reconvene at 10:15. Thank you.

[Break.]

DR. BUNN: Good morning, everyone. Welcome back. Our next presentation will be by Kyla Retzer who is the Center for Motor Vehicle Safety coordinator, and she'll be talking about the update to the Center for Motor Vehicle Safety strategic plan that will actually cover the next decade. So thank you, Kyla, and we look forward to your presentation.

CENTER FOR MOTOR VEHICLE SAFETY STRATEGIC PLAN

MS. RETZER: Hi. Good morning, everyone. Thank you for the opportunity to share with you an update on the NIOSH Center for Motor Vehicle Safety and our new strategic plan for the time period 2020 to 2029. The Center for Motor Vehicle Safety is composed of all of the staff across the institute who are working on research and communication projects aimed at improving motor vehicle safety for workers. Our lead team is presented here: Dawn Castillo is our manager from the Division of Safety Research in Morgantown; I am the CMVSs coordinator and epidemiologist by training and work in the western states division based in Denver; Rosa Rodríguez is our assistant coordinator and is also an epidemiologist and statistician; we're also fortunate to have Rebecca Olsavsky as our health communication specialist; and, David Fosbroke as our long-term planning coordinator.

Some of you may know Dr. Stephanie Pratt. She's on the phone. She was the manager, the original director of the Center for Motor Vehicle Safety since its inception over ten years ago. However, she's recently retired from federal government, but is still working with us on a limited basis and provides guidance to the center.

Our sharing committee members are listed here. The committee was recently relaunched in the past year and they have been very involved in the development of our new strategic plan. Our members represent a wide variety of divisions and expertise across all of NIOSH to ensure that gaps in needed research are recognized and included.

Here's a general outline of my talk today. First, a bit of background about the significance of motor vehicle safety in the workplace. I'll talk about the evaluation of our last strategic plan, and then discuss our new strategic plan. I'm going to cover four of the main themes that are covered in the new plan which include automation, fatigue, distraction, and safety culture and management. I will also cover how we communicate results of research and our recommendations. And then, finally, I'd like to collect the BSC's input on how we can best implement our new strategic plan and achieve success.

A bit of background on motor vehicle crashes and the Center for Motor Vehicle Safety. The burden of motor vehicle crashes to both workers and employers continues to be significant. It is the leading cause of U.S. Work-related deaths leading to over 29,000 deaths during 2003 to 2018. This issue cuts across all industries as it is either the first or second leading cause of death in all industry sectors. The economic impact to employers is also large. During 2013 it was estimated that $25 billion was the cost to U.S.S. Employers for the motor vehicle crashes that happened at work.

The purpose of the NIOSH Center for Motor Vehicle Safety is to conduct research

and develop strategies to prevent work-related motor vehicle crashes and resulting injuries. We do this by setting priorities for NIOSH-funded research. We continually develop public and private partnerships, and collaborate with our motor vehicle safety partners. Two examples are the National Safety Council and the Network of Employers for Traffic Safety. The CMVS lead team assists researchers to develop their funding proposals and to assure strong earnings need and impact is included, and study methods are sound. We then work within and across our divisions to conduct the research ideally that we have prioritized. We communicate results and recommendations of motor vehicle safety research across the institute to employers and other stakeholders using multiple routes such as our quarterly newsletter, social media, infographics, fact sheets, and other avenues. We're also actively engaged and work on committees to ensure that results from our research are translated into relevant governmental policies. We also participate in translation of research into industry standards, employer policies, and other stakeholder initiatives.

Here's a preview of the questions for which the center would like to get your input at the end of the presentation. So some things for you to consider. First, how can we effectively stimulate priority research in the NIOSH-funded extramural community and the extramural community at large? Second, which academic industry associations and others should we be partnering with to advance the plan's objective? Third, how can we effectively get our findings into the hands of those who can put them into practice? And, fourth, how can we capture usage of NIOSH motor vehicle output by organizations and employers outside of NIOSH?

So I'll move next into our last strategic plan evaluation that was completed in 2019. So in 2019 we performed this in-house evaluation of the success of our last strategic plan. The plan had assessed our progress on five strategic goals. Within each goal was a set of performance measures and we found in our process evaluation that 80 percent of our performance measures were partially or fully met. Partially met generally not that a project had been initiated, but that outputs and that project had not yet been completed. We made substantial progress in all five of our goals ranging from 56 percent of our measures being met on Goal 3 which is related to promoting evidence-based policies and practices to 100 percent of Goal 5 which is related to communicating safety and policy recommendations.

We also conducted what's called a contribution analysis, examining how our research led to positive changes in the workplace and documented five specific examples of impact. This plan is posted to the research program webpage in case you wish to read the complete report. This is a snapshot of both a cover and a goal line which was to identify risk factors for work-related crashes. The green in the middle on the right and the image in the right, represents fully met

performance measures. The orange means partially met and red were not completed. The greatest number of research outputs addressed this goal which reflects the strong epi and statistical expertise within the NIOSH Center for Motor Vehicle Safety. But there were two performance measures pertaining to identifying new potential sources of exposure data that were not able to be addressed.

I will briefly mention two of the five stories of impact that were included in this evaluation report. The first is regarding improved safety for EMS workers. NIOSH conducted a study with the National Highway Traffic Safety Administration to better understand non-single injuries among this vital workforce, and found that 2000 EMS workers were injured in motor vehicle crashes each year. NIOSH also partnered with the Department of Homeland Security and ambulance manufacturers to develop effective and reproducible crash test methods for ambulances, and also to carry out those crash tests. Ambulance design, purchasing, and licensing are not nationally regulated which leaves a potential gap in safety for these vehicles and their occupants. An award-winning video series about these new crash test methods was also developed.

The Society of Automotive Engineers published all of the ten new crash-test methods. These methods have also been adopted into three national bumper to bumper ambulance standards.

The second story is the impact of NIOSH research on truck drivers which critical research has been performed. One of the research projects was to collect body measurement data from more than 1900 truck drivers in partnership with seven truck manufacturers. It had been decades since anthropometric data had been collected on truckers. A poor ergonomic fit for truckers can be uncomfortable. It can also lead to safety concerns like when the controls are hard to reach or when seatbelts are less likely to be buckled.

A second project undertaken was a survey of 1,265 long-haul truck drivers in 32 truck stops and 48 states to determine national estimates of work-related safety and health conditions. The topics such as sleep, fatigue, work practices, and injury history. Half of the truck stops were also assessed for the availability of resources that contribute to the wellness of truckers.

Both of these studies outputs led to impacts beyond just a generation of new knowledge. The body measurement data was provided to large truck manufacturers, including Volvo, Daimler Trucks, and Navistar for its youth and new cab design. And a software company used the data to develop a 3D model for use in cab design. The long-haul truck drivers survey data was cited in two Federal Motor Carrier Safety Administration rules. One related to seatbelt usage and the other outlining driver training.

I'll move on now to the overview of our new strategic plan which we have decided

to cover a time period of ten years. One of the takeaways of our first five-year plan was that the NIOSH four-year funding cycle often led to funding of new and needed research projects, but a five-year time frame was not sufficient for outputs to be released and for impacts to occur in the workplace based on findings and recommendations.

There are multiple inputs to our new plan. We referred to our previous strategic plan and our evaluations. We reviewed the research of our partners and stakeholders such as the American Transportation Research Institute, which is the research arm of the American Trucking Association. We used published literature and internal expertise from our lead team and steering committee members, and we also incorporated feedback from the public that we received during our public comment period.

So who will use the plan? We have three key audiences we believe will use the plan. First, our NIOSH internal researchers who have an interest in pursuing or continuing motor vehicle safety research. Second, we have a keen interest in reaching out to the external research community who applies for NIOSH funding to make sure that they are aware of this plan and its priorities. And, third, we're hoping that the external research community at large and other government agencies will find this to be a resource as they determine their own projects and priorities. For example, during the open comment period on the public docket we were contacted by a regional NHTSA office with an interest in using the documents to stimulate program evaluation projects by state highway safety offices.

Our strategic plan is aligned with the NIOSH overall strategic plan, and because of that alignment our plan emphasizes research and four priorities industry sectors, and that is oil and gas extraction; public safety; transportation, warehousing and utilities; and, wholesale and retail trade. The plan provides detailed research needs for each of these four sectors and their priority worker group. For example, a priority worker group and transportation, warehousing, and utilities is long-haul truck drivers. Within wholesale retail trade rideshare and other drivers-for-hire are a priority. And within public safety EMS and law enforcement are priorities.

In the plan we have also included some overarching research needs that would benefit all sectors if pursued. The plan also defines the targeted actions that we want to be taken by our stakeholders as a result of our research projects. These actions include the development and implementation of policies, programs, standard-setting documents, guidance documents, and regulations by employers, industry organizations, governments, and others.

The plan is structured into three main strategies. The first is to strengthen understanding of crash and injury risk factors and how they contribute to work-

related crashes. The second is to develop and/or evaluate the effectiveness of engineering- and technology-based interventions to prevent crashes. And, third, is to evaluate motor vehicle safety management programs and practices. Within each of these strategies there are a set of research needs for each of the four sectors. Within each of these three overarching strategies there are some reoccurring and important topics or, what I'm going to call, themes.

Those themes are automation, fatigue, distraction, and safety culture and management. I'm going to spend some time discussing each of these four themes, talk about some of the recent work we've done at the center in that area, and then discuss the direction of the research priorities that are captured for that theme in our plan.

The first theme is in the area of vehicle automation. As of May 2018 it was reported that 92 percent of new vehicles available in the U.S. Had at least one advanced driver assistance system feature. This is a priority topic for the center because of its current and future far-reaching impact on worker safety on the road. This technical report, the *Management Practices for the Safe Operation of Partially and Fully Automated Vehicles*, is an example of collaborative work that the center has done in the area of automation. This was a collaborative effort with both the National Safety Council and the American Society of Safety Professionals. It provides guidance to help organizations develop policies, procedures, and management processes to control the risk associated with operating partially or fully automated motor vehicles. Topics include vehicle acquisition, training, operation, maintenance, and incident reporting. The document was developed as a technical report rather than a standard because of the limitations and our knowledge, and experience thus far with this evolving technology. Dr. Pratt was a member of the subcommittee and a major writer of the report. She also did a podcast and 11 radio spots for ASSP during its release.

The center also provided input to a recently published document developed by the White House on automated vehicle technologies called *Ensuring American Leadership and Automated Vehicle Technology*. The report looks at potential benefits of technology and the government's role in the growth of this industry. This document references worker safety and health as an area of concern for NIOSH, are identified research needs and it describes a new research project that we have initiated.

When it comes to the topic of vehicle automation, NIOSH's primary niche is to ensure the safe adoption and effective management of fleets with vehicle automation in the workplace. For research needs in the plan we have prioritized assessing occupational drivers use of, and understanding of, various automation features as well as developing and evaluating strategies to improve drivers' comprehension and use of these technologies. We also plan to continue to

conduct simulation studies that will help to adapt technologies for use in specialized vehicles such as fire trucks. As heavy trucks become more automated we're also interested in the impact this may have on the situational awareness and response time for truck drivers, and ensuring safe transition of the controls when necessary back to the driver.

The second theme is driver's fatigue. Fatigue is a contributing factor in 15 to 20 percent of motor vehicle crashes, and we are seeing increasing recognition by employers that this is a hazard that can be managed. We've had a number of recent fatigue-related outputs I'd like to mention. First, we have helped to develop several COVID fact sheets for occupations who are out on the road during the pandemic. The primary one being for long-haul truck drivers which is undergoing—has undergone, actually, external review, and we hope for it to be released soon. Guidance for rideshare, taxi, limo, and other drivers-for-hire is currently available on the CDC COVID website. Also under development is guidance for paratransit workers who are the workers that transport disabled passengers and often need to come in close contact with their passengers to assist.

Second, Cammie Menéndez, from our division of Safety Research recently published an important article on factors associated with fatigue among truck drivers. The center participated in last year's NIOSH working hours sleep and fatigue forum, and are involved in the development of manuscripts on this topic in three industries: oil and gas extraction, transportation, warehousing, and utilities, and, also, public safety sector.

Fourth, preventing driver fatigue on the job was the theme of the June issue of our quarterly B*ehind the Wheel at Work* e-newsletter which has over 20,000 subscribers. And we also have a new webpage with facts and resources on driver fatigue. Lastly, we've given numerous presentations to the industry on this topic.

The research needs for fatigue in driving outlined in our plan include quantifying the role of various work policies such as scheduling and methods of payment; assessing the use of fatigue risk management systems and how they can be integrated with other safety management systems; evaluating specific strategies such as the North American Fatigue Management Program and napping strategies for EMS workers; evaluating the effectiveness of fatigue detection technologies to detect worn and/or intervene and fatigue driving situations; and, last but not least, looking at the cost-effectiveness of fatigue management.

Distraction is the third theme in the plan. A few of our recent outputs include a webpage which provides an overview of the visual, manual, and cognitive effects of distraction, and provides recommendations for employers and workers on how to drive distraction-free. We recently updated the information on this site to reflect recent NIOSH research indicating that employers who have a full cellphone band

has better motor vehicle safety outcomes. The National Safety Council distracted driving awareness month is typically in April, and we had planned to join in these activities, but it has been postponed until later this year. Our health communication specialist has also developed animated images that can be used on monitors in workplaces as reminders of keeping your eyes on the road.

Our research needs in this area focus on better describing the sources of distraction and attentional overload, particularly, among law enforcement and emergency response vehicles with a number of aftermarket devices that are installed in them, in the vehicles. There is a need to examine the impact of the interaction between driver distraction and fatigue on driving performance to identify methods to reduce cognitive distraction and to evaluate the adoption of self-locking technologies.

The fourth theme is safety culture and management. Dr. Pratt was a co-author of this 2019 study of fleet safety management practices that included 70 fleets who are members of the Network of Employers for Traffic Safety. It cut across multiple industry sectors. The authors examined the relationship between employer sleep safety program elements and their crash or collision rates. A few of the policies with the strongest relationships with lower crash and injury rate or fatigue risk management for light vehicle drivers, cellphone record checks post-collision, some forms of driver training, and having a process in place of determining collision severity after crashes.

Research needs associated with safety culture and safety management occur throughout the plan, including evaluating the effects of operational strategies such as journey management, and in-vehicle monitoring. We would like to see more research on developing and evaluating initiatives to gain worker and frontline management of motor vehicle safety policies, identifying incentives and barriers to employers adopting effective strategies, and also establishing the business case for effective safety management strategies. One of the areas where we see a need for intervention development is for substance use and misuse such as opioids and cannabis.

We place a priority on communicating research results and recommendations in a manner that suits the target worker population. An example of this is our Officer Road Code Toolkit which was released in late 2018. Inspired by ten years of NIOSH research, the toolkit is designed to promote safe driving practices among law enforcement officers. It includes a manager sheet for agency leadership to use as a guide to incorporate materials into the workplace. Safety messages in this toolkit are focused on four topics: seatbelt use, speeding, distraction, and stress response that managers can use and adapt for their agency's means. Since the toolkits publication we've received positive feedback on its format and its content. And, most recently, an article about the toolkit was published in *Police*

Chief magazine.

Our primary strategy for sharing client findings are guided by focus groups that the center conducted within our priority industry sectors. Our products are tailored to industry audiences. They are brief, simple, visually engaging, and end with a specific call to action on the topic. In addition, being mobile-friendly has also been recommended as more and more people use their phone to obtain information.

We will evaluate the success of our plan using process measures through tracking of research projects and outputs. Where possible we also will capture the desired action taken by others as a result of our research. We hope we will be able to develop stories of impact among specific worker groups as we did for our last evaluation.

We did publish our draft strategic plan on the public docket and received 11 formal comments. Some commenters provided extensive comments like the National Safety Council who provided a five-page letter. We were able to accommodate most of these suggested edits and inclusions into our plan.

We anticipate the plan to be published in the next one to two months and will begin an implementation of the plan. First, we plan to market it NIOSH, NIOSH researchers to encourage proposals to meet the center's priorities. Second, we plan to develop memorandums of understanding and beta use agreements with our key partners to carry out the needed research. We also plan to share it with our NIOSH-funded extramural research community. There are no current R01 grants focused specifically on motor vehicle safety. However, there currently are a few states with NIOSH-funded surveillance grants that have motor vehicle safety emphasis areas, and are conducting important research on this topic, including Kentucky, Washington, and New Hampshire.

I would like to return to the questions that I shared at the beginning for your input, and here they are:

DR. BUNN: Hello? Kyla, have we lost you?

MS. RETZER: Can you hear me?

DR. BUNN: Now I can hear you again.

MS. RETZER: Okay. So I'd like to return now to the questions that I had presented earlier in the presentation for which we would very much like the BSE's input, and also open it up to questions that you have for us. So the first question is, how can we effectively stimulate this research in the extramural community? Second, which academic industry and other partners should we be speaking with to advance the plan's objectives? How can we effectively get our findings into the hands of those who can put them into practice? And, how can we capture the usage of our outputs by organizations outside of NIOSH?

So I think I'd like to open it up for input and/or questions. Thank you very much.

DR. BUNN: Thanks so much for your presentation, Kyla. We have a question? I think

someone is getting ready to ask a question. If not, could you mute your phone if you're not speaking, so that we reduce feedback? Okay. Well, this Terry. I, actually, have a question myself, and this is in response to your question on which academic, industry associations. And others could partner with us to advance the plan's objectives. I do know that under NHTSA funding many states have produced state highway safety plans that are targeted to some of the priority worker populations that are mentioned within the Center for Motor Vehicle Safety strategic plan. So I was just wondering if the state highway programs have been approached about partnering with you guys on advancing the plan's objectives?

MS. RETZER: So thank you so much, Dr. Bunn. Yes, we have had conversations with an individual sort of in a sort of outside of the State Highway Safety Offices, and I'm going to blank on the woman's name, she also is the director of ATSIP which is traffic safety information organization. But, basically, we have been in contact with an NHTSA person who does a lot of work with the State Highway Safety Offices and develops some materials for them to use in their motor vehicle safety campaigns. And so, we have had some conversations, and I think that there's a lot of opportunity to have more, both through NHTSA and directly with those State Highway Safety Offices. And that is one conversation I've had locally here in Colorado with our NHTSA regional office here, is the opportunities to work with them to evaluate or stimulate some research in evaluating some of their initiatives effectiveness, and reaching out to employers and finding ways to reach out to employers to share information and toolkits, and things of that nature.
I'm going to give both Dawn Castillo and Stephanie Pratt an opportunity to respond to any of the questions we have for the center since I'm relatively new to the role of coordinator. So I don't want to miss any important points.

MS. CASTILLO: So this is Dawn. And I'll just note one other connection with the State Highway Safety plan, it's been through our surveillance grants. So I'm not sure if it's currently happening, but I know in the past several of these states that we had funded for surveillance have been part of the input into, you know, their agency's efforts into those plans.

DR. BUNN: Okay. Thank you, thank you. And Lauren Barton says excellent presentation and Mary Doyle mentioned the academic injury centers as good partners. I do know that the CDC-funded centers from the National Center for Injury Prevention and Control fund about ten or eleven injury control research centers, and a number of them do have a focus on motor vehicle safety and motor vehicle injury prevention. So I also concur that they might be a great partner, both in advancing the strategic plan and in dissemination of findings.

MS. RETZER: Wonderful. Thank you so much.

DR. BUNN: Okay. Do we have any other questions? Oh, I see Steve Lerman. You have your hand raised.

DR. LERMAN: Yes. So, first of all, I agree with Lauren, it was a very good presentation; a lot of good work's been done. Probably already on your radar, especially since you've mentioned that they sent you a five-page letter, but your objectives here very closely align with the National Safety Council, and they have many, many major companies and relevant industries, the National Safety Council. So I wonder if a strategic partnership with them may be effective in getting industry to look at innovations?

MS. RETZER: Thank you so much, Dr. Lerman. Yes, we have been working with them on various communication campaigns and we have an ongoing conversation with National Safety Council, but you point out something that we might need to explore, is sort of how we might continue to build on that relationship and, perhaps, formalize it in some way for work associated with, you know, motor vehicle safety.

Dawn or Stephanie, do you have any additional thoughts on that?

DR. PRATT: Well, this is Stephanie. I'll just jump in and say that, you know, NIOSH does have a long-standing relationship with National Safety Council. So the work that we've done with them over the years with respect to motor vehicle safety certainly falls under that umbrella. It may be possible for us to develop more focused agreements with them to do work going forward, but we do have a strong relationship with them. We recommend a lot of their products on distracted driving because they've got good products already. We haven't necessarily developed a lot of products of our own because we like theirs. We work with them very closely in developing that technical report on automated vehicles. They've been a good partner in communication. So we have, over the past few years, especially, developed a really strong relationship going forward. They've also been involved in the topic of fatigue, and we participated in some of their initiatives there. And I know Dawn is involved in another more general workplace safety initiative.

Since I have the floor I just wanted to provide a little more context to one of the things that's really been an issue for us in terms of getting proposals for NIOSH on motor vehicle safety coming from the extramural community. And just to, I guess, to give a little background, one of the things that has historically been the case is that the Department of Transportation has funded all these university-based transportation research centers, and also their research program is driven by the need to regulate in certain areas for trucking and other commercial vehicles. So the people who are best equipped to do motor vehicle safety-related research look to the Department of Transportation as that funding pipeline. And it's been a challenge for us get to that very capable research community and get them to see us as a potential source of funding. So that's certainly something we're going to work on within our new strategic plan because as research within NIOSH on motor vehicle safety has ramped up, research funding of motor vehicle

safety projects from NIOSH to the extramural community has shrunk to almost nothing except for those state-related surveillance projects such as Kentucky's where there is an emphasis. So this is one of the things that we're really struggling with going forward and we are certainly going to incorporate that into the marketing plan for our new strategic plan, but if the BSC or anyone else has other ideas about how we can really target those researchers and make them see NIOSH as a viable supporter of that research, we would really appreciate it. Thanks.

DR. BUNN: Thank you, Stephanie. And just to comment on that before I call on Patrick Morrison. Something that may help is I know that in the past only just one or two awards may have been awarded as R01s in this area. It might benefit the researchers to know if there are future RFAs that will fund, you know, three to five applications in that area to make it so that they have a higher probability of attaining funding when there are more awards issued.

Okay. Thank you. And our next question is from Patrick Morrison.

MR. MORRISON: Hi. Yes, thank you. Excellent presentation. Thank you. And, you know, as far as the emergency services, medical emergency services, the EMS and the fire side, this is an issue that we continue to grapple with, and we're still trying to find, you know, what are those programs that we need to advance into the fire service, the EMS. And my question is with DOT and the Federal Highway Administration, their traffic—they call it TIM, Traffic Incident Management program, and then underneath that they have an executive leadership group that actually meets, and that's a number of different groups on the highway, anyway, for what we do and that's law enforcement, fire, EMS. And, believe it or not, it actually includes the tow trucking and those people that are removing equipment from the highway. We have a high fatality right there, too.

Have you reached out to the Traffic Incident Management executive leadership group out of the Federal Highway Administration?

MS. RETZER: Thank you for your question. I'm going to defer to Dawn or Stephanie because I am not familiar with this group, but I think, perhaps, one of them are.

MS. CASTILLO: So this is Dawn. I'm not. And so, I think this is a great suggestion that we can absolutely follow up with. I do know that within the portfolio of things we do, we often refer to Traffic Incident Management guidelines like when we investigate motor vehicle-related fatalities of firefighters. We also participate on an NFPA committee to advance those standards. But thanks, Patrick—

MR. MORRISON: Oh. Yes, thank you. I appreciate that. We were just invited to be on the executive leadership team, the IAFF, and I did attend their last sort of conference they had, and these are probably all be on the public safety side. These are probably all the public safety organizations from the chief of police to a number of from sheriffs to fire to EMS. So it is a good opportunity, and I think I will take the opportunity to

bring this up at our next meeting that we're going to have.
And then on the other question that you had, this is something that we probably need to, you know, bump up a little bit as far as getting the information out there. And I will look at other fire organizations, the International Association of Fire Chiefs and the IFF. We could probably look at this as really getting this out because this is—just thank you. It was an excellent presentation. You're bringing up so many things that are going to advance the safety for us. It's going to be a changing world out there with all these different automated vehicles on the road and what we're what we're dealing with. So we look forward to just, not only partnering, but really getting this information out and especially in our population. So, again, thank you for your presentation.

MS. RETZER: Wonderful. Thank you. Thank you so much for your comment. And I will note that we do have quite a few research priorities that we've identified in the plan that are related to Traffic Incident Management training and policies and procedures. One of them is focused on the towing and recovery industry, specifically, in fact. And also, you know, quite a number of other things in the area of fire trucks and EMS, and law enforcement as well. So thank you.

DR. BUNN: All right. Do we have any other questions from the Board? Well, I don't see any other hands raised or any other comments within the chat box. So, I guess, I will defer to Alberto and Emily on this as to whether we stop now, and then reconvene like at 12:30.

MR. GARCIA: Let's do that, Dr. Bunn, so we can stick to the agenda. One thing that I want to mention is that soon after lunch we'll do another roll call to make sure that we have quorum. So I'll be checking on the board members to see who's on the call after lunch. Well, thank you, Dr. Bunn.

DR. BUNN: All right. Thank you, Alberto. And thank you very much, Kyla, for an excellent presentation on the update and the strategic plan. So we will reconvene then at 12:30. Thanks, everybody.

[Lunch.]

DR. BUNN: Welcome back to the NIOSH Board of Scientific Counselors meeting. I think we'll, at this time, turn it over to Alberto to comment on whether there are any public comments that were submitted to the Board for consideration.

MR. GARCIA: Thank you, Dr. Bunn. Before we get into the public comments, I would like to do a quick roll call to see who came back after lunch and who's not here anymore. But do we have Grace LeMasters? Do we have Grace LeMasters?

DR. LEMASTERS: Yes. Can you hear me?

MR. GARCIA: Yes, now I can. Thank you, Grace. Dr. Bunn is back. Do we have Marc Schenker?

DR. SCHENKER: Here.

MR. GARCIA: Thank you. Do we have Mary Doyle?
MS. DOYLE: Yes, I'm here.
MR. GARCIA: Thank you, Mary. Do you we have Kyle Arnone? Do we have Steve Lerman?
DR. LERMAN: Yes, I'm here.
MR. GARCIA: Thank you. Can everybody else please mute their phones? Do we have Jessica Graham?
DR. GRAHAM: Alberto, I'm here.
MR. GARCIA: Thank you, Jessica. Do we have Cristina Demian?
DR. DEMIAN: Yes, I'm here.
MR. GARCIA: Thank you, Cristina. Do we have Patrick?
MR. MORRISON: Yes, I'm here.
MR. GARCIA: Thank you, Patrick. Do we have Tony Cox?
DR. COX: Yes, I'm here.
MR. GARCIA: Thank you, Tony. Do we have Judy Su?
DR. SU: Present.
MR. GARCIA: Thank you. Do we have Lauren Barton?
DR. BARTON: I'm here.
MR. GARCIA: Thank you. Do we have Tiina Reponen?
DR. REPONEN: Yes, I'm here.
MR. GARCIA: Thank you, Tiina. Do we have Robert Roy?
DR. ROY: I'm here, Alberto.
MR. GARCIA: Thank you. And do we have Michael Foley.
MR. FOLEY: I'm here, Alberto.
MR. GARCIA: Thank you, Mike. All righty, we have, again, 14. So we have quorum, and we can continue with the meeting. We haven't received any public comments submitted to the docket. So we can go ahead and move with the next presentation, Dr. Bunn.
DR. BUNN: All right. Thanks, Alberto. So our next presentation is by Dr. Matthew Groenewold with the Division of Field Studies and Engineering who will be presenting New Tools for Real-Time Coding of Industry and Occupation in Field Surveys.

NEW TOOLS FOR REAL-TIME CODING OF INDUSTRY AND OCCUPATION IN FIELD SURVEYS

DR. GROENEWOLD: Okay. Thank you, Dr. Bunn. Good afternoon, everybody. In my presentation today I'll address the following questions: Why do we care about collecting data on industry and occupation in field surveys? Why is the ability to translate free-text industry and occupation to standard codes in real time important? What are the challenges to doing so? How is NIOSH attempting to overcome these challenges? And, what are the opportunities for the Board of Scientific Counselor members and others to contribute?
Work is an important social determinant of health, and industry and occupation of

employment, current or usual, are important basic demographic descriptors of working, or formerly working, people. Like sex, race, and age these variables should be included whenever possible when information on human subjects is collected for use in public health datasets, including population-based data sets such as surveys and case-based datasets such as surveillance systems, field studies and healthcare, and counter datasets. Outbreaks, as well as individual cases of infectious disease, are often associated with occupational exposure to infectious agents. However, the contribution of occupational exposures to infectious disease risk may not be recognized if the surveillance system and the field surveys used to detect and investigate them do not capture the necessary information. This means such cases may only be recognized as a result of outbreak investigations. Because relatively few datasets are designed explicitly for it, occupational health surveillance and research relies heavily on the inclusion of these variables in other public health datasets assembled primarily for other purposes, including national surveys and surveillance systems. These variables, along with related constructs like employment status, class of worker, and work schedule are essential for conducting occupational health surveillance and research because they can serve as proxies for more specific work-related exposures. When specific work-related cases, conditions, or exposures are not explicitly identified, any connection between work and health, and a health outcome can only be inferred on the basis of population differences between industry or occupation groups.

Because of a wide diversity of possible responses industry and occupation data are usually collected in the form of descriptions provided by respondents and captured verbatim in free-text fields. Examples of standardized questions used to elicit these descriptions include: what kind of business or industry do you work in? For industry; and what kind of work do you do for occupation? To be analyzable these data must be coded, grouped into a manageable number of meaningfully related categories with assigned numeric or alphanumeric labels. A number of standard classification systems exist, including the North American industry classification system or NAICS, the Standard Occupational Classification or SOC system, and the U.S. Census Bureau Industry and Occupation Codes.

Coding of industry and occupation data is usually accomplished by mapping the free-text responses to one of these pre-existing classification systems through the systematic application of decision rules. Historically, this has typically been done by trained human coders, but now may be computer-assisted or computer-automated. Data sets contained in free-text industry and occupation data are normally batch coded after the data has been collected. This works well for large recurring surveys, for example, the National Health Interview Survey, that already undergo extensive data processing prior to their use and agency analyses or to

be released as public use data sets. However, this can be an impediment to the collection and use of industry and occupation data in field surveys or studies used in outbreak investigations and disaster response when rapid data analysis is required. It can also be an impediment to the collection of industry and occupation data and surveillance systems, including a reportable disease surveillance where cases are recorded one by one and accumulate over time rather than being collected in a batch. Additionally, data is often initially entered into surveillance systems by local or state public health jurisdictions without resources for industry and occupation coding.

Information about subjects industry and occupation can be collected in field studies in ways other than as open-ended free-text descriptions, but these alternatives have important limitations. For example, questions can be asked about whether a subject has a particular relevant occupation. For example, are you a healthcare worker or are you a food handler, but this approach presupposes a single or very limited number of pre-existing hypotheses about the occupational exposure being investigated? Similarly, it may be possible to limit subjects' possible responses to a set of pre-specified categories such as could be chosen from a drop-down menu, but to be of manageable size the categories in the drop-down menu may be too broad to be useful.

The ability to code industry and occupation data to a standard classification system based...

RECORDING: You've been muted. To unmute yourself press star-6.

DR. GROENEWOLD: ...would make the collection and use of such data more feasible. The integration of computerized capability with an established widely used field data collection tool could encourage the broader collection and use of Industry and occupation data in field surveys and surveillance systems by enabling real-time coding.

in addition to a web-based batch coding service, the NIOSH Industry and Occupation Computerized Coding System or NIOCCS, also provides an on-demand single record coding capability. Users enter free-text descriptions of industries and occupation and NIOCCS returns a coding solution in the form of a matched census industry or occupation code, or a range of codes ranked based on the confidence level of the match.

CDC's Epi Info is a suite of free data collection management analysis and visualization software tools designed specifically for the public health community. It is used extensively throughout CDC, domestically and internationally, for the collection and analysis of both field survey and surveillance data. Epi Info is used extensively in the field epidemiology, emergency preparedness and response, and reportable disease surveillance communities, especially in state and local health departments where it may be the primary data collection and analysis tool. The following features are of particular relevance to this project. Epi Info's form

designer module is used to create questionnaires or other data entry forms. The enter module is used to enter data into the project database. Check code is used to program data validation and other intelligent functions into Epi Info data entry forms. And templates are small XML files that are used to save and share Epi Info project elements, fields, form pages, or even entire projects without saving or sharing data collected in a project.

The process of geocoding addresses to map coordinates is analogous to that of industry and occupation coding. Input is a description entered in a free-text alphanumeric field and, as with industry and occupation descriptions, these data cannot be analyzed in their native form. Geocoding output, map coordinates, is generated by applying an algorithm that matches the input address description to a likely set of coordinates and consists of coded data located in a hierarchical system that can be analyzed. Like industry and occupation data, address data is usually geocoded in batch form after data collection is done.

Epi Info geocode check code program allows users to get map coordinates based on data entered into free-text address fields at the click of a button. Use of the program requires an Internet connection because it uses a web-based geocoding service to return candidate coordinate matches with confidence and quality measures. The user can reject the results or accept them which automatically populates the latitude and longitude fields.

The geocode program can be accessed within the check code editor of the EPI form designer module when creating a project. A predefined geolocation template which includes the input address field, the command button that runs the geocode program, and the output latitude and longitude fields, together as a group, is also available in the form designer module.

Using the geocode function as a model, NIOSH has developed new tools that integrate the ability to code free-text industry and occupation data in real-time on a record by record basis within the Epi Info data entry module. These include an industry and occupation field template and a corresponding code industry and occupation check code program based on an adaptation of the auto coding technology used by NIOCCS. The code for these tools was transferred to the Epi Info design team in October of last year. After testing and incorporation into the software source code a new version of Epi Info containing the NIOSH-developed I&O coding tools is scheduled for release at the end of June of this year.

Here's a conceptual overview of how it works. I'll describe the original conception first, and then note an important change that we made in the development process. The user enters the subject's open-ended free-text descriptions of industry and occupation in Epi Info's enter module. Then the user runs the code, Industry and Occupation check code program in Epi Info. The Code Industry and Occupation program presents the text data in the industry and occupation fields

to the NIOCCS I&O Single Record Coding service via an Internet connection. NIOCCS then produces a coding solution, and the NIOCCS output is displayed to the user in an Epi Info dialog box. The user then accepts or rejects the NIOCCS coding assignments, populating the I&O code and title fields in the Epi Info project database for that record.

However, we have now opted for a new, more self-contained approach that does not rely on an Internet call to NIOCCS. Based on the technology that underlays NIOCCS, NIOSH developed a disconnected approach that uses machine learning and computerized neural networks included within the code industry and occupation program to code entries. This is a significant improvement over our original concept in terms of both data security and functionality. Having the auto coding engine contained completely within Epi Info means that the respondent data is not transmitted outside the program, and that the coding function can be used in situations where an Internet connection is not available.

So, now, I think one of the, perhaps, the best way to give you a sense of how this works is for me to give you a little demonstration. And, okay. So the I&O field code template contains eight fields, two input fields, five output fields, and a command button. And these are they here. The two inputs fields are multi-line text fields for entering free-text descriptions of a subject's industry and occupation of employment. The output fields include number fields for industry and occupation codes, multi-line text fields for industry and occupation titles, and a multi-line text field for the coding scheme that is used. The command button invokes check code written using the IO code command. The resulting codes and their corresponding titles populate the industry and occupation code and title output fields. The coding scheme output field is automatically populated with the name of the coding scheme used by the auto coding program.

So to demonstrate I'm going to enter the descriptions for occupation and industry of a hypothetical subject. In this case we'll say it's a salesperson at a car dealership. When I click the "Get I&O Codes" command button the "Get Industry and Occupation Results" dialog box appears. It contains the free-text occupation and industry descriptions entered as well as the occupation and industry codes and corresponding titles assigned by the auto coder. It also contains a dynamic list of potential occupation and industry code assignments identified by the auto coder ranked in descending order of fit. Since, in this case, the initial results returned by the auto coder fit the description entered and are pretty clearly the best match, I'll click "Okay" and accept the results. You can see that the industry and occupation codes and titles are copied into the corresponding form. So that is the demonstration.

And, Emily, we can switch back over, I think, if you can pull my slides back up. So NIOSH has developed the auto coding tools for Epi Info and transferred them to

CDC's Epi Info development team for inclusion in a future release. We have also developed accompanying instructions for their use that will be included in the Epi Info user guide. We are in the process of developing several short tutorial videos on how to use the new I&O coding tools that will be included in the existing series of Epi Info tutorial videos. We also have plans to develop a longer scenario-based tutorial that, in addition to teaching how to use the new coding tools, will cover best practices for collecting, coding, and analyzing occupational data. NIOSH is also in the process of updating its I&O coding topic webpage to provide much more detailed information on this subject for all stakeholders, not just Epi Info users.

We believe that the availability of Epi Info tools that facilitate real-time industry and occupation coding during field or surveillance data collection will lead to increased collection and use of industry and occupation data by public health professionals, especially, in the field epidemiology, emergency preparedness and response, and reportable disease surveillance communities among whom Epi Info is used extensively and is often the primary data collection and analysis tool. It will also lead to increased use of Epi Info by the occupational health community due to its increased utility for them. Increased inclusion of Industry and occupation variables in the analysis of field survey and surveillance data will result in improved recognition and understanding of the contribution of occupational exposures to morbidity and mortality from infectious disease as well as other hazards.

Now is a propitious time to be undertaking this project. The 2019 to 2023 NIOSH strategic plan indicates that for Intermediate Goal 3.3 the lack of industry occupation variables in surveillance systems is a focus area for influenza surveillance research for all healthcare and veterinary medicine animal care workers and for Intermediate Goal 3.6 no reporting of infectious disease exposures, industry occupation variables not included in existing surveillance systems, is a focus area for infectious disease surveillance for the corrections, law enforcement. And EMS subsectors.

This project also responds to recommendation and in the recent report by the National Academies of Science, *A Smarter National Surveillance System for Occupational Safety and Health in the 21st Century* which states, quote, "To identify emerging and serious occupational safety and health injuries, illnesses, and exposures in a timely fashion NIOSH, in coordination with OSHA, BLS, and the states, should develop and implement a plan for routine coordinated rapid analysis of case level occupational safety and health data collected by different surveillance systems followed by the timely sharing of the findings." And that's the end of the quote.

It also responds to recommendation G by fostering, quote, "Collaboration

between NIOSH and other CDC centers in maximizing the surveillance benefits of including industry and occupation in these surveys and surveillance systems," end quote. We believe that the availability of these new industry and occupation coding tools removes one of the key barriers to collecting and using occupational data in field surveys and surveillance systems.

We look forward to input from the Board of Scientific Counselors on all aspects of this project. In particular, we seek advice of the Board to answer the following specific questions: How can NIOSH best communicate the importance of collecting industry and occupation data in field surveys and surveillance systems to public health communities of practice outside of occupational health? For example, reportable disease, field epidemiology, emergency preparedness and response; how can NIOSH best promote the availability and provide instructional material for the use of these new tools to public health communities of practice outside of occupational health? And, how can NIOSH best identify and advocate for the inclusion of these new tools in additional platforms and systems used for field surveillance and data collection?

Thank you, and I'm happy to answer questions now or at any other time when it's convenient for you. Thanks.

RECORDING: You are no longer muted.

DR. BUNN: Are there any questions for Dr. Groenewold?

DR. LEMASTERS: Yes. This is Grace. I wave my hand up.

DR. BUNN: This is Grace.

DR. LEMASTERS: I just want to say that's such an impressive system I would have loved to have had this available about 10 or 20 years ago and this is going to make a lot of researchers' lives much, much easier. And, I guess, the question you have for us I had for you and that is, how will you let other folks know about the availability? I was thinking of like, you know, things from our response to national disaster. And along with that is any occupational information being collected on the COVID-19 cases in the U.S.? That would have been an ideal chance to gather some important occupational information. And I know universities will be using this, who does occupational health studies, but if we could get it to some of the other federal resources, who like are responsible for collecting health care data and emergency, I think that would be excellent. Are there plans along those lines?

DR. GROENEWOLD: Yes. Thank you. We do have plans along those lines. Right now our main strategy is to—and really the strategy is embodied in this idea of including these tools sort of as a sort of beneficent Trojan horse, if you will, to sneak this idea of collecting industry and occupation into other communities, and then when they find it there before them we hope that that they will use it. So that's why we chose Epi Info, which is kind of widely used, as our vehicle for getting these tools in the hands of public health folks outside of the world of occupational health. And we

do plan to have some both promotional and instructional content that we want to disseminate, and we can think of some ways of doing it, making videos available on the Epi Info channel on YouTube where people go to find this instructional information, providing some scenario based tutorials. So we have a good handle on that, and we think we could even do some webinars. But the thing that we think we really need help with, and one of the big blocks is overcoming just the sort of cultural resistance to folks outside the world of occupational health to truly understanding the value of collecting these variables. So we think we have a message, and we think we have a message that can be delivered. We're just looking for the right channel and the best way to sort of entice people to accept and digest this message.

And a word about the COVID-19. Of course, NIOSH is doing everything that it can to advocate the collection of industry and occupation data from COVID-19 cases. Although these tools have not yet officially been released by Epi Info, we have made it clear through CSTE and some other communications channels that we are willing to provide any state with the beta version of these tools if they wish to use them to help collect industry and occupation data on COVID-19 cases.

DR. LEMASTERS: Thank you. Just a follow-up question. May I have a follow-up question?

DR. BUNN: Sure.

DR. LEMASTERS: I think one issue is having folks understand the difference in occupation and Industry coding. Will this function if you have one or the other, will you still be able to get it—let's say you just have the occupation and not the industry, will it blow up the system or will they still give you a code for, occupation code with the industry left blank or vice versa?

DR. GROENEWOLD: No. To the best of its ability it will still return. If you leave one blank it will still return the other. That being said, because sometimes industry can inform which would be the best occupational match or vice versa, you're likely to get better, more accurate results if you can provide both pieces of information, but it won't sort of hang up the system. If you only have information for one field it will still return the best information that it can, and very often it's going to be the most appropriate code or, at least, the most appropriate code is going to be ranked very highly in the dynamic list of possibilities. So, yes, even if you only have one piece of information the auto coder will still work to do the auto coding.

DR. LEMASTERS: Thank you. Marvelous system.

DR. GROENEWOLD: Thank you.

DR. BUNN: Thank you. We'll now move on to the chat question from Michael Foley that was next, and then on to Marc and Mary. So Michael Foley asks, can the coding system process batch files of free-text records or do you have to enter records manually?

DR. GROENEWOLD: So as it exists within Epi Info there's no Epi Info based capability to batch code

these files. So like if you had an external file of industry and occupation descriptions could you sort of import them and run it all at once? And the answer in this case is no, it's really not designed to do that. You would have to do it automatically—or, I'm sorry, you would have to do it manually, at least, on some level. I mean, Epi Info does allow for the importation of external files that can populate data fields. And so, it might be just an issue of advancing from record to record and clicking the "Get I&O Codes" button, but there would still be some degree of record by record manual operation that would be required. What we encourage is for people who have lists, you know, who have a previously assembled dataset that has a bunch of records that needs to be coded, the NIOCCS, which is a NIOSH program, has a web-based batch coding service that is available to the public. People can just go on the website, they can create an account, and they can upload their files to be batch coded that way.

DR. BUNN: All right. Thank you. I'm so sorry. Before I go on to Marc and Mary, kind of building on Michael's question. While Epi info does not have that capability, at least, at NIOCCS system, it does have the ability to code free-text records, right?

DR. GROENEWOLD: Yes, it does. Yes. Yes, that's what I was saying, is that we use the NIOCCS technology is what we use to develop these tools. But, right, if you have batch coding that needs to be done, NIOCCS is the way that we would recommend that it be done.

DR. BUNN: Okay. Thank you. Marc Schenker, you have a question. You raised your hand.

DR. SCHENKER: Sure. This is really the answer to the prayers for occupational epidemiologists. So often we're asking for this information and it's not available in otherwise rich data sources. My suggestion is to go to the Council of State and Territorial Epidemiologists. I think that would be a key group. And doing this on a state-by-state basis is realistically a target, but to get space datasets coded for occupation and industry would really open up a whole rich data source for epidemiologists.

DR. GROENEWOLD: Yes, yes, we agree, absolutely. And, yes, we also agree. And we have been, to a certain extent, in touch with the Council of State and Territorial Epidemiologists, especially, the occupational health subcommittee there, but we do recognize the need to go outside of that small group and approach the CSTE group more broadly and at a higher level. So thank you.

DR. SCHENKER: I just have one quick follow-up. It's sort of a partially related comment, and that is the country of birth. Some federal datasets such as the Census of Fatal Occupational Injuries collect country of birth on cases, and it tends to be a very valuable source to understand the impact of place of birth or emigration, and I wonder if that's anywhere within your realm?

DR. GROENEWOLD: It certainly can be. So that was a part of our strategy for incorporating these tools into Epi Info, is that it not only provides the ability to collect this occupational data, but, of course, Epi Info was designed to collect just a wide range of other kinds of

variables. So the Epi Info survey instruments or data entry forms that one can custom create can include just about any kind of information that you'd like to collect in a variety of different fields. So, certainly, country of birth and other kinds of demographic data can be collected. And, in fact, Epi Info has pre-existing templates that are PHIN VADS-compliant as well that can just be sort of dragged and dropped onto a canvas to create these sorts of data entry forms. And then, of course, custom fields can be created, too. So, I guess, that's a long way of saying answering yes to your question, that those data could certainly be incorporated into the same data collection activities that this industry and occupation data collection is part of.

DR. SCHENKER: Thank you.

DR. BUNN: Thanks. Our next question is from Mary Doyle. I think you have a question, and something that was in the chat box as well. If you'd like to speak.

MS. DOYLE: Yes. I was just wondering if you've done any social media campaign to advertise this?

DR. GROENEWOLD: We have not done that to date mainly because we are waiting for the official release of this from the Epi Info team at CDC. So a little bit later this year their best estimate was the end of June. I, honestly, at this point don't know to whether and to what degree the COVID-19 response has put them behind schedule or not, but certainly sometime this year they will be releasing a new updated version of Epi Info that will contain these tools. And when that happens that is when we hope to launch our campaigns which would fundamentally comprise a series of videos that are both instructional, but also deliver the message about the importance of collecting industry and occupation data, what it's useful for as well as best practices in the collection coding and analysis of it. So, but I definitely agree that when that happens a campaign on social media that provides links and drives people to these areas where they can get the richer content, the YouTube instructional videos, and those sorts of things would be an important thing to do, and that's something that we'll certainly attempt to do when Epi Info releases the official new version.

MS. DOYLE: That'll be great. Thanks.

DR. GROENEWOLD: Thank you.

DR. BUNN: Thanks. And I, actually, have one comment myself as far as dissemination and additional partners to get the word out. Have you approached the state public health commissioners and presented the functionality of Epi Info, especially, in this time was COVID and the effect on health care workers?

DR. GROENEWOLD: Yes. So only indirectly through the Council of State and Territorial Epidemiologists. So they have been our conduit to the states. Although I think not directly related to this project, but NIOSH has been working through the COVID-19 response to reach out to states and other ways to advocate for the collection

of this kind of information, but we have in conjunction with the occupational health subcommittee at CSTE, we have provided them information about these tools and made it clear that they're available to states who wish to use them, and that information has been communicated to the state epidemiologists via CSTE. So that's the closest thing we've been able to do to that so far. But to my knowledge we haven't had any direct contact with state public health directors other than indirectly via CSTE.

DR. BUNN: Right, right. That may be something to consider since some states separate those functions of the state Epi from the state public health commissioner and they may not fully communicate the availability of this tool.

DR. GROENEWOLD: Yes, agreed. Thank you.

DR. BUNN: Okay. Do we have any other questions or comments? I don't see anything else in the chat box or in the hands raised. All right. Thank you, Matthew.

DR. GROENEWOLD: Thank you.

DR. BUNN: We will move on then to our next, and last, presentation which is by Dr. Kenny Fent also with the Division of Field Studies and Engineering, who's going to be presenting an update on the National Firefighter Registry.

DR. FENT: Good afternoon. Can everybody hear me?

DR. BUNN: Yes.

DR. FENT: Okay, great. And I think I'll be able to advance the slides, is that correct? Let me see here. Or do I just say...

DR. NOVICKI: Yes, in the bottom left-hand corner you'll see the arrows.

NATIONAL FIREFIGHTER REGISTRY UPDATE

DR. FENT: I see it. Yes, I see it. Okay. Well, good afternoon, everybody. Thank you for the opportunity to give you an update on the National Firefighter Registry. I think a lot of you were around when I first presented on the registry to the Board of Scientific Counselors. So this is just to give you a very brief update on our status. So we are still very much in the development phase with the National Firefighter Registry, but we have made a lot of progress. That said, you know, we're not ready to start registering firefighters just yet. There are a lot of requirements that have to be met. And, you know, very important requirements at that.

So just a quick background. The National Firefighter Registry came about through the Firefighter Cancer Registry Act of 2018. So it is a congressionally mandated program. The goal is to track firefighters cancer risk over time, so that we can better understand the link between their exposures and cancer. It will be open to all firefighters. Even though the Act says it's a cancer registry, it's really an exposure registry. So any firefighter, regardless of their health status or whether they're active or retired, will be able to enroll. Our goal is to enroll around 200,000 firefighters. We realize that's an ambitious goal, but we also think it's achievable,

and would give us power to detect statistical differences. And then we won't require firefighters to report their cancer diagnoses to us, but rather we'll collect enough information so that we can link to state cancer registries and the national death index.

So some of the questions that we will try to answer through the registry. Of course, how much cancer, how does that compare to the general population, and then what types of cancers among firefighters. We're also interested in what does the cancer risk look like for different groups of firefighters. So, for example, women versus men, different types of firefighters, wildland firefighters versus structural firefighters, for example. We're also interested in cancer risk geographically throughout the United States with exposures. So we're planning on collecting some information about number of fire responses over a career. And then also major events. So we hear a lot from fire departments about those really big fire events or other sort of disasters that they respond to and whether those may contribute to their cancer risk. And then there's been a lot of control measures that have been implemented in the fire service over the last five or ten years. So we can also look at whether those measures are having an effect on the cancer risk.

Uh-oh. Can everybody hear me still?

MR. GARCIA: Yes.

DR. BUNN: Yes.

DR. FENT: My computer—okay. For a second I think I lost Internet connection. Okay. So you should see our progress. Does everybody see that on the slides?

DR. BUNN: Yes. Yes.

DR. FENT: Okay. Okay. So we have developed a draft protocol consent form and enrollment questionnaire that's gone through the initial review process at NIOSH, and has actually been posted. It's been posted to the National Firefighter Registry subcommittee webpage. So we have established this the National Firefighter Registry subcommittee, a subcommittee of the Board of Scientific Counselors. And, you know, the purpose of this committee is to provide that all-important stakeholder and peer review and provide, you know, input and guidance for us in establishing the registry.

And I'm losing Internet connection again.

DR. NOVICKI: Kenny, this is Emily. I can advance your slides for you if that would be helpful.

DR. FENT: it's like an intermittent loss of connectivity, but I'll let you know if that needs to happen.

DR. NOVICKI: Okay. Sure thing.

DR. FENT: And so, our first meeting for the subcommittee is scheduled for May 15th, so a few weeks away. We have posted the Federal Register Notice, notifying the public of this meeting. And really the goal of the first meeting is to review the

protocol consent form and questionnaire. So our subcommittee membership, which is really, you know, the membership was really directed by the Act itself. So the Act specifically called out that we needed to consult with epidemiologist, clinicians with experience diagnosing and treating cancer, active and retired volunteer and career firefighters as well as relevant national fire and response organizations.

So our co-chairs are Dr. Grace LeMasters and Pat Morrison who are also members of the BSC. But then we also have membership that includes Shawn Brimhall who's with the New York State Division of Homeland Security; Chuck Bushey who's with the International Association of Wildland Fire; Dr. Dennis Deapen who's an epidemiologist from the University of Southern California; Bryan Frieders who's a fire chief, and also on the leadership board for the Firefighter Cancer Support Network; Dr. Sara Jahnke who's a researcher and firefighter health and safety; Betsy Kohler who's with the North American Association of Central Cancer Registries; Dr. Barbara Materna who's an industrial hygienist with the California Department of Public Health; Brian McQueen who's with the National Volunteer Fire Council which is the largest volunteer firefighter organization; Richard Miller who's with the International Association of Fire Chiefs; Dr. Virginia Weaver who's an epidemiologist and professor from Johns Hopkins University; and then Regina Wilson who's a firefighter from FDNY; and then our Designated Federal Official is Dr. Paul Middendorf who, I think, most of you are familiar with.

So we do have a webpage that's up and running, that provides the most up-to-date information on the registry, and we also publish a quarterly newsletter. And anybody in the country can subscribe to this newsletter through our webpage. And we have, I believe, well over a hundred people, mostly stakeholders, fire service stakeholders who have subscribed to that newsletter.

So this just provides sort of a timeline moving forward with the registry. We started the process of developing an assurance of confidentiality. We're working with our CDC program on that. We want to make sure that we have that in place just for peace of mind for firefighters and departments. We have also begun developing the registration web portal. So this would be a secure web portal that any firefighter in the country can go to, to register themselves. We've developed functional and non-functional requirements for the web portal, and we also have a prototype. And we've started on the next phase of actually finalizing the development of that prototype. We also have a communications plan in development that would include sort of that initial awareness level, and then once we go live with the registry, a comprehensive promotional campaign. And then we're investigating fire incident record-keeping processes, and exploring what is the best mechanisms of being able to access different information that's routinely

collected at fire incidents.

So we have the protocol that's been submitted for review and, of course, we're in that peer review stakeholder review step right now, and we're developing that web portal, and then we would move on to the recruitment and enrollment of firefighters. And, of course, once that happens then we can move into that data collection and analysis, and dissemination phase.

So it was a quick presentation, but I'm happy to answer questions. This is our team. I'm the team lead; Dr. Siegel is the lead epidemiologist; and then we have Health Scientists Alex Mayer and Andrea Wilkinson who are also helping. Will Wepsala is our health communication specialist; and then Jill Raudabaugh is our IP team lead assigned to our project.

So at this time I'm happy to answer any questions that you might have.

DR. BUNN: Thank you, Kenny, for providing a great update on the development of the Firefighter Registry. Are there any questions from the Board about the development of the registry? I see Marc Schenker is typing. Would you like to just speak now?

DR. SCHENKER: Okay. I'm off mute. No, I was just asking about what's known about cigarette smoking or tobacco use prevalence in firefighters, and whether that's going to be part of this effort to look at that. Obviously, there are differences looking at a population basis or individually, but it's such a key function and somebody has to be thinking about that.

DR. FENT: Yes. So we do plan on collecting information through the enrollment questionnaire. I didn't really talk about that too much, but as part of the registration process there will be a short enrollment questionnaire that tries to collect some information on potential confounders, among other workplace factors, that were interested in, and that would include smoking. With respect to the smoking rates in the fire service, most of the reports that I have seen suggest that there are lower smoking rates, at least, among career firefighters. So we would expect that they would actually have lower smoking rates in the general population on average.

DR. SCHENKER: Thank you.

DR. BUNN: Thanks for the question, Marc. Do we have any other questions by the Board members? I don't see any hands raised or any items within the chat box right now. Okay. I will turn it over now to Emily who will be speaking about the meeting of the Firefighter Registry subcommittee, potentially, in August.

DR. NOVICKI: Yes, thank you, Dr. Bunn. So the National Fire Registry subcommittee that Kenny you described earlier, it’s going to finish their report in mid-July. And so, we wanted to propose holding a BSC meeting, a virtual one, in the first two weeks of August. If we wait until the usual September meeting to talk about the subcommittee's report that's going to really make it difficult on the program to

carry out their timeline. So instead we'd like to do a special one-time virtual meeting in August, very similar to this one, to look at the subcommittee's report, discuss it, start thinking about what your all report will be. So we'd like to do a quick poll. So what we're thinking is it be the afternoon, Eastern time, so not as early for our West Coast members. And so, if you could just take a minute and take a peek at your calendars and see which of these dates in the first part of August you might be available for. This is just like a quick first look. Will do a more formal confirmation before we schedule anything. We're just trying to get a sense of when people might be available.

DR. BUNN: This is Terry. Has anyone had any trouble voting at all? Okay. I think we have the majority of responses now. What are the next steps, Emily, if you don't mind telling us?

DR. NOVICKI: Yes, I think there will be the more usual process. Pauline will reach out and double check availability before we formally schedule the meeting. So, but thank you. All this was very helpful in getting a sense of which dates might work best.

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

DR. BUNN: All right. Thank you very much. Are there any other questions? Any last questions or comments about the Firefighter Registry update? Okay. I believe that concludes all of our presentations then. We had a wonderful set of presentations today on the peracetic acid, and a great overview of the broad research that's already been performed, and is being performed currently, looking at the effects of peracetic acid exposure and assessment; as well as the update to the Center for Motor Vehicle Strategic Plan; and, the great presentation on the use of Epi Info which I think would be an excellent tool for use by public health practitioners; and then last about the Firefighter Registry update.

Are there any future agenda items that the Board members would like discussed at our next formal meeting in September after this virtual meeting of the Firefighter Registry? I have a quiet group today.

MR. GARCIA: Very true.

DR. BUNN: Okay. Well, I'm not sure about the other Board members, but it might be a great opportunity for us to also hear more presentations or a presentation kind of on the progress with the guidance, and maybe talking about some impacts of the COVID guidance that has been disseminated to health care workers and to employers. Maybe providing some information on that at our September meeting.

DR. LEMASTERS: I think that's a good idea. This is Grace.

DR. SCHENKER: Yes, I would second that, and also the vulnerable workers who are considered essential and may be at increased risk in the whole COVID pandemic.

DR. BUNN: Yes, excellent idea. Excellent idea. Any other ideas?

All right. Well, I think the next item to discuss is potential meeting dates. I think

probably Pauline, she can speak about that on her usual process for determining the dates for the next formal meeting that probably will be, most likely, in September. I'm not sure if Pauline is still on.

MS. BENJAMIN: I am on. Yes ,thanks, Dr. Bunn. I will reach out to you all as usual. Thank you.

DR. BUNN: All right. Thank you, Pauline. So if there is nothing else, I guess. This will close the meeting. Before I formally close it, Emily or Alberto, do you have anything else that you would like to discuss before we formally end the meeting?

MR. GARCIA: No, I just wanted to say thank you, everybody, for putting up with us for almost six hours today. We know that this is not ideal for conducting the meetings, and I have enjoyed working with you all. I think that this is going to be my last meeting as a DFO. Emily's going to be taking over for the Board pretty soon. I mean, she'll be the DFO for sure in the September meeting and also on the August meeting that you guys just voted for the Firefighter Registry. But I wanted to say thank you. I have enjoyed my time with you, and I hope that the Board will continue to function as smooth as it has.

DR. BUNN: Well, I would just like to personally thank Alberto for all of the hard work that he's put into making these last three or four years of meetings a great set of presentations overall and wonderful organization and coordination of these meetings. So thank you very much, Alberto, for all of the work you've done on this.

MR. GARCIA: Thank you.

DR. NOVICKI: This is Emily. I want to echo that as well. Thank you, Alberto, for your service as DFO, and for making the transition so easy. Alberto's done a really great job in showing me the ropes so far. And so, I'm looking forward to working with all of you in the coming months.

MR. GARCIA: Great. Thank you.

DR. BUNN: All right. Thank you, everyone. So, I guess, the meeting is formally closed now.

[Adjourn.]

G L O S S A R Y

ABPM	American Board of Preventive Medicine
ACGME	Accreditation Council for Graduate Medical Education
AEA	American Economic Association
AIHA	American Industrial Hygiene Association
AIHce	American Industrial Hygiene conference & expo
AOHP	Association of Occupational Health Professionals
ASSP	American Society of Safety Professionals
BSC	Board of Scientific Counselors
CDC	United States Centers for Disease Control and Prevention
CE/CME	Continuing Education/Continuing Medical Education
COSH	Conference and Exhibition on Occupational Safety and Health
CPSC	Consumer Product Safety Commission
CRA	Cumulative Risk Assessment
DART	Division of Applied Research and Technology
DOE	Department of Energy
DOL	Department of Labor
DOT	Department of Transportation
DSHEFS	Division of Surveillance, Hazard Evaluations, and Field Studies
EPA	Environmental Protection Agency
ERC	Emergency Response Center
FACA	Federal Advisory Committee Act
FDA	Food and Drug Administration
FSIS	Food Safety and Inspection Service
GPRA	Government Performance and Results Act
HELD	Health Effects Laboratory Division
HHE	Health Hazard Evaluation
HHS	US Department of Health and Human Services
HRSA	Health Resources and Services Administration
ILO	International Labor Organization
IOHA	International Occupational Health Organization
IRB	Institutional Review Board
MSHA	Mine Safety and Health Administration
NACOSH	National Advisory Committee on Occupational Safety and Health
NIDA	National Institute on Drug Abuse
NIH	National Institutes of Health
NIOSH	National Institute for Occupational Safety and Health
NORA	National Occupational Research Agenda
NPPTL	National Personal Protective Technology Lab

OEL	Occupational Exposure Limit
OMB	Office of Management and Budget
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
SAMHSA	Substance Abuse and Mental Health Services Administration
TWE	Total Worker Exposure

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-fourth Meeting

NIOSH
Virtual Meeting Only

Conference Number: (855) 644-0229
Participant Code: 9777483
https://odniosh.adobeconnect.com/nioshbsc/

Tuesday – April 28, 2020

Time	Topic	Presenter
8:30 am	Welcome and Introduction Meeting Logistics	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	Peracetic Acid: Overview of Analytical, Toxicology and Field Studies	Dr. Kevin Dunn DFSE, NIOSH
10:20 am	Break	
10:30 am	Center for Motor Vehicle Safety Strategic Plan	Kyla Retzer WSD, NIOSH
11:30 am	Lunch	
12:45 pm	Public Comments	Alberto Garcia DFO, NIOSH
1:00 pm	New tools for real-time coding of industry and occupation in field surveys	Dr. Matthew Groenewold DFSE, NIOSH
1:45 pm	National Firefighter Registry Update	Dr. Kenny Fent DFSE, NIOSH
2:15 pm	Summary & Wrap-up, Future Agenda Items, Meeting Dates, Closing Remarks	Dr. Terry Bunn Chair, NIOSH BSC
2:30 pm	Adjourn	

Appendix B

National Institute for Occupational Safety and Health (NIOSH)
Board of Scientific Counselors Update
Washington, D.C.
April 28, 2020

Budget

The President's proposed budget for Fiscal Year (FY) 2021 (October 1, 2020 – September 30, 2021) was sent to the Congress on February 10, 2020 and released to the public. The President's proposed FY 2021 budget will now be considered by the various appropriations committees in the House of Representatives and the Senate in the months to come.

The President's budget proposes an appropriation of $190 million for NIOSH (the same funding level proposed in last year's President's budget). Of that $190 million, $111 million is included in the Occupational Safety and Health Line and $79 million has been reallocated from Public Health Service Evaluation Funds. Additional information on the budget can be found at the HHS FY 2021 Budget in Brief at: https://www.hhs.gov/about/budget/fy2021/index.html. NIOSH is discussed on p. 51.

Organizational and Personnel Announcements

NIOSH Leadership Updates

- In February 2020, Dr. R.J. Matetic was appointed to the position of Associate Director for Manufacturing, leading the NIOSH Manufacturing Sector Program. Dr. Matetic will also serve as a senior advisor to NIOSH for the Transportation, Warehousing and Utilities Sector Program and the Hearing Loss Prevention Cross-Sector Program.

- In February 2020, Dr. Jennifer Lincoln was appointed to the position of Associate Director for the NIOSH Office of Agriculture Safety and Health in the Office of the Director.

- In February 2020, LCDR Alice Shumate was appointed to lead the NIOSH Center for Maritime Safety and Health Studies.

- In December 2019, Dr. Lauralynn Taylor McKernan was appointed to the position of Director of the Division of Field Studies and Engineering (DFSE).

Retired Staff

- Dr. Christine Branche retired February 2020.

- Dr. Brad Husberg retired January 2020.

- Dr Teresa Schnorr retired November 2019.

New Programs and Initiatives

Follow #KeepTeenWorkersSafe for Young Workers Safety Info

NIOSH has teamed up with OSHA, CareerSafe, and others to provide workplace safety and health information and resources to employers of youth, young workers, parents, and educators with a goal of keeping young workers safe at their summer jobs. The program has been available on NIOSH Facebook, Instagram, and Twitter through April. Visit the Keep Teen Workers Safe website and the NIOSH Science Blog for materials, resources, and information.

Office of the Director (OD)

Update on Coronavirus Response

In response to Coronavirus Disease 2019 (COVID-19) CDC is operationalizing all of its pandemic preparedness and response plans, working on multiple fronts to meet these goals, including specific measures to prepare communities to respond to local transmission of the virus that causes COVID-19. For more information, please visit the COVID-19 Outbreak web page.

NIOSH released a webpage to highlight resources available for the protection of workers: https://www.cdc.gov/niosh/emres/2019_ncov.html. This page provides a centralized resource for

new guidance and recommendations produced during CDC's COVID-19 response, as well as pre-existing resources and materials, to promote the safety and health of workers during the response.

Upcoming International Conferences

The XXII World Congress on Safety and Health at Work is planned for October 4-7, 2020 in Toronto. Our Canadian colleagues have put together an exciting program with the theme of *Prevention in the Connected Age.* The Call for Abstracts was due December 15, 2019. The announcement and preliminary program can be found at https://www.safety2020canada.com/.

Division of Science Integration (DSI)

Occupational Health Equity Program Update

One of the goals of the Occupational Health Equity (OHE) program is to encourage public health researchers to more actively engage with the relationship between work and health. While social and ecological models recognize that work influences health through numerous pathways, work remains largely absent from examination of health inequities in the United States. On March 9, 2020 the "Social Determinants of Health Conversation with CDC Authors" series featured a discussion of the recent article, *Work as an Inclusive Part of Population Health Inequities Research and Prevention*, coauthored by NIOSH researchers. On March 24-25, 2020 several invited OHE collaborators presented at the workshop sponsored by the National Institute on Minority Health and Health Disparities, *The Role of Work in Health Disparities in the U.S.* The OHE program, in collaboration with the NIOSH Surveillance program, will review federal and state supported public health surveillance and health monitoring systems to document the degree to which work-related variables are incorporated. The review will identify existing data sources that could be used by public health researchers to analyze the relationship between work and health and highlight opportunities to improve data collection on work-related variables in these systems.

Reaching Small Businesses

At the most recent National Advisory Committee on Occupational Safety and Health (NACOSH) meeting, NIOSH and OSHA presented current efforts to reach small employers with safety and health information. The NACOSH workgroup requested a summary of NIOSH work with

intermediaries in reaching small employers and planned to develop recommendations related to identifying specific intermediary organizations to engage in OSH outreach and assistance efforts. NIOSH researchers have investigated ways of reaching small employers with occupational safety and health information and training through intermediaries, including construction, general industry, restaurants, and fall prevention and boat repair contractors[1]. These outreach efforts engaged several combinations of intermediary organizations and achieved varying levels of success. NIOSH plans to continue investigating new ways of effectively disseminating and implementing OSH assistance activities for small employers and looks forward to possible NACOSH recommendations for how NIOSH and OSHA might better serve small business employees.

NIOSH Risk Assessment Practices

The Current Intelligence Bulletin: NIOSH Practices in Occupational Risk Assessment was published in March 2020. The report describes the history, science, and approach behind NIOSH systematic assessments of health risks associated with workplace hazards. Risk assessment informs decision-making on appropriate safeguards when complete information is not available for a hazard. For example, recent NIOSH risk assessments have formed the basis for recommended limits on occupational exposures to carbon nanotubes, diacetyl and 2,3-pentandione, hexavalent chromium, refractory ceramic fibers, titanium dioxide dust, and others. The information provided in this report apprises a broad audience of scientists, labor, industry, and other stakeholders on the evolution and best practices in NIOSH risk assessment.

Division of Field Studies and Engineering (DFSE)

NIOSH Workplace Solutions Documents on Legionella and Indoor Environmental Quality during Construction

Two NIOSH Workplace Solutions documents were published - Preventing Occupational Exposure to Legionella and Maintaining Acceptable Indoor Environmental Quality (IEQ) During Construction and Renovation Projects. Health Hazard Evaluations (HHEs) in workplaces with reported cases of Legionnaires' disease among employees were conducted and recommendations

[1]Cunningham, T.R. & Sinclair, R. (2015). Application of a model for delivering occupational safety and health to smaller businesses: Case studies from the U.S. *Safety Science, 71,* 213-225.

were made to prevent conditions that lead to Legionella growth and spread in workplaces. This work benefits individual workplaces and supplements the overall CDC Legionella effort. The second document is based on several HHEs conducted during construction and renovation in occupied buildings. Investigators identified issues that could affect IEQ such as a lack of dust control, the use of high emission building materials, and limited communication with occupants about hazards related to the work being done. After the evaluations, detailed recommendations were made to help employers reduce exposures and maintain acceptable IEQ.

Absenteeism in the Workplace

Researchers are monitoring health-related workplace absenteeism on a monthly basis as a measure of the impact of influenza (and other illnesses) in the working population. Results from the surveillance analyses are reported to CDC and to the others (state health departments, employers, the public) via a Tableau-based dashboard on the NIOSH absenteeism topic page.

Musculoskeletal Health Cross-sector Program

NIOSH launched the Musculoskeletal Health Cross-Sector (MUS) program and associated NORA MUS council in FY17 to reduce occurrences of work-related musculoskeletal disorders (WMSDs) Stakeholders are collaborating with NIOSH to mitigate the risk and costs ($15 billion per year, 25% of total workers' compensation cost) of WMSDs. The MUS Council is collaborating with the American Industrial Hygiene Association (AIHA) Ergonomics Committee on the latest update of the AIHA Ergonomic Assessment Toolkit and is posting comprehensive information on ergonomic solutions/interventions/guidelines in collaboration with the International Ergonomics Association (IEA).

With the rapid deployment of exoskeletons in workplaces, industrial stakeholders need information on the health and safety effects of exoskeletons. To address the research gap, eight NIOSH intramural MUS related projects have been started in FY20: four focus on safety and health assessments of industrial exoskeletons; two HELD laboratory-based projects assess health effects of exoskeletons in the construction and healthcare; and two field trials assessing the health effects of practical usage of exoskeletons. NIOSH also serves on the ASTM F48 committee and ISO 11228 ergonomic standard committee to assist stakeholders in developing consensus standards for industrial exoskeletons.

Division of Safety Research (DSR)

Update on Public Crowdsourcing Competition to Refine Machine Coding of Occupational Injury Narratives

Many occupational safety and health surveillance databases use free-text narratives to capture explanations of how workers are injured. Coding these narratives to analyze data is expensive, time consuming, and fraught with coding errors. NIOSH enlisted the help of both CDC staff and the public – via crowdsourcing competitions – to develop a natural language processing algorithm to classify occupational work-related injury records. NIOSH's ability to code how workers were injured was 82%. The intramural CDC competition raised that to 87%. The public (external) crowdsourcing competition, conducted via an interagency agreement with NASA and hosted on Topcoder's crowdsourcing platform in partnership with the Laboratory for Innovation Science at Harvard, ran for 5 weeks. There were 388 registrants from 26 countries, with 961 submissions, and 5 scripts were published. A doctoral student from the University of Amsterdam, raised the bar to nearly 90%. These results were shared via the NIOSH Science Blog and a NIOSH press release.

Drug Overdose Deaths at Work: 2011-2016

Drug overdose fatalities have risen sharply and the impact on US workplaces has not been described. This paper, published in November 2019 in Injury Prevention, describes US workplace overdose deaths between 2011 and 2016. In that period, 760 workplace drug overdoses occurred for a fatality rate of 0.9 per 1,000,000 full-time equivalents (FTEs). Fatality rates significantly increased 24% annually, with highest rates in transportation and mining industries (3.0 and 2.6 per 1,000,000 FTEs, respectively). One-third of workplace overdose fatalities occurred in workplaces with fewer than 10 employees. Heroin was the single most frequent drug documented in workplace overdose deaths (17%). Workplace overdose deaths were low but increased considerably over the six-year period. The current Altmetric statistic for this publication is 33, placing it in the top 5% of all research outputs scored by Altmetric. Study results were shared through a NIOSH Science Blog, and an infographic suite was developed to share results via NIOSH social media channels.

NIOSH Fast Facts – Taxi Drivers – How to Prevent Robbery and Violence

Workplace violence for taxi drivers, including both physical assaults and verbal abuse like yelling or name-calling, can result in injuries and death. NIOSH published a Fast Facts sheet with recommended strategies for taxi drivers to prevent or reduce the likelihood of violence during a shift in October 2019. It was revised in November 2019 to include OSHA-related information and was cobranded with OSHA and the International Association of Transportation Regulators (IATR). NIOSH provided 150 copies to the Transportation Alliance, an industry group representing owners of both taxi companies and transportation networking companies. IATR and OSHA are assisting in disseminating the fact sheets and their availability.

Health Effects Laboratory Division (HELD)

Biomarkers of Neurotoxicity

Toxic exposures of the nervous system tend to affect different brain regions and cell types in an unpredictable manner. This characteristic feature of neurotoxicity hampers our ability to develop broadly applicable biomarkers of the neurotoxic condition. The Molecular Neurotoxicity team has made progress in overcoming this problem by using animal models to evaluate astrogliosis, a brain cell response that highlights the location of toxicant-induced damage anywhere in the nervous system. While enhanced expression of the protein, GFAP, has been found to be a hallmark of astrogliosis, few other biomarkers have been identified. Recently, bacterial artificial chromosome - translating ribosome affinity purification (bacTRAP) technology has been shown to reveal the actively translating transcriptome of a particular cell type. This technique overcomes the difficulty of sorting molecular biomarkers among all of the different brain cell types. The bacTRAP approach was used to profile only the genes being translated in cells undergoing astrogliosis in response to a neurotoxic insult. This resulted in identification of several new astrogliosis biomarkers that can now be applied to assess broad classes of potential neurotoxic exposures using animal models.

National Personal Protective Technology Laboratory (NPPTL)

Responding to PPE questions

NIOSH continues to respond to COVID-19 personal protective equipment (PPE) questions through multiple communication outlets including webpages, webinars, and inquiry responses. A

NIOSH Science Blog post covered Proper N95 Respirator Use for Respiratory Protection Preparedness Web content includes frequently asked questions about PPE. In the month of February, there were over 121,000 visits to the NIOSH/NPPTL filtering facepiece respirator (FFR) main page and over 391,000 visits to the N95 respirator landing page. Additionally, NPPTL responded to over 250 requests for information in February and March (as of March 11, 2020).

Evaluating the performance of stockpiled respirators

NIOSH identified ten U.S. stockpile facilities that varied in geographic location, type of facility (e.g., federal, state, county), type of storage conditions, inventory quantities, but had similar N95 FFR models stockpiled. These ten facilities included one federal, five state, two regional, and one county level stockpiles. At each facility NIOSH evaluated the site and storage conditions using checklists to record observations that may affect PPE performance. NIOSH evaluated the performance of 3,971 stockpiled respirators and determined that 98% of the respirators (including the P95 filters) tested from the ten facilities and manufactured between 2003-2013 maintained their inhalation and exhalation resistance and filtration performance in accordance with NIOSH performance requirements. This has informed CDC/NIOSH guidance as outlined in *Strategies for Optimizing the Supply of N95 Respirators* that in times of increased demand and decreased supply, such as when responding to COVID-19, consideration can be given to use N95 respirators past their designated shelf life.

Advancing an eye and face protection standard

NIOSH is working with the ANSI Z87 Accredited Standards Committee on Safety Standards for Eye Protection to develop a new standard. The title of the standard is "Eye and Face Protection Used Against Biological Hazards," ANSI Z87.62. This standard sets forth criteria related to the general requirements, testing, permanent marking, selection, care and use of protectors to minimize or prevent exposure to the wearer's eyes and/or face caused by biological hazards including, but not limited to blood, body fluids or other potentially infectious materials (OPIMs) or microorganisms, viruses or toxins from a biological source that can affect human health. This standard will not address hazards related to transmission of an infectious agent suspended in the air, and which may require additional forms of protection. NIOSH has led development of initial testing requirements. It is expected in 2020, pending additional interlab testing to determine the repeatability and reproducibility of proposed techniques.

Respiratory Health Division (RHD)

Electronic Health Records

A cross-institute work group for electronic health records (EHRs), has developed a methodology collecting work information in EHRs called Occupational Data for Health (ODH). In December 2019 and January 2020, templates for ODH were published for trial use by Health Level Seven International (HL7®), an important standard-setting organization for EHRs.

Respiratory Health in Coffee Workers

RHD staff developed and are guest editors for a research topic "Investigating exposures and respiratory health in coffee workers" in the journal Frontiers in Public Health – Occupational Health and Safety. One article has been published and others are in preparation.

Cured-in-Place Pipe Installation

Two health hazard evaluations have been completed that evaluated styrene exposures during cured-in-place pipe installation, which is an emerging technology in infrastructure repair. One report has been published, and one is in preparation. Additionally, a NORA project is starting on this topic.

Total Worker Health® (TWH)

Opioids Coordination Efforts

To guide development of resources and ongoing research on the topic of *Workplace Supported Recovery* NIOSH has published a *Request for Information* in the Federal Register, which is open February 26-April 26, 2020. The RFI seeks input from a variety of stakeholders, including employers, labor unions, workers, researchers, treatment providers, and government agencies on the Workplace Supported Recovery program (WSRP). The intent is to develop approaches to reduce risk factors for substance use among workers and assist in recovery

In addition, NIOSH is partnering with CPWR, the National Construction Safety Center, TWH Centers of Excellence, and the National Safety Council to further efforts on peer support systems for persons with or at risk for opioid use disorder.

Lastly, NIOSH representatives were asked to serve on three sub-committees of the White House's Office of National Drug Control Policy related to the opioid response, including: Peer Recovery Support Services; Employment for People in Recovery; and Expanding Research on Recovery.

TWH Releases the NIOSH WellBQ

The TWH program plans to release a new survey tool to measure and understand worker well-being. The NIOSH WellBQ, developed in concert with the RAND corporation and a panel of more than two dozen international researchers and experts, will assess well-being across 5 domains (such as work experience, worker health, safety practices and financial security). The survey is designed to gauge the current state of workforce or personal well-being. It can also be used by employers, researchers, and workers.

Western States Division (WSD)

Cannabis

NIOSH is represented on the CDC Cannabis Working Group to draft a CDC Cannabis Strategy. The CDC Cannabis Strategy has been reviewed by all CIOs and comments have been addressed. It is now with the CDC Office of the Director for review. NIOSH activities preliminarily include conducting worksite hazard evaluations and identifying issues for the general worker population.

NIOSH is planning a Science blog on cannabis, impairment, and workers' comp issues. Bradley King has been working with the OSHA Education Center at Red Rocks Community College to develop a Hazard Awareness course, which will focus on the hazards found in the cannabis industry.

Fatalities in Oil and Gas

The NIOSH Fatalities in Oil and Gas (FOG) Database released the 2017 data that provide a summary of worker fatalities by oil and gas operations, activities, industry group and worker demographics. During 2020, FOG researchers will compile the first five years of FOG data (2014-2018) and develop a NIOSH report containing findings and recommendations for improved worker safety and health.

In-Vehicle Monitoring System Data

NIOSH is collaborating with industry, academic, and insurance partners to examine opportunities to use in-vehicle monitoring system data beyond its primary use of identifying individuals with risky driving behaviors for driver coaching. During 2020, NIOSH participated in two meetings with several partners including companies, IVMS service providers, and insurance companies to discuss potential research opportunities. Opportunities to use IVMS data to identify needed infrastructure improvements, guide journey management programs, and guide fleet safety policies were identified as priority research topics.

Social Presence Statistics

NIOSH continues to expand its presence on social networks**.**

Social Media and Public Outreach Accounts and Services	February 2019	February 2020
Facebook	137,056 likes	147,780 likes
Twitter	@NIOSH account 306,094	@NIOSH account 305,064 *
Instagram	2,522 followers	4,529 followers
YouTube	234 videos, 739,962 views	271 videos, 1,050,445 views
LinkedIn	761 members	932 members
Website Views	1,184,799 site views in February 2019	3,425,461 site views in February 2020
eNews Subscribers	74,785	58,818 **
TWH Newsletter Subscribers	82,742	62,483 **
Science Blog	Total blog entries: 522 Total comments: 8,187 Blog site views (February 2019): 32,215	Total blog entries: 592 Total comments: 8,829 Blog site views (February 2020): 124,974

* Twitter is actively deleting inactive accounts
** Due to a change in subscription services some subscribers were lost

NIOSH Publications

March 2020

EXAMiner

Current Intelligence Bulletin 69: NIOSH Practices in Occupational Risk Assessment (Revised March 2020)

February 2020

Now Hear This! Take Action to Protect Your Hearing

Technology News 562 - ESPnano Characterizes Hazardous Airborne Particles in the Workplace

January 2020

Maintaining Acceptable Indoor Environmental Quality (IEQ) During Construction and Renovation Projects

Faces of Black Lung II (Video)

Faces of Black Lung II (Revised January 2020)

Ground Stress in Mining (Part 2): Calibrating and Verifying Longwall Stress Models

Ground Stress in Mining (Part 1): Measurements and Observations at Two Western U.S. Longwall Mines

December 2019

NIOSH Extramural Research and Training Program: Annual Report of Fiscal Year 2018

PPE CASE Notes Personal Protective Equipment Conformity Assessment Studies and Evaluation Notes: Firefighter SCBA Facepiece Sizing Issues

November 2019

NIOSH Prevention through Design Program

Agriculture, Forestry, and Fishing Program

NIOSH Fast Facts Taxi Drivers How to Prevent Robbery and Violence (Revised November 2019)

Prevent Construction Falls from Roofs, Ladders, and Scaffolds (Revised November 2019)

Certification Statement

I hereby certify that, to the best of my knowledge and ability, the foregoing minutes of the April 28, 2020, meeting of the NIOSH Board of Scientific Counselors, CDC are accurate and complete.

05/20/20
Date

Terry Bunn
Terry L. Bunn, Ph.D.
Chair, NIOSH Board of Scientific Counselors