MINUTES
Board of Scientific Counselors
National Institute for Occupational Safety and Health
395 Patriots Plaza, SW
Washington, DC 20201
September 22, 2015

NIOSH Board of Scientific Counselor (BSC) board members in attendance:

- Karla Armenti (No conflicts)
- David Bonauto (No conflicts)
- Theodore Courtney (No conflicts)
- Bradley Evanoff (No conflicts)
- James Frederick (No conflicts)
- John Mendeloff (No conflicts)
- Corinne Peek-Asa (No conflicts)
- James Platner (No conflicts)
- Bonnie Rogers (No conflicts)

On the phone:

- Sharon Cooper (No conflicts)
- Michael Larranaga (No conflicts)
- Judith McKenzie (No conflicts)

The meeting started at 8:30 am with a quorum present. John Decker provided emergency procedures and evacuation instructions for the Board members. Mr. Decker also talked about the rules of the BSC and the regulations that apply to the Board. The NIOSH BSC welcomes public input if you want to submit written comments. At the end of the meeting there is an allowance for public comments should they be needed. A copy of the agenda is provided in Appendix A. Introductions were followed after these announcements.

- Christy Forrester
- Lauralynn McKernan
- John Piacentino
- Frank Hearl
- Fred Blosser
- Angela Morley
- Maria Colopy
- 1 more attended (name unregistered)

The Board members voted to approve the previous minutes and they were approved.

Opening remarks by Dr. Howard, talking points.

A copy of the Director's talking points can be found in Appendix B. Several members of the Board are completing their terms at the end of 2015. NIOSH thanks everyone for contributing their time to help advance high quality science at NIOSH.

- David Bonauto, M.D., M.P.H.
  Washington State Department of Labor and Industries
- Darryl Hill, Ph.D., C.S.P.
  Johnson Controls, Inc.
- Michael Larranaga, C.I.H., C.S.P, P.E., Ph.D.
  Ramboll Environ
- John Mendeloff, Ph.D.
  University of Pittsburgh
- Corinne Peek-Asa, M.P.H., Ph.D.
  University of Iowa
- James Platner, Ph.D., C.I.H.
  The Center for Construction Research and Training (retired)

Dr. Howard announced organizational and personnel changes to NIOSH including:

- Angela Morley, JD, MPH, has joined the NIOSH Associate Director for Science Office, where she serves as Human Research Regulatory Administrator. She also chairs the NIOSH Institutional Review Board and directs the NIOSH Human Research Protection Program.
- Jon Szalajda has been selected as Deputy Director of NIOSH's National Personal Protective Technology Laboratory (NPPTL).
- Roger Rosa, long time BSC Executive Secretary and Designated Federal Official, has retired from NIOSH.
- Kathleen Kreiss, Branch Chief of the Field Studies Branch (Division of Respiratory Disease Studies), has retired.
- David Baden, former NIOSH Management Officer, has transferred to the CDC Office of the Chief Financial Officer.
- Maggie Ivory, after more than 40 years of service, has retired from the Division of Applied Research and Technology (DART).

Dr. Howard mentioned a few documents that are currently or recently available for public review and comment. Some of these documents include:

1. **Open for Comment.** Docket 288: **A Vapor Containment Performance Protocol for Closed System Transfer Devices Used during Pharmacy Compounding and Administration of Hazardous Drugs,** closes 11/19/2015**.** The purpose of the protocol is to test a closed system transfer device's (CSTD) capability to perform as a closed system during preparation of hazardous prescription drugs. During an evaluation of the protocol, registered pharmacists, familiar with the use of CSTDs, tested the protocol's prescribed compounding and administration tasks using five commercially available CSTDs. They also performed the assigned tasks using a negative control condition without a CSTD. Prescribed tasks were performed in a NIOSH-developed environmental test chamber with 70% isopropyl alcohol (IPA) as the challenge agent. A highly specific gas analyzer, with measurement capabilities specific to IPA and with a low limit of detection (LOD), was used to detect vapor concentrations of escaped IPA during the tasks. The protocol is not intended for CSTDs designed to operate using air-cleaning technologies. This protocol has multiple applications and can be used by manufacturers to evaluate prototype CSTDs, by consumers to compare CSTD products, or by jurisdictions wishing to adopt the protocol for a CSTD performance certification procedure.
2. ***Recently Closed.*** Docket 233-A: **NIOSH List of Antineoplastic and Other Hazardous Drugs in Healthcare Settings: Proposed Additions to the NIOSH Hazardous Drug List 2016**, closed 7/27/2015. The NIOSH Alert:

"Preventing Occupational Exposures to Antineoplastic and Other Hazardous Drugs in Health Care Settings" was published in September 2004. This Alert contained Appendix A which was a list of drugs that were deemed to be hazardous and may require special handling. This list of hazardous drugs was updated in 2010, 2012 and 2014. For this update, NIOSH reviewed the recommendations of the peer reviewers and stakeholders and determined that 33 drugs, in addition to 3 drugs with manufacturer's warnings, had one or more characteristics of a hazardous drug and this list of 36 drugs was published for public comment.

3. ***Recently Closed.*** Docket 286: **Occupational Safety and Health Research and Related Activities; Administrative Functions, Practices, and Procedures; Removal of Part 80**, closed 09/14/2015. HHS promulgated Part 80 of Title 42 to facilitate Section 21(a)(1) of the Occupational Safety and Health (OSH) Act of 1970 (29 U.S.C. 670(a)(1)), which authorizes the Director of NIOSH to conduct educational programs to provide an adequate supply of qualified personnel to carry out the purposes of the OSH Act. Part 80 established tuition fees for such training, as authorized by 31 U.S.C. 483a (31 U.S.C. 9701, as revised by Pub. L. 97-258, September 13, 1982), which permits agencies to "prescribe regulations establishing the charge for service or thing of value provided by the agency." In accordance with section 6 of Executive Order 13563, HHS conducted a retrospective analysis of its existing rules, determined Part 80 to be obsolete, and is proposing the removal of Part 80 from Title 42.

Dr. Howard also talked about new programs and initiatives. A complete listing of these documents are included on the talking points shown on Appendix A. Some of them include:

- NIOSH Research Rounds Newsletter: In July, NIOSH introduced the new NIOSH Research Rounds newsletter. This monthly on-line bulletin summarizes selected research projects and products in lay language for stakeholders and the general public, supplementing our existing e-newsletter of record, NIOSH e-News.

- NIOSH announces a new digital publication product called "NIOSH eDoc," which presents workplace safety and health information in a way that is accessible and easy to use on any mobile device, desktop, or laptop computer. This addresses a need of stakeholders who expressed interest in a mobile-friendly format for NIOSH documents. The first NIOSH document to be available in the new eDoc format is Ergonomic Solutions for Retailers: Prevention of Material Handling Injuries in the Grocery Sector (NIOSH Publication No. 2015-100). This booklet for retailers and safety experts illustrates the use of mechanical assist devices for safer materials handling in grocery work. The NIOSH Web team is transitioning NIOSH topic pages (Web pages) to a new responsive design template that allows readers to access this information using various mobile devices such as tablets and smart phones. One resource that is being updated in this new template so that it will be more accessible to small business users is the NIOSH Small Business Resource Guide.

Dr. Howard briefly mentioned that publication of a new ***Best Practices: Engineering Controls, Work Practices, and Exposure Monitoring for Occupational Exposures to Diacetyl and 2,3-Pentanedione***. Workers who handle diacetyl or work in areas where diacetyl exposure occurs are at risk of developing severe lung disease if their exposures are not properly controlled. NIOSH has developed guidance in a variety of areas to reduce workers' exposures to diacetyl through engineering controls, best work practices, and methods for monitoring airborne exposures. This document discusses engineering control approaches for a range of common production processes, including: weighing and handling of flavorings and flavoring ingredients; filling, mixing, and emptying flavor mixing tanks, and; loading and unloading of powder blenders. Twelve sketches showing the control approach and pertinent design criteria for each of these unit processes are included in the document which is available at: http://www.cdc.gov/niosh/docs/2015-197/default.html

Dr. Mendeloff asked about the Criteria Document for Heat Stress and where it stands. Dr. Howard pointed to Dr. Schulte and Dr. McKernan who mentioned that comments were approved by the OD and it is back with EID for final editing. The Criteria Document for Heat Stress should be released soon. Dr. Mendeloff asked how protective this Criteria Document compared to other documents. Dr. Schulte mentioned that it is as protective as other standards. The 1986 version was updated and more attention was provided to prevention and remediation than the previous document.

Dr. Rogers asked about the budget and the healthier work-centers. Dr. Howard mentioned that he is not completely sure. Dr. Howard also mentioned that he didn't have any good answer for this question. Once the budget is approved, a reconciliation of these items will be conducted for the 13 appropriations bill, or keep on Continuing Resolution.

Dr. Howard thank all Board members and Dr. Kitt awarded certificates to those members rotating off the Board.

Dr. Kitt presented on the NIOSH Labor- Management Participation in Research Partnerships Workgroup.

This is the second update on this topic that has been prepared for the BSC. Dr. Kitt acknowledged the Workgroup (WG) members for the hard work on this project. The presentation included recommendations and response to recommendation on nine different topics.

Recommendation # 1: NIOSH researchers involved in the Toyota study should conduct a "follow-back" survey of workers at the completion of the project to obtain feedback on the issues of barriers to participation and communication of findings.
Response to Recommendation # 1: Dr. Kitt mentioned that, as presented at the September 2014 BSC meeting, the NIOSH WG members met with the Project Officer of the Toyota study. After review, the WG indicated appropriate steps had been put into place to ensure confidentiality for the study. Because OMB approval for the survey, which normally takes 6-12 months, had already been obtained months prior, adding a follow-back survey was deemed impractical given the approval time that would be needed. This study has been suspended early for unrelated reasons.

Recommendation # 2: NIOSH should conduct follow-back surveys in selected union and non-union field/intervention studies to collect information on the views of workers, and union representatives in workplaces where employees are represented. NIOSH policies should be developed to address identified problems and successes.
Response to Recommendation # 2: Dr. Kitt mentioned that the WG developed a short bank of questions on confidentiality/participation that could be added to field work and research studies. These survey questions have already been tested in one survey with taxicab drivers and will be included in a 2nd study of oil and gas workers. Results of these two pilots will be presented to the Science Lead Team for input, along with discussions about further piloting the surveys. The survey questions will be made available to researchers for inclusion in surveys where appropriate.

BSC members mentioned differences in survey needs between union and non-union facilities. Dr. Kitt mentioned that the project officer of the taxicab project indicated that these set of questions were very helpful. Dr. Kitt also mentioned that the Health Hazard Evaluation (HHE) program does provide follow-back with the employer regarding recommendations provided following a site visit. Dr. Courtney asked about confidential participation on follow-back surveys and also wondered if employees understood that participation was completely voluntary even prior to be engaged in the study. Dr. Rogers asked if researchers spoke to individuals who opted out to understand what could have influenced their participation to participate. Dr. Kitt mentioned that in follow-back surveys there is a list of questions to assess if the study was helpful and what could have been improved.

Recommendation # 3: In circumstances where NIOSH researchers believe it appropriate, they should use worker-guided or worker-participatory research methods…
Response to Recommendation # 3: Dr. Kitt mentioned that at the September 2014 NIOSH Science Forum, a session was conducted on participatory research (one of the most attended forums to date). At the May 2015 Work, Stress, and Health conference numerous presentations (including those by NIOSH) contained discussion of the need for more worker participatory research. These are examples of venues where this topic has been discussed the past two years.

Dr. Platner mentioned that some institutions might not have as vigilant of an IRB office as the NIOSH IRB programs. Dr. Kitt indicated that NIOSH has looked into several external partners IRB policies. Mr. Frederick wondered if the HHE program tracks the percentage of union vs. non-union shops that NIOSH visits. Dr. Kitt noted that these numbers of unionized workplaces are low. Dr. Mendeloff asked if a private company is contacted by NIOSH regarding participation, employees may feel compelled to participate given that it was being promoted by the employer. Dr. Kitt mentioned that participation in NIOSH studies has always been completely voluntary and this statement is repeated throughout the

duration of the survey. Dr. Courtney mentioned that workers sometime reject an intervention, an example being a construction intervention and tying re-bars, where workers rejected the intervention as it would "de-skill" the task.

Recommendation # 4: The NIOSH IRB is encouraged to continue, and strengthen, its evaluation of the potential economic and social consequences that may be connected to research proposals it reviews. Particular focus should include examination of barriers to participation...and ensuring confidentiality is upheld…IRB should secure expertise it needs to accomplish this objective.
Response to Recommendation # 4: Dr. Kitt indicated that the NIOSH Human Research Protection Program (HRPP) completed a literature review on potential economic and social consequences and recommended safeguards to prevent/mitigate potential associated research harms. Educational sessions have been held with NIOSH staff and IRB members; training will be updated periodically. Job aids have been posted to the NIOSH intranet. An individual representing worker health, safety and welfare has accepted an invitation to join the NIOSH IRB.

Dr. Courtney asked if any of these recommendations were available to grantees for funding proposals. Dr. Kitt mentioned that as of now, it has been utilized internally, but it will discussed for possible further dissemination outside NIOSH.

Recommendation # 5: Where employee participation is sought, NIOSH researchers should be made aware of and receive education on the provisions of the NLRA that govern labor-management relationships, including Section 8(a)(2) that prohibits an employer from dominating or interfering with the formation or administration of a labor organization.
Response to Recommendation # 5: As part of our NIOSH Legal Seminar Series, Dr. Kitt indicated a presentation about these specific provisions of the NLRA will be delivered to NIOSH staff by legal experts in January 2016.

Dr. Evanoff asked if these seminars are open to the public. Dr. Kitt mentioned that as of now they are only held internally. Dr. Peek-Asa mentioned that engagement is usually more effective if it occurs early in the planning process for research.

Recommendation # 6: For intervention studies…NIOSH researchers should consider mechanisms to monitor progress of the study, including outside monitoring experts or a safety committee.
Response to Recommendation # 6: NIOSH HRPP conducted a scoping exercise of applicable CDC and NIH policies. NIOSH HRPP is in process of adapting these materials for establishing Data Safety Monitoring Plans and Data Safety Monitoring Boards. Educational sessions have been held with NIOSH staff and NIOSH IRB members.

Recommendation # 7: NIOSH should develop a new policy or guideline document that addresses the communication of results of all studies where the research was conducted….should include dissemination approaches.
Response to Recommendation # 7: As presented at Sept 2014 BSC meeting:

- Since the BSC report NIOSH has formed a Communication Lead Team (CLT)
- The CLT embraced this recommendation and is working with Divisions and the CO to advance a communication culture at all stages of research
- Science/information dissemination continuum developed and being used as a model

Recommendation # 8: NIOSH should consider developing some general criteria or guidelines for minimum elements that must be contained in a letter of agreement beyond that of an employer demonstrating its good intention to participate in the study. The letter might contain elements such as stating that employee participation is voluntary, employees can withdraw from participation at any time, and confidentiality will be maintained.
Response to Recommendation # 8: NIOSH developed a template Letter of Agreement (LOA) that it now uses in agreements with companies. LOAs are approved at Division leadership level or at the NIOSH OD level depending on the nature of the agreement. The template did not previously have language pertaining to confidentiality and the voluntary nature of participating in studies. This language has now been inserted into the LOA template and presented to the Lead Team for review and approval.

Dr. Mendeloff asked if this LOA template has already been used in new LOAs. Dr. Kitt mentioned that it would be used for future agreements, but had not been implemented on an agreement as of the date of the BSC meeting.

Recommendation # 9: In one year from the adoption of these recommendations, NIOSH should report back to the BSC on progress and thereafter periodically report on issues related to labor-management structures that impact outcomes and employee participation. Updates have been provided at BSC meetings September 2014 and now September 2015.

In Conclusion, the BSC Report of Recommendations has been instrumental in precipitating action on many issues related to Labor-Management Participation in Research Partnerships.

A larger discussion is ongoing on mechanisms to introduce new researchers and periodically update others on key policies and tenets of NIOSH work to include issues related to Labor and NIOSH tripartite policies.

Dr. Rogers mentioned that the IRB needs to take into consideration individual data sets and not always as aggregate. Also, Dr. Rogers mentioned that workers individually should be informed if they were at risk, but couldn't be due to IRB limitations. Dr. Platner asked about the communication plans and also mentioned that it is not easy to communicate with subjects long after a study, because publications can sometimes be released years after the project ended and the workforce might not be there anymore. Dr. Kitt mentioned that the NIOSH communications team are engaged from the beginning of the project to address these issues. Dr. Frederick mentioned that timing is important particularly because workforces can be transient in nature, and NIOSH should try to provide quick feedback, and perhaps with other tools other than electronic dissemination, given that many workers might not have access to the internet. Dr. Cooper (on the phone) asked if there are generalizable results from the Toyota study that can be applied to other worksites. Dr. Kitt mentioned that the data set is being analyzed and those generalizable pieces have not been ascertained at this point.

Dr. John Piacentino presented on the Systematic Review: An update on NIOSH Activities

Dr. Piacentino provided an update on NIOSH activities regarding systematic review. NIOSH has had a work group examining the topic since 2014. Dr. Piacentino acknowledged the NIOSH workgroup members and thanked everybody for the work on the topic. The mission of the work group has been to become more informed about the systematic review processes being used by CDC and other Federal agencies, to evaluate and improve the NIOSH guidance development process to assess whether refinements or additions are needed, and also to examine the feasibility of adopting or adapting existing approaches of systematic reviews and grading evidence.

Systematic review methods are explicit and transparent methods to critically appraise a body of literature with some examples being:

- National Toxicology Program, Office of Health Assessment and Translation
- Cochrane Database of Systematic Reviews
- US Preventive Task Force Services Guidelines
- The Guide to Community Preventive Service
- Grading of Recommendations Assessment, Development and Evaluation

Dr. Piacentino mentioned that the reasons to conduct a systematic review are divided into 3 basic areas:

- Quality
    - Transparency
    - Consistency
    - Reduce bias
    - Validity
    - Reliability
    - Confidence
- Trend
    - Academia
    - Government
    - International Consortia

    - Professional Society
    - Industry
- Risk
    - Reputation
    - Leadership
    - Loss of value or utility

Dr. Piacentino also explained the six basic elements of a systematic review which are divided into:

- Define the question
    - Define the question(s) to be evaluated.
    - Questions should be specific
- Create a review protocol
    - Develop a systematic review protocol, or use a template from published methods, to describe the systematic review process that will be used.
    - Databases for information
    - Selection and exclusion criteria
    - Opportunities for peer, stakeholder and public engagement
- Conduct a literature review
    - Identify and select relevant studies using pre-defined search terms and inclusion/exclusion criteria.
- Evaluate individual studies
    - Conduct detailed quality analysis of individual studies and extract data using pre-defined evaluation criteria.
    - Relevance to question
    - Appropriateness of study population
    - Unexplained inconsistency
- Integrate and interpret data
    - Integrate and interpret evidence across studies and across lines of evidence.
    - Describe the number, quality, size, strengths and weaknesses, and other factors of the included information.
    - Describe direction and consistency of effect across studies.
    - Describe patterns of strengths and limitations across studies, including bias.
    - Describe streams of evidence that are logically or mechanistically connected.
    - Identify and describe which studies were most heavily relied on for making influential determinations.
- Develop a report
    - Make conclusions about a body of evidence, develop recommendations, and produce a report

Dr. Piacentino mentioned that one of the things the work group learned was that the systematic review is consistent with core principles of NIOSH guidance development (advances mission, based on best available evidence, developed transparently). NIOSH is already engaged in full-scale or partial-scale systematic reviews. There is not one preferred methodology for all of NIOSH – the NIOSH framework or a published system may be used. Not all NIOSH publications require systematic review.

While NIOSH already uses the principles of systematic review, moving forward, NIOSH will use more structured and up-to-date systematic review methods for critically appraising scientific literature. However, because systematic review methods can be resource intensive, NIOSH will need to scale the methods and resources to the question. Other areas where NIOSH is planning improvements is providing an explicit description of the literature review and evidence base (selection criteria) and more transparently link recommendations to the evidence base using clear language.

Dr. Piancentino mentioned that the work group is further studying evidence integration and evidence rating/grading. The current objective is to evaluate options for adopting, adapting, or developing an evidence rating system for NIOSH assessments.

Dr. Mendeloff expressed skepticism about some systematic reviews and their application to occupational health questions, specifically the Cochrane review. Dr. Mendeloff mentioned that one problem is some systematic reviews focus too much on methodology and too little on quality of the data. In some cases a single study is published cast in a slightly different light, but it is the same study being included in a systematic review several times, thus distorting the systematic review. The individuals working conducting systematic reviews have a division of responsibilities, and sometimes the authors do not know enough about the data to make good assessment of the evidence.

Dr. Evanoff mentioned that in the Institute for Work and Health in Toronto, questions are normally driven by stakeholders, so it is not so much an academic exercise. In Dr. Evanoff's opinion, the Toronto format is structured better in some ways than the Cochrane review. Stakeholder input can assist in the initial weighting and importance of evidence criteria that are incorporated into a systematic review. Also, some study designs are not well graded in some systematic reviews, despite the importance of their findings. For instance, it is impossible to randomize state-based differences in safety regulations. Dr. Evanoff also commented that obtaining stakeholder input early in the process is important to identifying the correct questions.

Dr. Platner said that systematic review criteria can result in exclusion of nearly every study. NIOSH conducts a diversity of study types, and just because something doesn't include clinical trials doesn't mean that the study is not worth conducting.

Dr. Evanoff mentioned that BSC members are interested in the systematic review and this should be further discussed. Dr. Bonauto mentioned that it is essential how the research results are communicated and how to formulate the research questions at the beginning of the study.

Dr. Lauralynn McKernan presented on the Occupational Exposure Bands

Dr. McKernan started by introducing the NIOSH Occupational Exposure Banding Team and acknowledging the hard work and effort put into this project.

Occupational Exposure Band (OEB) is a mechanism to quickly and accurately assign chemicals into "categories" or "bands" based on their health outcomes and potency considerations. Bands go from A to E, A being least hazardous and E the most hazardous.

There are approximately 1000 chemicals with authoritative OELs (RELs, PELs, CalPELs, TLVs, WEELs, and MAKs). The EPA reports that the Toxic Substances Control Act (TSCA) Chemical Substance Inventory contains over 84,000 chemicals. According to the Society of Chemical Manufacturers and Affiliates (SoCMA), there is no process for EPA to remove chemicals from the list if they are no longer being produced. SoCMA estimates that over half of the chemicals on the list are no longer in production; so, 84000 may be a significant overestimate of what is *actually* in commerce in the U.S.

Dr. McKernan mentioned that to achieve the Occupational Exposure Banding, NIOSH will facilitate more rapid evaluation of health risk, used with minimal data, supporting the application of OEL-ranges for families of materials and will provide a screening tool for the development of RELs. Stakeholders will provide guidance for materials without OELs, identify hazards to be evaluated for elimination or substitution, and will facilitate the application of Prevention through Design principles.

Dr. McKernan indicated that control banding was developed to handle the vast number of chemicals used in industry. It is possible to determine the broad hazard group to which a chemical belongs and on that basis determine the necessary level of control, or control band. Control banding is not currently appropriate for many situations, including "hot" processes, open spray applications, gases, and pesticides. These situations involve more complex exposures requiring additional considerations that are not yet fully addressed by current control banding strategies. In addition, control banding does not yet cover safety hazards, environmental issues, or ergonomic issues.

OEB derived from toxicology and potency and can be used to identify a control strategy. The OEB concept groups together chemicals without authoritative OELs, based on toxicology and potency. Each band is linked to an order of magnitude range of OELs based on benchmark chemicals.

A tiered approach is used on OEB where you would start at Tier 1, move on to Tier 2 and Tier 3 as resources become available. Tier 1 is a rapid evaluation with the least data requirements. A Tier 1 evaluation utilizes GHS Hazard Statements and Categories to identify chemicals that had the potential to cause irreversible health effects. Tier 2 assigns bands with more confidence. A Tier 2 evaluation produces a more refined OEB based on point of departure data from reliable sources. Data availability and quality are considered. Tier 3 uses expert judgment and all available data to perform an assessment of health risk. Tier 3 involves the integrating all available data and determining the degree of conviction of the outcome.

Dr. McKernan mentioned that in many cases detailed expertise is needed to make judgements about these various types of toxicity endpoints. Thus we can:

- Tier 1: Rely on existing hazard classifications – does not require any independent toxicology evaluation
- Tier 2: Be adequately familiar to find summary from authoritative reviews and in some cases weigh among studies with well-defined criteria
- Tier 3: Be able to review primary data and make judgments about effect adversity

Tiers 1 and 2 are based on the findings for eight standard toxicological endpoints:

- Acute toxicity
- Skin corrosion and irritation
- Serious eye damage and irritation
- Respiratory and skin sensitization
- Germ cell mutagenicity
- Carcinogenicity
- Reproductive/developmental toxicity
- Target organ toxicity resulting from repeated exposure

Regarding the hazard classification, each physical or health hazard is a “hazard class” (e.g., carcinogenicity is a hazard class). A “hazard class” may be sub-divided in the criteria into several “hazard categories” based on the degree of severity of the hazard. Placing a chemical into a “hazard class”, and where necessary, a “hazard category”, is the concept of classification—determining not only the hazard, but also the severity of the effect.

NIOSH developed a Tier 1 Validation, where compared bands obtained from Tier 1 process for 744 chemicals and compared with full shift OELs from the following authoritative bodies:

- NIOSH Recommended Exposure Limits (RELs)
- OSHA – Permissible Exposure Limits (PELs)
- ACGIH– Threshold Limit Values (TLVs)
- AIHA – Workplace Environmental Exposure Levels (WEELs)
- California OSHA Program (Cal/OSHA) – PELs
- German Maximale Arbeitsplatz-Konzentration (MAK)

The results of these comparisons for vapors were that 76.7% of chemicals had Tier 1 Bands equally or more protective than corresponding OEL-based bands, and 23.3% of chemicals had Tier 1 Bands less protective than the corresponding OEL-based bands. The results of these comparisons for particles were that 84.7 % of chemicals had Tier 1 bands equally or more protective than the corresponding OEL-based bands, and 15.3% of chemicals had Tier 1 bands less protective than the corresponding OEL-based bands.

The overall rate of Tier 1 bands being at least as protective as the OEL was 79.4% (combined vapor and particulate). It is recommended to always do a Tier 2 assessment since about 20% of the time the Tier 1 band is not as protective as the OEL. Possible to skip the Tier 2 process if you get band E in Tier 1.

A Tier 2 approach is an additional level of analysis used when there are no GHS H codes and the outcome of the Tier 1 analysis is incomplete, or an insufficient reflection of the health potency of the chemical. Tier 2 is a semi-quantitative approach that requires that the user do a thorough search of several publically accessible databases in order to retrieve

hazard information. Tier 2 is performed by a skilled IH or toxicologist, and relies heavily on information gathered from secondary data sources. Examples of these sources are from the government (like CDC and EPA), and professional health agencies. Tier 2 also has a threshold for data sufficiency, meaning that if there isn't enough information available, a Tier 2 evaluation cannot be performed. The strategy for performing Tier 2 is prescriptive and outlined in detail in our document to ensure that the results of the process are consistent among users. After a Tier 2 evaluation, there is potential for a chemical to be moved into a more or less protective band from the Tier 1 OEB.

Dr. McKernan also mentioned some key toxicology concepts where Health-based OEL and OEBs are established following the selection of an adverse (critical) effect endpoint. Chemicals generally cause more than one effect. Not all effects are "adverse" – need to interpret the impact. Characterization of effects can be qualitative (hazard assessment) or quantitative (potency or dose-response assessment). Toxicological expertise and professional judgment to select the endpoint on which to base the assessment with scientifically defensibility is critical.

NIOSH developed a Tier 2 Validation where questions such as the ones listed below are asked:

- Is the Tier 2 process consistent and specific to independent users?
- Do the Tier 2 banding criteria reflect toxicity as determined by an independent evaluation (e.g. OELs)?
- Do new users get the same Tier 2 bands as expert users?
- Do users get the same endpoint specific bands as other users?
- Are there any health effects that band more reliably than others?

In the Tier 2 Validation – phase 1, two groups (expert users and new users) completed the Tier 2 process on 102 chemicals. Comparisons were made of the chemicals with OELs to the OELs banded. This validation used different scales and units for vapors (ppm) and particles (mg/m^3) and it was done separately for NIOSH and both users.

The expected project outputs are:

- NIOSH guidance document
- OEB training class, blended –learning option
- Emergency response modifier
- Overall process, including the decision logic
- Tools to facilitate finding and evaluating hazard data and assign chemicals to hazard bands
- Electronic tools to help users create OEB online
- Education materials for Health & Safety professionals, managers, emergency responders, and workers

Dr. Evanoff complimented the presentation on how NIOSH is using the resident expertise to produce good things.

Dr. Armenti asked if stakeholders were company industrial hygiene and environmental health and safety people. Dr. McKernan mentioned that those are some of the stakeholders; a lot of the pharmaceutical companies and chemical companies are already doing these types of banding. Dr. Armenti wondered if the computer program will aid smaller companies. Dr. McKernan mentioned that it might help, but the IH or other professional will be a critical part of the process, so it will not be completely automated via spreadsheet. Dr. McKernan also mentioned that the spreadsheet is developed as a tool to help the process, and not necessarily as a do-it-alone platform.

Dr. Bonauto mentioned that some chemicals might have different biological effects, and also it is important to not group all of them as it might not have the same effect or toxicity.

Dr. Frederick asked if any stakeholder has done the same analysis and came with the same results. Dr. McKernan mentioned that some stakeholders have done some analysis, and what we learned is that a high percentage ended up in the same point. But there were some differences with the intermediate bands and now we are trying to figure out why that is.

Dr. Frederick thought that NIOSH was going to set a specific control band for a number of chemicals, but with new information becoming available every minute, it makes sense to go through the process and determine a band class with the most up-to-date information.

Christy Forrester presented on the Research Translation Office Update

Dr. Forrester started the presentation stating that NIOSH aims to move our science into practice by collaborating with partners and stakeholders on the adaptation, adoption, and use of NIOSH knowledge, interventions, and technologies. To do this, NIOSH takes an approach called research to practice, or r2p, where NIOSH moves science to the practice community along a pathway intended to improve worker safety and health.

Dr. Forrester mentioned the six (6) core elements that make up the r2p approach. Each of the elements uniquely contributes to workplace safety. The interactions and confluences of these elements, however, is what leads to measurable impact and directly aligns with the full mission of NIOSH. These elements are:

- Partnerships
- Intramural Science
- Extramural Science
- Technology Transfer
- Communication
- Evaluation

Traditionally, r2p at NIOSH has focused largely on translating our science into publications and products, and disseminating these products to our stakeholders. NIOSH has raised awareness through efforts, improved and expanded channel selection, and learned more about NIOSH audiences, increasingly reaching more and more of the stakeholders. NIOSH has tracked, measured, and reported outcomes both at the Institute level and project level, focusing on evaluation metrics of reach, such as website traffic, social media followers/fans/likes, blog traffic and numbers of publications disseminated.

Some good examples of products that have been moved into the practice community include the NIOSH Pocket Guide and the NIOSH Manual of Analytical Methods. Other examples include the Workplace Violence Prevention for Nurses, The Silica/Asphalt Milling Machine Partnership, and the Youth@Work – Talking Safety Curriculum. Each of these efforts was strengthened, promoted, and sustained through collaboration and Confluence of core elements for r2p – providing insight on how NIOSH might improve r2p to extend beyond reach and into the future.

This r2p initiative raised questions such as…

- How can we not only reach, but engage our audiences?
- How can we get our knowledge, technologies, and practices USED? Adopted, adapted, or applied?
- How can we influence change and inspire ACTION to improve workplace safety and health?
- How do we achieve measurable and sustainable IMPACT?

The NIOSH Research Translation Office (RTO) was created October year to address these sorts of questions. The mission is to advance the use, adoption, and adaptation of NIOSH knowledge, interventions, and technologies. We seek to accomplish this mission by engaging the core elements of r2p to improve collaboration, systems efficiency, and capacity.

Science, both intramural and extramural, is the basis of NIOSH translation products. Over the past 6-8 months RTO engaged the NIOSH Division and Laboratory leadership to better understand:

- What is their main ingredient – their priorities?
- What impact do they seek?
- What science would they most like to see translated into action?
- What are their r2p needs?
- How can RTO help to get their science adapted, adopted, or applied?
- What tools, systems, or strategies might RTO contribute to facilitate this move from science to practice?

Thus far, we have met with 9 of the 11 Divisions and Laboratories and what we have learned is that there is a wide variety of r2p needs and priorities. Some examples include:

- Marketing
- Locating new audiences for existing technology solutions
- Providing support for translational research efforts; and
- Advancing mobile app sustainability

Engaging the communication core element, NIOSH developed and implemented an internal messaging calendar to improve the coordination, consistency, transparency, planning, and content of NIOSH communication and dissemination efforts. The calendar is hosted through SharePoint on an internal server, available to all NIOSH staff, and provides an internal online workspace where staff can collaboratively post and coordinate communication efforts by topics, observances, conferences or events, product releases, blog entries, and news updates. The NIOSH Communication Office manages the calendar and hosts a weekly teleconference to share and discuss this information among NIOSH health communication specialists and social media channel managers.

NIOSH has also engaged the NORA sector councils and Center Grantees to learn about their r2p interests and needs and how partners might benefit from NIOSH r2p systems, models, and tools. There are few opportunities for all NIOSH extramural partners to interact as a whole. The NIOSH Center Directors meeting, for example, is held only once a year.

Dr. Courtney asked about how RTO deals with the external community and intellectual property (IP) identification. Dr. Forrester mentioned that she has not run into that yet; the goal is to get the product used, and not competing with other IP's. Leslie Nickels mentioned that our commitment during the last year was to expand the office and increase the exposure to the external community and choose grantees for pilots and increase interaction with the NORA office. At the moment, NIOSH is looking at a case by case basis and is cautious about how that information can be evaluated through the communications office. Dr. Platner mentioned that the problem with NIOSH funded products is the reverse of what the private industry does. NIOSH wants manufacturers to adopt the technologies, whereas the manufacturers want to be more protective of IP.

Dr. Peek-Asa mentioned that sometimes depending on what it is, it is easier to sell something than to give it away to make it more effective and also wondered if there is a plan to evaluate the efficiency of this and wonders about measuring reach. Leslie Nickels mentioned that measuring reach is important and the NIOSH RTO is trying to measure reach and impact on these programs. Garrett Burnet mentioned that trying to get impact from some things can be convoluted, and some of the evaluations are focused into a binary system of whether it worked or it did not work.

Dr. Evanoff was intrigued about the concept of the calendar, initially intended to facilitate communications internally and initially it was behind the firewall. The other piece was an opportunity to share files and finally an opportunity for scheduling recurring meetings. It seem like a low cost way to promote communication internally. Leslie Nickels mentioned that these are pilot steps, started internally initially, and then maybe next year have a conversation to be more inclusive of the stakeholders.

Dr. Evanoff asked in terms of how NIOSH internal funded projects are being disseminated and if there are plans to enhance traction and multiply efforts with low cost. Dr. Kitt mentioned that the NIOSH office is looking into how to expand on these comments.

Dr. Rogers asked about the practitioners' community and asked whether certain interventions worked, how it worked, why it did not work. Dr. Rogers also mentioned that sometimes it is 10-years later when solutions are being adopted, and how things translate into real world scenarios.

Dr. Platner asked about the research communication, and asked about indexing the information into the right venues and websites and promote NIOSH to participate in disseminating and improving research communication. John Decker mentioned that though it does not relate to indexing, NIOSH is now submitting all the pubs into the NIH system. Dr. Evanoff asked if NIOSH tracked pubs. Dr. McKernan mentioned that all of them are recorded on NIOSTIC-2.

Dr. Bonauto mentioned that it would be a good idea to summarize the research documents into simple things as “This is why we did the research, and this is how it affects you.”

Leslie Nickels mentioned that most of these initiatives are happening from the Division of Surveillance, Hazard Evaluation, and Field Studies (DSHEFS) and talked briefly about cyber security and protecting sensitive data. Mr. Burnett mentioned that there are protocols within CDC about protecting these information.

Mr. Decker inquired about public comments. None received.

Next meeting will be not before April 2016.

Other issues or items, please email Mr. Decker and Dr. Rogers.

Meeting Adjourned at 1:55 pm ET

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)
Sixty-Fifth Meeting
September 22, 2015
NIOSH Offices
395 E Street, S.W., Suite 9000
Washington, DC 20201

Time	Topic	Presenter
8:30 a.m.	Welcome and Introductions Meeting Logistics Conflict of Interest Declarations	Mr. John Decker, Designated Federal Official, NIOSH
8:45 a.m.	Agenda, Announcements, and Approval of Minutes	Dr. Bonnie Rogers, Chair, NIOSH BSC
9:00 a.m.	Director's Opening Remarks	Dr. John Howard, Director, NIOSH
9:30 a.m.	Structuring Labor-Management Participation in Research Partnerships – NIOSH Response	Dr. Margaret Kitt, Deputy Director for Program, NIOSH
10:15 a.m.	**Break**	
10:30 a.m.	Systematic Review and Grading Evidence	Dr. John Piacentino, Associate Director for Science, NIOSH
11:30 p.m.	**Lunch**	
12:30 p.m.	Occupational Exposure Bands	Dr. Lauralynn McKernan, Deputy Director, Education and Information Division, NIOSH
1:30 p.m.	Research Translation Office Update NIOSH	Ms. Christy Forrester, Health Scientist, Mr. Garrett Burnett, Health Communications Specialist, NIOSH
2:30 p.m.	Summary & Wrap-up, Future Agenda Items, Meeting Dates, Closing Remarks, Public Comments	Dr. Bonnie Rogers, Chair, NIOSH BSC
3:00 p.m.	**Adjourn**	

Appendix B – Director's Talking Points

Board of Scientific Counselors
395 Patriots Plaza, SW
Washington, DC 20201
September 22, 2015

Retiring Members of the Board of Scientific Counselors (BSC)

Several members of the Board are completing their terms at the end of 2015. NIOSH thanks everyone for contributing their time to help advance high quality science at NIOSH.

David Bonauto, M.D., M.P.H.
Washington State Department of Labor and Industries

Darryl Hill, Ph.D., C.S.P.
Johnson Controls, Inc.

Michael Larranaga, C.I.H., C.S.P, P.E., Ph.D.
Ramboll Environ

John Mendeloff, Ph.D.
University of Pittsburgh

Corinne Peek-Asa, M.P.H., Ph.D.
University of Iowa

James Platner, Ph.D., C.I.H.
The Center for Construction Research and Training (retired)

Budget

The budget proposals pertinent to NIOSH are provided below:

House Committee:

- Total program level: $341.100 million, $6.237 million above FY 2015 and $57.682 million above FY 2016 the President's budget proposal.
- Restores FY 2016 President's budget proposal cuts to NORA Agriculture, Forestry and Fishing (AgFF) sector and Education and Research Centers (ERCs).
- Funds previously set-aside for Lake Lynn to be used to acquire a new mine safety and health research facility. Funding from prior unobligated Individual Learning Accounts (training accounts for staff) would be rescinded to support payment of the facility
- Terminates Section 225 -- The HHS "Nonrecurring expenses fund" (NEF) and rescinds the unobligated balance

Senate Committee:

- Total program level: $305.887 million, $28.976 below FY 2015 and $22.469 above FY 2016 President's budget proposal.
- Eliminates funding for AgFF, which received $24.000 million in FY 2015
- Restores $27.445 million for ERCs, which were eliminated in the FY 2016 presidential budget proposal.

- Eliminates funding for Healthier Workforce Center, which received $4.976 million in FY 2015 and the same funding in the FY 2016 PB
- Funds for repairing Lake Lynn facility can be used to acquire a replacement facility
- Continues a provision that permits CDC to transfer funds that are available for ILAs.
    - New provision rescinds unobligated carry-over balances from previous appropriations acts for ILAs
- Includes modified bill language directing funding from the NEF to be expended only by the NIH for carrying out section 301 and title *N* of the PHS Act with respect to biomedical research

Organizational and Personnel Announcements

- Angela Morley, JD, MPH, has joined the NIOSH Associate Director for Science Office, where she serves as Human Research Regulatory Administrator. She also chairs the NIOSH Institutional Review Board and directs the NIOSH Human Research Protection Program.
- Jon Szalajda has been selected as Deputy Director of NIOSH's National Personal Protective Technology Laboratory (NPPTL).
- Roger Rosa, long time BSC Executive Secretary and Designated Federal Official, has retired from NIOSH.
- Kathleen Kreiss, Branch Chief of the Field Studies Branch (Division of Respiratory Disease Studies), has retired.
- David Baden, former NIOSH Management Officer, has transferred to the CDC Office of the Chief Financial Officer.
- Maggie Ivory, after more than 40 years of service, has retired from the Division of Applied Research and Technology (DART).

Currently or Recently Available for Public Review and Comment

Open for Comment. Docket 288: **A Vapor Containment Performance Protocol for Closed System Transfer Devices Used during Pharmacy Compounding and Administration of Hazardous Drugs,** closes 11/19/2015**.** The purpose of the protocol is to test a closed system transfer device's (CSTD) capability to perform as a closed system during preparation of hazardous prescription drugs. During an evaluation of the protocol, registered pharmacists, familiar with the use of CSTDs, tested the protocol's prescribed compounding and administration tasks using five commercially available CSTDs. They also performed the assigned tasks using a negative control condition without a CSTD. Prescribed tasks were performed in a NIOSH-developed environmental test chamber with 70% isopropyl alcohol (IPA) as the challenge agent. A highly specific gas analyzer, with measurement capabilities specific to IPA and with a low limit of detection (LOD), was used to detect vapor concentrations of escaped IPA during the tasks. The protocol is not intended for CSTDs designed to operate using air-cleaning technologies. This protocol has multiple applications and can be used by manufacturers to evaluate prototype CSTDs, by consumers to compare CSTD products, or by jurisdictions wishing to adopt the protocol for a CSTD performance certification procedure.

Recently Closed. Docket 233-A: **NIOSH List of Antineoplastic and Other Hazardous Drugs in Healthcare Settings: Proposed Additions to the NIOSH Hazardous Drug List 2016**, closed 7/27/2015. The NIOSH Alert: "Preventing Occupational Exposures to Antineoplastic and Other Hazardous Drugs in Health Care Settings" was published in September 2004. This Alert contained Appendix A which was a list of drugs that were deemed to be hazardous and may require special handling. This list of hazardous drugs was updated in 2010, 2012 and 2014. For this update, NIOSH reviewed the recommendations of the peer reviewers and stakeholders and determined that 33 drugs, in addition to 3 drugs with manufacturer's warnings, had one or more characteristics of a hazardous drug and this list of 36 drugs was published for public comment.

Recently Closed. Docket 286: **Occupational Safety and Health Research and Related Activities; Administrative Functions, Practices, and Procedures; Removal of Part 80**, closed 09/14/2015. HHS promulgated Part 80 of Title 42 to facilitate Section 21(a)(1) of the Occupational Safety and Health (OSH) Act of 1970 (29 U.S.C. 670(a)(1)), which authorizes the Director of NIOSH to conduct educational programs to provide an adequate supply of qualified personnel to carry out the purposes of the OSH Act. Part 80 established tuition fees for such training, as authorized by 31 U.S.C. 483a (31 U.S.C. 9701, as revised by Pub. L. 97-258, September 13, 1982), which permits agencies to "prescribe

regulations establishing the charge for service or thing of value provided by the agency." In accordance with section 6 of Executive Order 13563, HHS conducted a retrospective analysis of its existing rules, determined Part 80 to be obsolete, and is proposing the removal of Part 80 from Title 42.

New Programs and Initiatives

- NIOSH Research Rounds Newsletter: In July, NIOSH introduced the new NIOSH Research Rounds newsletter. This monthly on-line bulletin summarizes selected research projects and products in lay language for stakeholders and the general public, supplementing our existing e-newsletter of record, NIOSH e-News.

- NIOSH announces a new digital publication product called "NIOSH eDoc," which presents workplace safety and health information in a way that is accessible and easy to use on any mobile device, desktop, or laptop computer. This addresses a need of stakeholders who expressed interest in a mobile-friendly format for NIOSH documents. The first NIOSH document to be available in the new eDoc format is Ergonomic Solutions for Retailers: Prevention of Material Handling Injuries in the Grocery Sector (NIOSH Publication No. 2015-100). This booklet for retailers and safety experts illustrates the use of mechanical assist devices for safer materials handling in grocery work. The NIOSH Web team is transitioning NIOSH topic pages (Web pages) to a new responsive design template that allows readers to access this information using various mobile devices such as tablets and smart phones. One resource that is being updated in this new template so that it will be more accessible to small business users is the NIOSH Small Business Resource Guide.

- Musculoskeletal disorders (MSD) account for approximately 35% of the lost-time injuries and illnesses in the workplace, costing over $15 billion per year and accounting for a significant portion of the overall national disabling injury burden. The Musculoskeletal Disorders Health and Safety Cross-Sector has adopted a more focused research approach to address these conditions through surveillance, effective interventions, and communication dissemination. Through a unique collaboration with the Ohio Bureau of Workers Compensation, NIOSH's Center for Workers' Compensation Studies, and NIOSH's Economic Research and Support Office, the MSD Health and Safety Cross-Sector will be able to bring an economic analysis component to its research. The program has just issued an internal funding announcement for FY16, FY17 and FY18 that is anticipated to develop small research projects from across the Institute addressing the revised focus previously mentioned. Dr. Stephen Hudock was named Manager of the MSD Health and Safety Cross-Sector, effective June 1st, 2015. Dr. Hudock received his Ph.D. In Interdisciplinary Engineering (specializing in Occupational Ergonomics) from Texas A&M University following a long-term training assignment. Dr. Hudock is also the Team Leader for the Human Factors and Ergonomics Research Team within DART.

- The CDC Foundation has established the Thomas R. Waters Memorial Scholarship for Ergonomics Research at the website: http://www.cdcfoundation.org/what/program/waters-scholarship. The fund is established in memory of Dr. Waters who passed away suddenly in October 2014. The fund will provide partial scholarships to graduate students conducting research in the area of human factors/ergonomics with an emphasis on occupational safety and health. The fund can accept both corporate and individual donations.

- NIOSH pilot-tested a new NIOSH internship program through the Oak Ridge Associated Universities (ORAU) known as the Collegiate Leaders in Occupational Safety and Health program. NIOSH/Cincinnati had seven interns through this 10-week program. Interns conducted or assisted in research projects in labs and offices in three NIOSH divisions. They participated in an orientation to NIOSH and a weekly seminar series with presentations by NIOSH researchers. The interns ended their program with a presentation of their work in a poster session, which they also presented during NIOSH Bring Your Child to Work day. NIOSH/Cincinnati is now working on an interagency agreement with ORAU to continue this program.

Upcoming NIOSH Publications

- Criteria for a Recommended Standard: Occupational Exposure to Heat and Hot Environments
- Criteria for a Recommended Standard: Occupational Exposures to Diacetyl and 2, 3-pentanedione
- Criteria for a Recommended Standard: 1-Bromopropane
- Current Intelligence Bulletin: Neurological Effects of Manganese Exposure to Welders
- NIOSH Current Intelligence Bulletin: Update of NIOSH Carcinogen Classification and Target Risk Level Policy for Chemical Hazards in the Workplace
- NIOSH/OSHA Hazard Alert: Health and Safety Risks for Workers Involved in Manual Tank Gauging and Sampling at Oil and Gas Extraction Sites

Recently Released NIOSH Publications

- Published a new ***Best Practices: Engineering Controls, Work Practices, and Exposure Monitoring for Occupational Exposures to Diacetyl and 2,3-Pentanedione***. Workers who handle diacetyl or work in areas where diacetyl exposure occurs are at risk of developing severe lung disease if their exposures are not properly controlled. NIOSH has developed guidance in a variety of areas to reduce workers' exposures to diacetyl through engineering controls, best work practices, and methods for monitoring airborne exposures. This document discusses engineering control approaches for a range of common production processes, including: weighing and handling of flavorings and flavoring ingredients; filling, mixing, and emptying flavor mixing tanks, and; loading and unloading of powder blenders. Twelve sketches showing the control approach and pertinent design criteria for each of these unit processes are included in the document which is available at: http://www.cdc.gov/niosh/docs/2015-197/default.html

- EID staff co-authored the joint NIOSH/ASSE document "Overlapping Vulnerabilities: The Occupational Safety and Health of Young Hispanic Immigrants in Small Construction Firms". This document was released at a press conference with both NIOSH and ASSE representatives for North American Occupational Safety and Health week in May, and has led ASSE to plan an intervention effort specifically aimed at improving workplace safety and health for workers who belong to multiple vulnerable groups. This report has been widely noted and well received.

- All 54 versions of the NIOSH-numbered documents for *Youth@Work-Talking Safety*, a foundational curriculum in workplace safety and health, are published to the NIOSH Website. The *Talking Safety* curriculum is aligned with the Common Core State Standards, the Common Career Technical Core, and the National Health Education Standards. It is customized for all U.S. states and territories. http://www.cdc.gov/niosh/talkingsafety/

- Five new NIOSH Skin Notation Profiles have been published. These documents provide information about the dermal hazard associated with chemical exposures.
  - Aldrin [CAS No. 309-00-2]
  - Aniline [CAS No. 62-53-3]
  - Capatfol [CAS No. 2425-06-1]
  - Dieldrin [CAS No. 60-57-1]
  - Dinitro-o-cresol [CAS No. 534-52-1]

- NIOSH Publication 2015-117 - The Hospital Respiratory Protection Toolkit was developed in collaboration with OSHA and the California Department of Public Health to assist hospitals in developing and implementing respiratory protection programs. https://www.osha.gov/Publications/OSHA3767.pdf
- NIOSH Publication 2015-201, "Reducing Musculoskeletal Disorders among Airport Baggage Screeners and Handlers," reports on two case studies that evaluated mechanical lift aids to determine if they could reduce the risk of work-related musculoskeletal disorders in airport baggage and screening. The devices reduced some physical WMSD risk factors such as hand loading and spinal compression force.

Other Recent NIOSH Publications

- NIOSH Training for Nurses on Shift Work and Long Work Hours. DHHS (NIOSH) Publication No. 2015-115.

- A Story of Impact: Measuring How Well Earplugs Work. DHHS (NIOSH) Publication No. 2015-181.
- Workplace Solutions: Reducing the Risk of Hearing Disorders among Musicians. DHHS (NIOSH) Publication No. 2015-184.
- Workplace Solutions: Reducing Hazardous Dust Exposure When Cutting Fiber-Cement Siding. DHHS (NIOSH) Publication No. 2015-185.
- Workplace Solutions: Reducing hazardous dust exposure when dowel drilling in concrete. DHHS (NIOSH) Publication No. 2015-200.
- Fleet Safety Fact Sheet: Freezer Longliners. DHHS (NIOSH) Publication No. 2015-238
- Fleet Safety Fact Sheet: Amendment 80 Factory Trawlers. DHHS (NIOSH) Publication No. 2015-237

Recently Published NIOSH Manual of Analytical Methods (NMAM):

The following methods have been published since May 2015

NIOSH 5100 Carbon Black
NIOSH 0501 Particulates Not Otherwise Regulated, Total
NIOSH 8322 Trichloroacetic acid in urine

Recent NIOSH Authored Journal Publications:
An update on the occupational exposure limit manuscripts that were presented at the May 2015 BSC meeting: This collection of ten manuscripts that reflect the state-of-the-science of NIOSH risk assessment, toxicology, and industrial hygiene regarding occupational exposure limits and the assessment and control of chemicals and other occupational hazards was submitted to the Journal of Occupational and Environmental Hygiene. Five of the papers are available online as e-pubs. The remaining papers are in the final stages of journal clearance for publication.

Dankovic DA, Naumann BD, Maier A, Dourson ML, Levy LS [2015]. The Scientific Basis of Uncertainty Factors Used in Setting Occupational Exposure Limits. Epub ahead of print.

DeBord GD, Burgoon L, Edwards SW, Haber LT, Kanitz MH, Kuempel E, Thomas RS, Berran Yucesoy B [2015]. Systems Biology and Biomarkers of Early Effects for Occupational Exposure Limit Setting. Epub ahead of print.

Deveau M, Chen C-P, Johanson G, Krewski D, Maier A, Niven KJ, Ripple S, Schulte PA, J Silk S, Urbanus JH, Zalk DM, Neimeier RW [2015]. The Global Landscape of Occupational Exposure Limits—Implementation of Harmonization Principles to Guide Limit Selection. Epub ahead of print.

Maier MA, Lentz TJ, MacMahon KL, McKernan LT, Whittaker C, Schulte PA [2015]. State-of-the-Science: The Evolution of Occupational Exposure Limit Derivation and Application. Epub ahead of print.

Wheeler M.W, Park R.M, Bailer A.J & Whittaker C [2015]. Historical context and recent advances in exposure-response estimation for deriving occupational exposure limits. Epub ahead of print.

Published an update on national silicosis mortality data and a companion NIOSH science blog:

- Mazurek JM, Schleiff PL, Wood JM, Hendricks SA, Weston A. Update: Silicosis Mortality — United States, 1999–2013 *MMWR* 2015; 64 (23) 653–654.
- Mazurek J, Weissman D. Silicosis Update NIOSH Science Blog. June 15, 2015. Available at http://blogs.cdc.gov/niosh-science-blog/2015/06/15/silicosis-update/

The data show that from 2011-2013, silicosis caused or contributed to about 100 deaths per year. From 2011-2013, twelve of these deaths were in people younger than 45 years of age.

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Cohen AL, McMorrow M, Walaza S, Cohen C, Tempia S, Alexander-Scott M, Widdowson MA [2015]. Potential Impact of Co-Infections and Co-Morbidities Prevalent in Africa on Influenza Severity and Frequency: A Systemic Review. PLoS One 10(6):e0128580 (June 2015).

DeBord DG, Burgoon L, Edwards SW, Haber LT, Kanitz MH, Kuempel ED, Thomas RS, Yucesoy B [2015]. Systems Biology and Biomarkers of Early Effects for Occupational Exposure Limit Setting. J Occup Environ Hyg epub ahead of print (July 2015).

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Vo, E., Zhuang, Z., Horvatin, M., Liu, Y., He, X., & Rengasamy, S. (2015). Respirator Performance against Nanoparticles under Simulated Workplace Activities. *Annals of Occupational Hygiene*, 1-10. doi:10.1093/annhyg/mev042.

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Science Blog Topics Since Last BSC Meeting

- NIOSH Travel Health and Safety Resource Kit for Workers with International Assignments
- September 11, 2015: Health Effects from 9/11: Lessons Learned
- September 8, 2015: Illustrating the Point: Choosing the Right ART for the Message

- September 7, 2015: Labor Day Message from NIOSH Director John Howard, M.D.
- September 4, 2015: N95 Day 2015: The Tools to Build a Culture of Proper Respiratory Protection Practices
- September 1, 2015: Protect Yourself at Work: A Series of print and Video Materials for Spanish-speaking Immigrant Workers
- August 28, 2015: Overlapping Vulnerabilities
- August 24, 2015: Palm Tree Worker Suffocated by Palm Fronds
- August 10, 2015: Improving the Safety and Health of Bosin Handlers
- August 7, 2015: Ergonomics Climate Assessment
- August 5, 2015: The NIOSH eDoc: New Way to Get NIOSH Information on the Move
- July 24, 2015: Workplace Medical Mystery Solved: Influenza-Like Illness Sickens Golf Course Worker
- July 22, 2015: NIOSH Research Highlights Importance of Rigorous Standards for Gowns used to Protect Healthcare Workers
- July 20, 2015: Workplace Medical Mystery: Influenza-Like Illness Sickens Golf Course Worker
- July 7, 2015: Turn It Down: Reducing the Risk of hearing Disorders Among Musicians
- July 2, 2015: Work, Stress, and Health: help Us Plan the Next 25 Years
- June 18, 2015: N95 Respirator Use During Pregnancy – Findings from Recent NIOSH Research
- June 16, 2015: A Joint Session of the NORA Manufacturing Sector and Services Sector Councils.
- June 15, 2015: Silicosis Update
- June 12, 2015: Workplace Medical Mystery Solved: Drum Maker Develops a Suspicious Rash
- June 8, 2015: Workplace Medical Mystery: Drum Maker Develops a Suspicious Rash
- June 1, 2015: Workplace Secondhand Smoke Exposure During Pregnancy: Who Is Protected?
- May 28, 2015: Respiratory Hazards from Latino Horse Farm Workers
- May 21, 2015: Cleaning for Asthma-Safer Schools Reduces Asthma Risk, Saves Money
- May 19, 2015: Collaboration with Wikipedia
- May 18, 2015: A Hard Day's Night: Training Provides Nurses with Strategies for Shift Work and Long Work Hours
- May 14, 2015: NIOSH, Nail Guns, and Consensus Standards: Where We Stand

Highlights from the NIOSH Divisions and Offices: Program and Research Pipeline

Office of Extramural Programs

Expansion of State Surveillance Programs
- The OSH state surveillance portfolio was re-competed and grew from 23 to 26 states
- Three new fundamental programs were added: Montana, Mississippi and Tennessee
- Three types of programs are supported: Fundamental (11), Fundamental Plus (8), and Expanded (7)

First two Workers' Compensation Surveillance Research Cooperative Agreements funded
- Massachusetts Department of Public Health: Maximizing Massachusetts Workers Compensation Data for Surveillance and Prevention
- California Public Health Institute: California Workers Compensation Surveillance

Extramural Research and Training Report for Fiscal Year 2013
- "NIOSH Extramural Research and Training Program: Annual Report of Fiscal Year 2013" released as DHHS (NIOSH) Publication No. 2015-196
- Available at the following website: http://www.cdc.gov/niosh/oep/

Nine Funding Opportunity Announcements Published/Underway/Planned
- Education and Research Centers (published 21 July 2015)
- Training Project Grants (TPGs) (expected September 2015)
- Centers for Agricultural Safety and Health -- Cooperative Agreements (expected September 2015)
- Centers of Excellence for Total Worker Health® -- Cooperative Agreements (expected September 2015)

- National Mesothelioma Virtual Bank for Translational Research -- Cooperative Agreement (expected November 2015)
- Cooperative Research Agreements Related to the World Trade Center Health Program (pending re-authorization of Zadroga Act)
- Extension of the World Trade Center Health Registry -- Cooperative Agreement (pending re-authorization of Zadroga Act)
- Small Research Grant Program, R03 (update, re-issue)
- Exploratory/Developmental Research Grant Program, R21 (update, re-issue)

Next Phase of Interdisciplinary Research and Training in Global Environmental and Occupational Health (GEOHealth)

- NIOSH partnership with Fogarty International Center supports linked GEOHealth awards for 7 paired US institutions and foreign institutions in Low or Middle-Income Countries (LMICs)
- Awards to be made by Fogarty International Center in FY2015
- NIOSH participated in development of the paired funding opportunity announcements, nominated peer reviewers, and participated in secondary review.

Education and Information Division

- The NIOSH Nanotechnology Research Center and the SUNY Poly Colleges of Nanoscale Science and Engineering announced the launch of the Nano Health and Safety Consortium at a special White House forum sponsored by the National Economic Council and White House Office of Science and Technology Policy. The forum discussed small business challenges to commercializing nanotechnology, with an emphasis on how collaborations and partnerships (including public-private partnerships) can help overcome those challenges. The consortium will initially operate within the new SUNY Poly network of campuses and sites across the state.

- The NIOSH Nanotechnology Center provided strategic support to the NNI-CPSC co-sponsored workshop on "Quantitative Exposure to Engineered Nanomaterials" (QEEN). NIOSH scientists served as workshop co-chairs, developed a plenary presentation, and participated on an expert panel on 'Exposure Science in the 21st Century'.

- Collaborated with the Oklahoma Department of Labor on the next steps for implementing Oklahoma Senate Bill 262, which requires workplace safety and health training on the NIOSH Talking Safety curriculum for all 7th to 12th graders in the State.

- Issue 3 of the Wholesale and Retail Trade Council Sector Bulletin newsletter was published and released to stakeholders, July 2015.
  http://www.cdc.gov/niosh/programs/wrt/bulletins/WRTSectorCouncilBulletinW3-2015-07-02.pdf

Division of Respiratory Disease Studies

- Continued implementation of health surveillance for surface coal miners as mandated by recent MSHA regulations. From June 23–July 29, 2015 outreach efforts to surface mining regions in the West using a mobile medical unit provided services including digital radiographs and spirometry at 19 different sites in 6 northwestern states (North Dakota, Montana, Wyoming, Colorado, Utah, and Nevada). Medical surveillance was provided to a total of 1,018 surface and underground coal miners. Also continued efforts to add personnel and infrastructure to support expanded surveillance requirements over time.

- Initiated a NIOSH Health Hazard Evaluation in response to a request from a coffee roasting and processing plant to evaluate concerns about potential worker exposure to diacetyl and 2,3-pentanedione during the coffee roasting process. An initial industrial hygiene survey was performed to collect personal and area air samples, bulk samples, and conduct an assessment of ventilation. Analyses are pending.

Division of Surveillance, Hazard Evaluations, and Field Studies

- The work of several NIOSH Divisions (especially DRDS and DSHEFS) has played an important role in assisting OSHA to move ahead with the recently released proposal for a beryllium standard, which is based on consideration of risks for both chronic beryllium disease and lung cancer. The standard is based to a significant degree on collaborative research to prevent beryllium sensitization and chronic beryllium disease conducted by investigators based in DRDS and the Materion Corporation.

- A report titled "The National Institute for Occupational Safety and Health Workers' Compensation Leaders Research Colloquium, December 11, 2014: Proceedings" has been released and is available on the NIOSH website. These conference proceedings summarize key points made at the NIOSH Workers' Compensation Leaders Research Colloquium. The goal of the colloquium was to elicit input from thought leaders and key stakeholders in the occupational safety and health and workers' compensation communities to help NIOSH's Center for Workers' Compensation Studies (CWCS) maximize the impact of its research activities. We expect this document will help NIOSH in setting strategic priorities for CWCS and will be of interest to members of the researcher and practitioner communities. The document is published by RAND; there is a link to the document on the NIOSH website.

Division of Applied Research and Technology

- NIOSH researchers are working with an Institut National de Recherche et de Securite (INRS)-led adhoc group Bitumen fumes / aerosols ISO/TC 195/WG 9 ISO 20500 Mobile Road Construction Machinery - Safety. The ad hoc group is interested in adopting the NIOSH-developed tracer gas testing protocol for asphalt fume engineering controls (NIOSH publication number 97-105) into a proposed draft ISO standard for mobile road construction machinery. NIOSH staff have been to Nancy, France to assist the group in applying the necessary revisions to the NIOSH-developed protocol required due to changes in French paver designs. NIOSH staff also visited the INRS facility in June to help conduct tracer gas testing on an 18.5 ton Atlas Copco/Dynapac model SD2500CS paver finisher. A demonstration of the method was performed for the 15 member workgroup on the European paver to accommodate design differences between European and US pavers. Work was done to adapt the NIOSH test procedures for the European Normative format. The workgroup also made plans to agree on a finalized format of the WG 9 document at a final work group meeting scheduled for February 2016 in Paris, France.

- DART/BHAB brought a portable field laboratory online this summer to support NIOSH field studies. The DART portable field laboratory is a heavy-duty, climate controlled 7 x 12 foot trailer that can run on either generator or shore-line power. It is used to transport field equipment including field portable gas chromatographs, direct reading instrumentation, and when on location, provides an enclosed weather-tight space for on-site sample analysis, as well as environmental and biological sample preparation, collection and handling. This summer the portable field laboratory has been used on field studies in the oil and gas industry in Arkansas, Montana, North Dakota, Pennsylvania and West Virginia and in association with DSHEFS/IWSB will soon be used to support studies to assess worker exposures to coal-tar volatiles during asphalt sealant application in Indiana, Minnesota, Kentucky and Ohio.

- The NIOSH Center for Direct Reading and Sensor Technologies hosted two seminars this summer. The first seminar was Dr. William Mills of the University of Northern Illinois. Dr. Mills presented a lively seminar entitled "Real-time Detection Systems: Application Examples and Reflections on Challenges and Opportunities." The second seminar was presented by Dr. Kim Anderson of Oregon State University who presented "Passive Wristband Sampler Technology Used to Build Bridges: Pilot Study Examples."

Division of Safety Research

- The NIOSH ladder safety smartphone app, NIOSH's 1st such app, has received another accolade; NIOSH researchers received a merit award from the 2015 Digital Health Awards. In addition to awards, this popular

app, designed to enable an individual to check the positioning of an extension ladder for the optimal angle for safety, continues to be well-received by users. As of July 31, the app has been downloaded almost 44,000 times.

- Following its publication as a NIOSH document in late 2014, information from Law Enforcement Officer Motor Vehicle Safety: Findings from a Statewide Survey is being disseminated to stakeholders. Two articles have recently been published in trade journals designed to reach law enforcement management: Research in Brief: Motor Vehicle Safety for Law Enforcement Officers--- Still a priority in the July issue of the journal *Police Chief*, and Law Enforcement Officers' Risk Perceptions toward On-duty Motor-Vehicle Events in the July-September issue of *Policing: An International Journal of Police Strategies & Management*. These are in addition to a fact sheet for patrol officers published earlier this year: Take Charge of Your Safety In and Around Your Patrol Vehicle.

National Personal Protective Technology Laboratory (NPPTL)

NPPTL is leading the national efforts to bring the science to the standards to address research and standards development gaps identified through the Ebola response.

- NIOSH is collaborating with USAID and OSTP on President Obama's Ebola Grand Challenge to help healthcare workers, both domestically and internationally, provide better care and stop the spread of Ebola. Our focus is on bringing science to PPE standards and guidance documents by (1) studying the rates of change in core body temperature and postural stability while wearing Ebola PPE in different environmental conditions (e.g., heat and humidity) and lengths of time; (2) assessing strategies (e.g., cooling vests, novel barrier materials, etc.) to reduce the potential for heat injuries while wearing Ebola PPE in hot, humidity environments; and (3) developing or validating test methods to measure the ability of barrier materials (e.g., gowns and coveralls) to resist penetration of viruses and bodily fluids under a wide range of conditions. Lastly, we will work with our partners to use these research findings to develop performance standards for the types of medical PPE where no widely-accepted standards currently exist (e.g., isolation gowns, surgical head covers, aprons, boot covers, interface regions between the glove and gown). A recent example of this is a research project done in collaboration with ASTM F23 committee to develop an improved isolation gown standard. As discussed in a recent NIOSH science blog, 22 models of isolation gowns from 6 different manufacturers were evaluated for a variety of performance requirements. Of the 20 models that make AAMI PB70 standard liquid barrier performance claims, only 13 of them were found to pass the test requirements. This finding, along with other research, has led to isolation gown product changes, modification of CDC Ebola PPE guidance to now recommend 3rd party testing of gowns and coveralls, and proposed improvements in how FDA clears isolation gowns for sale in the United States.

- NPPTL is collaborating with Vanderbilt University to develop a National PPE monitoring system. The objective is to establish a national system to monitor usage and training for PPE used to protect against the Ebola virus based or a national emergency based on current CDC recommendations. The contract for the three year project was awarded in August 2015.

Participation and leadership in National and International consensus standards to date for calendar year 2015 have resulted in the following accomplishments:

- The NFPA Technical Committee on Emergency Medical Services Protective Clothing and Equipment completed an emergency revision to the NFPA 1999 Standard on Protective Clothing and Ensembles for Emergency Medical Operations. This addressed performance criteria and certification for "single-use" and "multi-use" ensembles providing body protection from air-borne and liquid-borne pathogens.

- The InterAgency Board (IAB) developed and released the "Recommendations on Selection and Use of Personal Protective Equipment for First Responders against Ebola Exposure Hazards." NIOSH/NPPTL had a lead role in this process as the Federal Co-Chair of the IAB Equipment Subgroup.
- The NIOSH-NFPA Memorandum of Understanding (MOU) partnership agreement has been updated and will be signed by Director NIOSH and NFPA President and CEO on September 23rd, 2015 for another five year period of performance.
- NPPTL researchers are assisting the ASTM International Committee F23 on Protective Clothing and Equipment the review and modification of the Standard Test Method for Resistance of Materials Used in Protective Clothing to Penetration by Blood-Borne Pathogens Using Phi-X174 Bacteriophage Penetration and the Standard Test Method for Resistance of Materials Used in Protective Clothing to Penetration by Synthetic Blood.

The National Framework for Personal Protective Technologies – A Conformity Assessment Infrastructure Document, the output from nearly five years of the PPE Conformity Assessment Working Group activities, is undergoing peer review and when published will provide guidance for developing, structuring, and managing conformity assessment (CA) of personal protective technologies (PPT) in the United States. The recommendations and guidance in this document are intended to serve as foundational principles for various types of conformity assessment programs for occupational PPT. NIOSH has partnered with ASTM to develop a new practice guide to help users manage risks to wearers of potentially non-conforming PPE. The practice will set specific criteria for defining hazards based on risk assessment for which the end product specifications are written. It will define options for conformity assessment consistent with the National Framework to manage the defined hazards and risk to wearers of the PPE.

So far for calendar year 2015, 263 respirator approval decisions have been completed and 570 new approvals for respiratory protective devices have been issued. Notable accomplishments this year include a new NIOSH approved PAPR manufactured by Syntech International meets the ASTM barrier penetration requirements. Additionally, two CAP 1 Closed circuit escape respirators (CCER) for non-mining applications and one CAP 1 CCER for mining applications were approved this calendar year.

NIOSH collaborated with The Joint Commission to develop the following document to provide organizations examples, strategies, and resources to develop effective respiratory protection programs. The Joint Commission Monograph titled Implementing Hospital Respiratory Protection Program Strategies from the Field was developed to help protect workers from exposure to all types of respiratory hazards in hospitals and health care organizations. Available at http://www.jointcommission.org/topics/monographs_and_white_papers.aspx

Emergency Preparedness and Response Office

NIOSH continues to contribute to CDC activities related to the Ebola response. Staff continue to deploy to West Africa to support international efforts to get to zero cases. Domestically, NIOSH staff participate on hospital assessments for Ebola readiness. NIOSH staff contributed to updating previously issued guidance on PPE for healthcare workers treating Ebola patients. The updated guidance was released in August and provides more detailed information on PPE type and rationale for respiratory protection. The guidance is titled "Guidance on Personal Protective Equipment (PPE) To Be Used By Healthcare Workers during Management of Patients with Confirmed Ebola or Persons under Investigation (PUIs) for Ebola who are Clinically Unstable or Have Bleeding, Vomiting, or Diarrhea in U.S. Hospitals, Including Procedures for Donning and Doffing PPE" and can be found at http://www.cdc.gov/vhf/ebola/healthcare-us/ppe/guidance.html

Social Presence Statistics

NIOSH continues to expand its presence on social networks.

Social Media and Public Outreach Accounts and Services	August 2014	August 2015
Facebook	51,345	96,926

Twitter	277,777 (July 31, 2014)	14 accounts, total of 381,299 followers
Instagram	Launched in Spring 2015	181 followers, 70 posts
YouTube		1,081 subscribers, 301,131 views 147 videos/clips
Pinterest		37 pins to CDC's Workplace Safety and Health Board which has 3100 followers
Flickr		258 images, 104 followers
Website Views	1,463,452 views/clicks (July 2014)	1,450,549 views/clicks (July 2015)
eNews Subscribers	51,696	58,205
TWH Newsletter Subscribers	55,483	62,072
Research Rounds Newsletter	Launched July 2015	57,747
Science Blog	25556 views	28424 views

Awards

- The NIOSH Nanotechnology Field Research Team received the 2015 Edward J. Baier award for Technical Achievement from the American Industrial Hygiene Association. The field team was created to fill a critical knowledge gap regarding worker exposure at a time when very little was known. Over the course of their investigations, the team developed a process that is used globally as a key component in understanding worker exposure to engineered nanomaterials. The team has conducted over 100 visits to 65 different sites since being formed in 2006.
  The American Industrial Hygiene Association (AIHA) announced the addition of 12 new distinguished Fellows, including Martha A. Waters, Senior Research Health Scientist in DART. Fellows are nominated by a local section, special interest group, committee, or other formal AIHA entity, for their achievement in the field of industrial hygiene. Individuals are approved as Fellows by the AIHA Board of Directors after a recommendation by the Awards Committee. She was nominated by the Ohio Valley Local AIHA section and received this notable honor at the June 2015 AIHCE meeting in Salt Lake City, Utah.

- NIOSH was selected as a winner in the 17th annual Digital Health Awards(SM) program this year. This competition recognizes the world's best digital health resources for consumers and health professionals, and recognized NIOSH's Ladder Safety app for a Merit Award in the mobile application category. The Digital Health Awards (SM) program holds a competition twice each year, during the spring and fall months. For Spring 2015, they gave the Merit Award to NIOSH and the production and design team of the Ladder safety app, housed within NIOSH's Division of Safety and Research (DSR): Peter Simeonov, Ph.D., Hongwei Hsiao, Ph.D., and John Powers.

Certification Statement

I hereby certify that, to the best of my knowledge and ability, the foregoing minutes of the September 22, 2015, meeting of the NIOSH Board of Scientific Counselors, CDC are accurate and complete.

Date

M.E. Bonnie Rogers, MPH, DrPH, COHN-S
Chair, NIOSH Board of Scientific Counselors