

**DEPARTMENT OF HEALTH AND HUMAN SERVICES
NATIONAL INSTITUTES OF HEALTH
NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES**

**MEETING SUMMARY OF THE
NATIONAL ADVISORY ENVIRONMENTAL HEALTH SCIENCES COUNCIL**

June 24, 2026

The 178th meeting of the National Advisory Environmental Health Sciences Council convened on June 24, 2026. Open session convened at 9:00 a.m. EST and adjourned at 3:34 p.m. EST on June 24, 2026. A closed session took place from 3:45 p.m. EST to 4:27 p.m. EST on June 24, 2026. Dr. Walsh, Director, NIEHS, presided as chair. The meeting was hybrid. Participants attended either in-person or via MS Teams. All Council members attended via MS Teams. The meeting was also webcasted to the public.

Participating Council Members

Yulia Iossifova Carroll, MD, PhD (*ex officio*)
Stephania Cormier, PhD
Jason Aungst, PhD (*ex officio*)
J. Timothy Greenamyre, MD, PhD
Maureen Gwinn, PhD (*ex officio*)
Patricia Nez Henderson, MPH, MD
Darryl B. Hood, PhD
Keri Hornbuckle, PhD
Cathrine Hoyo, MPH, PhD
Gökhan M. Mutlu, MD

NIH Staff

Lisa Marie Adiaba
Irina Alva-Weinstein
Trevor Archer
Camilo Asuncion
Jennifer Baker
David Balshaw
Valerie Bartlett
Sharon Beard
Abee Boyles
Danielle Carlin
Toccaro Chamberlain
Jennifer Collins
Christopher Duncan
Anika Dzierlenga

Kim Gaetz
Amanda Garton
Kimberly Gray
Jenny Greer
Michelle Heacock
Heather Henry
Jonathan Hollander
Michael Humble
Bonnie Joubert
Cindy Lawler
Jacqueline Marzec
J'Ingrid Mathis
Aubrey Miller
Alison Motsinger-Reif
Srikanth Nadadur
Liam O'Fallon
Heather Patisaul
Amelia Pearson
Eric Persaud
Clark Phillips
Ashlinn Quinn
Lingamanaidu Ravichandran
Thaddeus Schug
Carol Shreffler
Claudia Thompson
Brittany Trottier
Kyle Walsh
Courtney Wimberly
Alicia Zorn
Darryl Zeldin

Members of the Public Present – During Open Session Only

Chirag Patel, Harvard Medical School

OPEN SESSION

The meeting was open to the public on June 24, 2026 from 9:00 a.m. EST to 3:34 pm EST. In accordance with the provisions set forth in Section 552b(c)(4) and 552b(c)(6), Title 5, U.S. Code and Section 10(d) of the Federal Advisory Committee Act, as amended (5 U.S.C. Appendix 2), the meeting was closed to the public on June 24, 2026 from 3:45 p.m. EST to 4:27 p.m. EST for consideration of grant applications and Board of Scientific Councilors reports. Notice of the meeting was published in the *Federal Register*. Dr. Kyle Walsh presided as Chair and Dr. David Balshaw served as the Designated Federal Officer for the meeting.

I. Call To Order and Opening Remarks

The National Institute of Environmental Health Science (NIEHS) and National Toxicology Program (NTP) Director, Dr. Kyle Walsh, welcomed attendees and called the meeting to order. He read the Sunshine Act. The Division of Extramural Research and Training (DERT) Director, Dr. David Balshaw, asked Council members to introduce themselves. Council members Dr. Olivier Deschenes and Maria Savasta-Kennedy were unable to attend. Members of the NIEHS senior leadership team introduced themselves. Dr. Balshaw then reviewed the logistics for the meeting and read the conflict-of-interest statement.

II. Review of Confidentiality and Conflict of Interest

Dr. David Balshaw read the conflict-of-interest statement. "This certifies that in the review of applications or projects conducted by the National Advisory Environmental Health Sciences Council on today's date, I absented myself and I did not participate in the discussion of, nor vote on, any applications or projects in which I or, to my knowledge, my spouse, minor child, or close professional associates have a financial interest nor on any applications or projects from an organization or institution where I am an employee, consultant, officer, director, or trustee, am negotiating for employment, or otherwise have a financial interest. In Council actions in which we voted on a block of applications or projects without discussing any individual one—the 'en bloc' actions—my vote did not apply to any applications from any institution fulfilling the criteria in the preceding paragraph." Members should sign the certification and email it to Valerie Bartlett today if they have not already done so.

III. Consideration of March 2026 Meeting Minutes

Approval of the March 2026 meeting minutes was moved for by Dr. Darryl B. Hood and seconded by Dr. Keri Hornbuckle. Council voted to approve the minutes, with all in favor.

IV. Report of the NIEHS Director

Dr. Kyle Walsh briefed Council on Institute developments that have occurred since the March 2026 Council meeting.

Dr. Walsh began with an update on the NIEHS budget. He presented a slide showing the NIEHS fiscal year (FY) 2025-2027 Funding Summary noting the House mark for FY 2027 is the exact same amount as the FY 2026 enacted budget. The Institute is waiting for Congress to finalize the budget for FY 2027. He also addressed the FY 2027 President's budget proposal, which includes a proposed HHS reorganization. This

would move NIEHS to the Centers for Disease Control and Prevention to become part of a new National Center for Chemicals and Toxins. However, the FY 2027 House mark retains NIEHS within the National Institutes of Health (NIH). Finally, he announced that the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs were reauthorized through FY 2031. NIH released new SBIR and STTR Parent Notice of Funding Opportunities (NOFOs) with the next application due date being September 8, 2026.

Next, Dr. Walsh presented the NIEHS research areas of emphasis from the current Strategic Plan. He explained that last Council he highlighted health effects of extreme weather and environmental health disparities. Today, he will provide updates on mechanistic biology and toxicology. The NIEHS Division of Translational Toxicology (DTT) recently compared glyphosate, glyphosate metabolites, and 13 glyphosate-based formulations in liver and human skin cell new approach methodologies (NAMs) systems. They observed that glyphosate alone showed weak and inconsistent activity for oxidative stress and DNA damage, even at high exposure levels. However, several glyphosate-based formulations produced stronger signs of oxidative stress and DNA damage. This suggests that potential toxicities that people may be concerned about with regards to glyphosate could potentially be driven less by glyphosate itself and more by the surfactants and other things that are part of the formulations.

Dr. Walsh provided an update on the Tox21 program. He explained there have been three phases of the Tox21 program to modernize how we evaluate chemicals using high throughput modalities, generating large amounts of data quickly across compounds that are pharmaceuticals, industrial chemicals, and environmental exposures. The program is now heading towards a fourth phase. A strategic planning workshop was held in May bringing together about 50 representatives from the Tox21 partners.

He also provided updates to Council on the NIH Common Fund Complement Animal Research in Experimentation (Complement-AIRE) program, which is jointly led by NIEHS and NCATS. A kickoff meeting was held in May, with focus on the consortium structure, governance, scientific priorities, opportunities for impact, and planning for future consortium meetings. The Technology Development Centers and NIH Challenge awardees will provide data to the New Approach Methodologies (NAMs) Data Hub and Coordinating Center (NAMHub). The NAMhub will coordinate with the Validation and Qualification Network, which is financially supported by the Foundation for the National Institutes of Health.

Dr. Walsh congratulated the winners of the Technology Development Center awards. He noted one of the technology development centers is a collaboration between

investigators at NIEHS and NCATS. They are developing an integrated multi-organ platform of 3D micro tissues designed to model and understand interindividual drug susceptibility to different fibrotic pathologies. This will support a comprehensive center to generate and integrate multi-omics data from a platform of in vitro fibrotic organoid models to look at fibrosis in the lungs, liver, skin, and uterus.

Next, Dr. Walsh provided updates on how NIEHS is using artificial intelligence (AI) in data science to accelerate discovery in toxicology and environmental health research. NIEHS recently hired several intramural staff in data science areas that span modern AI areas, including agentic systems, AI-centric information technology, large language models, predictive modeling, as well as geospatial modeling. DTT is using a ToxPipe agentic AI ecosystem that combines specialized toxicology tools and databases with commercial and open AI models. This allows scientists to ask domain-specific questions in plain language to run toxico-informatic workflows and receive tailored output. NIEHS is also partnering with national labs and industry on AI methods. For example, the Oak Ridge National Laboratory partnership is developing geospatial foundational models for the Health and Extreme Weather Program. NIEHS is also funding biomedical knowledge bases that are increasingly being integrated with and used to leverage AI.

Extramural funding of data standards has also begun. Examples include the Mixtures Methods Roadmap, Zebrafish Information Network, and collapsible kernel machine regressions. Extramural data science capacity building is also happening through the NIEHS Superfund Program and Health and Extreme Weather Program. These programs provide researchers with training modules, data resources, and analytic tools to apply complex environmental health data to health research questions. Additional NIEHS extramural investments are being made through the NIH Data Repositories and Knowledgebases Program, which is a collaborative partnership between the NIH Office of Data Science Strategy and 17 participating Institutes and Centers (IC). The program supports investigator initiated and sustainable data repository and knowledge base development driven by critical research needs and IC specific missions. Lastly, NIEHS is currently supporting five R24 awards accelerating community-driven data and metadata standards, advancing fair data practices, and disseminating data for broader use and reuse across NIEHS and NIH supported research.

Following the AI discussion, Dr. Walsh provided an update on the NIEHS Personalized Environment and Genes Study (PEGS) led by Dr. Alison Motsinger-Reif and Dr. Lawrence Kirschner. Dr. Motsinger-Reif will talk about PEGS and how genes, environment, and health can be studied, understood, and integrated from a research framework across the PEGS and *All of Us* cohorts today. NIEHS partnered with the *All*

of *Us* program to identify environmental risk factors and biomarkers associated with type 2 diabetes. The data will become publicly available in the future.

Dr. Walsh went on to provide brief programmatic highlights. Currently, NIEHS has led three Highlighted Topics and signed-on to eleven Highlighted Topics led by other ICs. There is ongoing discussion on how to measure the efficacy of highlighted topics in driving applications.

Dr. Walsh provided updates on NIEHS hiring, noting that 53 of the 74 position requests have been posted for hiring. These include both administrative and scientific positions. Two of which are new tenure-track investigator positions in the Reproductive & Developmental Biology Branch and Epidemiology Branch. There are also new staff scientist positions in DTT, one focused on developmental neurotoxicity and the other on immunotoxicology.

Dr. Walsh congratulated Dr. David Balshaw, who received the Distinguished Leadership Award at the Bordeaux Exposome Symposium. He also highlighted two NIH Office of AIDS Research Innovation Award winners. Dr. Jeannine Santos and her team are developing a NAM to serve as a first-line screening platform that will be used to assess both approved and emerging antiretroviral combinations for placental and cardiac toxicity. The second group is focused on reprogramming HIV to deliver immune protection. Finally, Dr. Walsh congratulated the NIH Director's Award recipients: Dr. Clarice Weinberg, Dr. Alan Jarmusch, and the Study of Environment, Lifestyle, and Fibroids Research Team. The team received this award for their women's health research focused on the incidence, etiology, and consequences across the lifespan of uterine fibroids.

Dr. Walsh ended his presentation by thanking current Council members and ex officio members for their service. He acknowledged that NIEHS is working on new Council slates and welcomed Jason Aungst as the newest ex officio member.

V. Report of the DERT Director

Dr. David Balshaw began his presentation to Council about DERT developments since the March 2026 Council meeting with a staffing update. Dr. Balshaw announced that Fred Tyson retired after 35 years at NIEHS. He joined DERT in 1998 and led many programs that had a vital impact on NIEHS' science. Sharmice Outen departed DERT in May. He welcomed new DERT employee Kim Gaetz, a Health Specialist within the Worker Education and Training Branch. He also announced several staff promotions. Clark Phillips was promoted to a Supervisory Grants Management Officer and Team

Lead position. Jennifer Baker and Joel Collinson were both promoted to Administrative Officer positions.

Next, Dr. Balshaw presented a line graph showing the cumulative NIEHS awards distributed by month from FY22 – FY26. He explained that over the last several years DERT has prioritized getting awards out earlier, with FY22 serving as a historical reference line. The pace of awards increased in FY23 and FY24. There were some periods of slowdown in FY25 due to the funding freeze, but DERT was able to issue all awards. This fiscal year, DERT was unable to issue awards during the government shutdown from October to mid-November. There was another slowdown in February with money coming available from the Office of Management and Budget and NIH Budget Office, but since then DERT has increased the rate of getting awards out. DERT is currently on pace to issue all anticipated awards by end of the fiscal year.

Dr. Balshaw went on to highlight the NIH website changes to how grant information is being shared with the public and applicants. The new grants.nih.gov website houses all extramural grant information for each of the 27 institutes and centers at NIH. All extramural information will now be found on this centralized website. He walked through how to get to the NIEHS specific page within the grants.nih.gov website and gave an overview of the information listed on the NIEHS page. The section titled “Additional Information by Funding Category” breaks down every aspect of NIEHS’ funding portfolio. It is critical to look at this information and reach out to your Program Officer as you put your application in.

Dr. Balshaw discussed policy changes and updates. A list of all NIH policy changes can be found on grants.nih.gov. The NIH Guide is no longer listing NOFOs as they are released. NOFO information is now listed on grants.gov. Fourteen policy updates have come out since the last Council meeting. Dr. Balshaw highlighted a few of particular importance. NIH’s definition of intervention within a clinical trial has been brought in line with the 2018 Common Rule (45 CFR 46, Subpart A [Protection of Human Subjects]). This does not change the definition of a clinical trial itself. NIH has also changed the definition of Basic Experimental Studies in Humans (BESH) to no longer be clinical trials by default. BESH applications submitted after May 25, 2026 are no longer considered clinical trials. Next, while the definition of foreign components has not changed, there is now a default assumption that if awardees publish with foreign scientists it will be considered a foreign component of a grant and should be disclosed. The use of Common Forms are required for all applications submitted on or after May 8, 2026. The modifications of peer review practices will continue for the October Council round. Effective, June 1, 2026 prior approval of changes for domestic subawards must come through the new prior approval module. The revised NIH Grants Policy Statement and Notice of Legislative Mandates for FY 2026 were released. Lastly, there are two

requests for information that are open for public comments. A proposal to cap the number of simultaneous research project grants per principle investigator, and a request for information on measuring and rewarding scientific impact.

Dr. Balshaw ended his presentation by sharing DERT programmatic updates. The Superfund Hazardous Substance Research and Training Program (P42) NOFO has been published on grants.gov. Applications are due September 25, 2026. Staff held an informational webinar at the beginning of June and the link to the recording is available on the presentation slides. He announced the FY 2026 class of the NIEHS Revolutionizing Innovative, Visionary Environmental Health Research (RIVER) awardees. The Worker Training Program engaged in disaster response for the severe storms and flooding in New Mexico along with Federal partners and grantees. The Superfund Research Program shared advances from the MIT Center on “Unraveling the Cancerous Effects of NDMA” and a small business grantee that has developed filter technologies to remove PFAS from water. Lastly, Dr. Balshaw highlighted several upcoming conferences and trainings that DERT will be participating in this summer. The Worker Training Program is attending a worker safety and health tech conference. They will also be holding a webinar on job training, worker safety, and community revitalization. DERT is contributing to a trans-NIH workshop on microplastics in July. Finally, a NIEHS Core Centers P30 grantee meeting will be held in September.

VI. Break

VII. From PEGS to All of Us: Genes, Environment, and Health Across Two Cohorts

Dr. Darryl Zeldin introduced Dr. Alison Motsinger-Reif, Branch Chief and Senior Investigator of the Biostatistics and Computational Biology Branch at NIEHS. Dr. Motsinger-Reif explained her presentation will focus on the data her groups have collected and what they are doing with the data from two cohorts, the Personalized Environment and Genes Study (PEGS) and the NIH *All of Us* Research program.

Dr. Motsinger-Reif began by thanking her team for their work and providing a brief background on the Personalized Environment and Genes Study (PEGS). PEGS is a North Carolina based cohort that started in the early 2000s as a registry of participants that were willing to help researchers at NIEHS. It has evolved to about 20,000 total PEGS participants, and they keep in regular contact with 10,000 to 11,000 participants currently. They have whole genome sequencing data and epigenetic chip data. They also have phenotype data from self-reported surveys and they have a number of exposures, many from surveys they collect, as well as geospatial linkages.

Dr. Motsinger-Reif provided a few snapshots of the PEGS cohort. She explained there is diversity across education status and income. About 63% have European ancestry and about 28% have African American ancestry with more females than males represented. Self-reported diseases are proportional to the general population. This data is collected via three different surveys: a health and exposure survey, and external and internal exposomics surveys. Across these three surveys participants answer 1,700 questions providing a variety of data on their health and environmental exposures.

Dr. Motsinger-Reif went on to provide several examples of how her team is using PEGS data to carry out studies. One of the first PEGS studies looked for gene environment interactions based on how far a participant lived from caged animal feeding operations in North Carolina. They have also used PEGS data to do genetic discovery associated with gestational hypertension and a separate study looking at adult-onset asthma. They have used their broad number of survey questions to do an Exposome Wide Association Study (ExWAS) of cardiovascular diseases and looked at high prevalence traits such as hypertension and diabetes. All of the results from their ExWAS studies are available on the NIEHS website at <https://pegsexplorerer.niehs.nih.gov/>. The next set of results that will be posted come from their geospatial exposure studies.

Dr. Motsinger-Reif's lab is currently looking at exposures and polygenic scores to build polyexposure scores. They have found that these polyexposure scores identify at-risk populations in high prevalence diseases. In their continued commitment to data sharing, Dr. Motsinger-Reif and her group launched a Dream Challenge using PEGS data. Dream Challenges are publicly open Sage BioNetworks in collaboration with the University of Washington Seattle. A manuscript describing the experience is currently under review. Ongoing work includes expanding the ExWAS studies to their geospatial data, performing epigenetic-wide association studies, and expanding their polyexposure score work.

Next, Dr. Motsinger-Reif shifted her presentation to discuss ongoing work with the *All of Us* Research program. *All of Us* is a United States study with over 850,000 participants currently. She is leading two partnered research studies. One on exposomics, which is a case cohort study focused on diabetes, and the other on environmental exposures and occupational health.

In 2022, NIEHS held a joint workshop with the *All of Us* program where they developed a three-phase approach to integrate environmental data into the *All of Us* data. Phase one and two focused on geospatial linkages and phase three was a pilot study using the biospecimens to look at exposures. For phase one and two Dr. Motsinger-Reif worked with the Connecting Health Outcomes Research Data System that focuses on building

software and computational tools to do geospatial linkages. One of the first products from this is a software package, called Amadeus, that lets you use 16 different national and international data sets. The *All of Us* program is currently using this software to generate linkages with these data sets. Dr. Motsinger-Reif's group has been using one of the Amadeus data sources to look at associations with wildfires and are currently drafting a paper on association with different diseases and wildfire smoke.

In the exposomics partnered research study, Dr. Motsinger-Reif's group recently received a very large metabolomics exposomics data set. They are starting to do analyses in the context of diabetes and looking at the heterogeneity of chemical exposures across the US by different demographics. They estimate the data will be publicly available via the *All of Us* website by early 2027. For the environmental exposures and occupational health partnered research study they are in the process of finalizing their questionnaires on residential and occupational exposures. The plan is to launch them to the *All of Us* participants in November 2026. Dr. Motsinger-Reif ended her presentation with acknowledgements to PEGS participants and collaborators across her work with PEGS and the *All of Us* program.

VIII. Realizing the Human Exposome Project: From Population-Scale Discovery to Translation

Dr. Walsh introduced Dr. Chirag Patel, Associate Professor of Biomedical Informatics at Harvard Medical School and Principal Investigator of the NIEHS funded Network for Exposomics in the United States (NEXUS) Data Science Hub. Dr. Patel explained that his presentation would focus on how exposomics, coupled with advances in artificial intelligence and large-scale data science, can fundamentally change environmental health research by enabling systematic discovery of environmental determinants of disease.

Dr. Patel described the exposome as the collection of environmental exposures experienced throughout an individual's lifetime and argued that understanding these exposures is essential for explaining phenotypic variation beyond genetics. While the Human Genome Project and genome wide association studies (GWAS) have transformed biomedical research by systematically identifying genetic variants associated with disease, environmental health research has largely remained focused on individual candidate exposures. He suggested that environmental health should adopt a discovery framework similar to that used in genetics by measuring many exposures simultaneously and applying rigorous statistical methods to identify reproducible associations.

Drawing upon the evolution of GWAS, Dr. Patel explained that advances in high throughput measurement technologies and the development of large biobanks enabled genetic investigators to answer increasingly sophisticated questions regarding disease susceptibility, replication of findings, and causal inference. He noted that a similar opportunity now exists for environmental health as improvements in analytical chemistry and exposure measurement make comprehensive characterization of the exposome increasingly feasible.

Dr. Patel discussed several limitations of traditional environmental epidemiology. Candidate exposure studies often evaluate only a small number of environmental factors, increasing the likelihood of false positive findings while failing to account for the highly correlated nature of environmental exposures. Different analytical models and confounder adjustments may produce inconsistent conclusions, limiting reproducibility. By contrast, exposome wide association studies evaluate hundreds of exposures simultaneously using standardized statistical approaches that reduce false discoveries and improve replication across independent cohorts.

He described his group's efforts to estimate the contribution of environmental exposures to disease using large epidemiologic datasets. Earlier studies employing health insurance claims linked to twin data suggested that genetics explained approximately one-third of disease variation, while shared environmental influences accounted for only a modest proportion, leaving substantial unexplained variation. Dr. Patel proposed that much of this unexplained component may reflect non-shared environmental exposures captured within the exposome. Subsequent analyses combining polygenic risk scores with environmental measurements further demonstrated that environmental exposures frequently explain important variation beyond demographic characteristics and inherited genetic risk.

Dr. Patel then introduced the NIEHS funded NEXUS consortium, which was established to develop the scientific infrastructure needed for exposomics research. NEXUS integrates expertise in chemical biology, geospatial science, data science, and stakeholder engagement to establish standardized methods for measuring environmental exposures, harmonizing analytical techniques, and promoting reproducible environmental health research. He emphasized that NEXUS seeks to provide the environmental health community with tools comparable to those that transformed genetic epidemiology during the genomic era.

Using recent studies from his laboratory, Dr. Patel illustrated how exposome wide analyses can identify reproducible associations between hundreds of environmental exposures and diverse clinical phenotypes. His group evaluated more than 600 environmental variables across approximately 200 phenotypes, producing over 100,000

exposure-phenotype associations. Approximately five percent of these associations remained statistically significant following stringent multiple-comparison correction, and many replicated across independent datasets. These findings demonstrate that systematic exposome wide approaches can produce robust, reproducible discoveries similar to those achieved through genome-wide analyses.

He presented an exposome-phenome atlas demonstrating relationships between broad categories of environmental exposures including heavy metals, hydrocarbons, volatile organic compounds, smoking-related biomarkers, and dietary exposures and physiologic outcomes such as inflammation, metabolism, hormone regulation, anthropometric characteristics, and cardiovascular biomarkers. While individual exposures typically explained relatively small proportions of variance, Dr. Patel demonstrated that combining multiple exposures into polyexposome scores substantially increased explanatory power. In some instances, environmental exposures explained as much as sixty percent of observed variation, and for several traits environmental predictors performed comparably to polygenic risk scores derived from UK Biobank data.

Dr. Patel cautioned, however, that exposomics requires careful attention to statistical methodology. He demonstrated that associations may vary substantially depending on adjustment strategies for demographic and behavioral variables and noted that inappropriate modeling can even reverse observed associations. Consequently, sensitivity analyses and rigorous evaluation of alternative analytical models are essential for distinguishing genuine environmental effects from statistical artifacts.

He further described ongoing efforts to integrate exposomics with other omics platforms, particularly proteomics. By linking environmental exposures with circulating proteins and disease outcomes, investigators can begin identifying biological pathways through which environmental factors influence disease. He noted that several environmentally responsive proteins identified through these studies are already therapeutic targets in clinical medicine, suggesting that exposomics may contribute directly to development of preventive and therapeutic strategies.

The final portion of Dr. Patel's presentation focused on artificial intelligence (AI). He acknowledged concerns that AI could accelerate publication of low-quality analyses but argued that appropriately designed AI systems should instead function as scientific partners. Rather than serving only as language models, newer agentic AI systems are capable of querying databases, executing analyses, integrating datasets, and producing reproducible computational workflows. Dr. Patel demonstrated ExposomeQL, an AI-enabled platform that allows investigators to query multiple environmental health datasets using natural language while automatically generating reproducible analytical

workflows. He suggested that these tools have the potential to substantially accelerate environmental health research while improving reproducibility and accessibility of large environmental datasets.

Dr. Patel concluded by proposing development of a Human Exposome Project modeled after the Human Genome Project. He envisioned a coordinated national effort leveraging existing NIH supported cohorts such as *All of Us* and Environmental influences on Child Health Outcomes (ECHO) to conduct longitudinal exposome wide association studies across multiple chronic diseases. Such a project would integrate repeated exposure measurements, geospatial data, high-resolution mass spectrometry, multi-omics, and artificial intelligence to systematically identify environmental determinants of disease. He believes that this effort would provide the environmental health sciences community with the comprehensive exposure data needed to advance precision environmental health and improve prevention of chronic disease.

IX. Lunch

X. Concept: Micro and Nanoplastics Research Coordination Center

Dr. Walsh introduced Dr. Anika Dzierlenga from the Genes, Environment, and Health Branch and Dr. Lingamanaidu Ravichandran from the Exposure, Response, and Technology Branch within DERT. They jointly presented a proposed concept for establishing a NIEHS Micro and Nanoplastics Research Coordination Center.

Dr. Dzierlenga began by reviewing the rapid growth in global plastic production over the past seventy years and explained that plastics have become integral to nearly every sector of modern society, including consumer products, textiles, electronics, transportation, and medicine. Their durability, however, has resulted in widespread environmental persistence. Over time, large plastic materials degrade through physical, chemical, and biological weathering processes into progressively smaller particles known as microplastics and nanoplastics (MNP)s. MNP particles have become increasingly common contaminants of food, water, and air. She emphasized that this widespread environmental presence has raised significant questions regarding potential human health concerns.

Dr. Dzierlenga reviewed the definitions commonly used in the field. Microplastics generally refer to plastic particles measuring less than five millimeters in diameter, while nanoplastics represent particles approximately one hundred nanometers or smaller. She noted that these definitions encompass an enormous range of particle sizes and physical properties. Plastics themselves are highly heterogeneous materials composed of numerous polymer backbones, including polyethylene, polypropylene, polyurethane,

and others. In addition to the polymer structure, manufacturers incorporate a wide variety of chemical additives, such as plasticizers, flame retardants, pigments, and stabilizers, which further increase the chemical diversity of environmental plastic particles. As plastics weather, they fragment into fibers, fragments, spheres, and other morphologies while simultaneously adsorbing environmental contaminants including metals, persistent organic pollutants, microorganisms, and naturally occurring toxins. Consequently, MNPs represent highly complex environmental mixtures rather than single chemical entities.

Dr. Dzierlenga explained that humans are exposed to these particles primarily through ingestion, inhalation, and dermal contact. MNPs have been detected in bottled water, seafood, salt, honey, tea, food packaging materials, and numerous additional consumer products. Recent studies have also identified MNPs in a wide range of human tissues and biological fluids, including blood, brain, lungs, liver, kidneys, colon, placenta, and testes. Experimental studies have further demonstrated biological effects of MNPs such as oxidative stress, inflammatory responses, DNA damage, and cellular toxicity. While NIEHS has long supported research examining health effects of chemicals associated with plastics, significant uncertainty remains regarding the independent biological effects of the MNPs themselves and the mechanisms through which they may contribute to disease.

She reviewed earlier NIEHS efforts that established the scientific foundation for the proposed coordination center. An NIEHS sponsored National Academies workshop identified major knowledge gaps in exposure characterization, realistic exposure models, and analytical methods. Building upon those recommendations, NIEHS released a Notice of Special Interest (NOSI) encouraging applications focused on technology development, exposure assessment, and health effects research involving MNPs. In parallel, investigators supported through Environmental Health Sciences Core Centers, Children's Environmental Health Centers, and the Oceans and Human Health Program began pursuing pilot studies addressing plastic pollution in environmental and biological systems. She also noted that federal interest in this topic has expanded considerably, citing ongoing interagency collaborations and the Advanced Research Projects Agency for Health (ARPA-H) STOMP initiative, which is investing substantially in technologies for measuring and ultimately removing microplastics from the human body.

Dr. Ravichandran continued the presentation by describing the development and outcomes of the 2022 NIEHS NOSI, that successfully stimulated considerable scientific interest within the environmental health community. He reported that prior to the NOSI, NIEHS supported only a handful of grants addressing MNPs. Since its publication, however, the Institute has funded approximately forty-six awards totaling more than \$30

million, with an additional \$18 million committed through future-year funding. These awards span multiple funding mechanisms, including R01s, R21s, fellowship awards, career development awards, supplements, and Small Business Innovation Research (SBIR) grants, reflecting the rapid growth of the research community in this area.

Despite these advances, Dr. Ravichandran emphasized that major scientific challenges remain. Existing analytical methods vary considerably among laboratories, standardized reference materials are scarce, and reliable methods for detecting nanoplastics remain underdeveloped. Investigators frequently use different sampling procedures, analytical platforms, and quality-control methods, making direct comparison among studies difficult and limiting reproducibility. Furthermore, the growing volume of data generated by the field has highlighted the need for standardized data elements, harmonized analytical approaches, and centralized resources capable of integrating findings across laboratories.

To address these needs, the presenters proposed establishment of a Micro and Nanoplastics Research Coordination Center. They envisioned the Center serving as a national scientific resource that would coordinate analytical method development, establish standardized sampling procedures, develop reference materials and testing standards, promote best laboratory practices, facilitate data harmonization and sharing, and provide education and training to the broader research community. The Center would also foster multidisciplinary collaborations among exposure scientists, toxicologists, engineers, analytical chemists, and data scientists while coordinating closely with other federal agencies to complement ongoing activities rather than duplicate them. The presenters concluded that such a coordinated infrastructure would substantially strengthen rigor, reproducibility, and scientific collaboration across the rapidly expanding field of MNPs research.

Council Discussion

- Dr. Keri Hornbuckle noted that environmental engineers, manufacturing experts, materials scientists, statisticians, and source-apportionment specialists appeared underrepresented in the proposed framework. She also asked whether the proposed activities would overlap with work being conducted at the National Institute of Standards and Technology (NIST), particularly regarding standards, calibration materials, and interlaboratory comparisons.
 - **Response:** Dr. Ravichandran agreed that the multidisciplinary community described by Dr. Hornbuckle is critical and explained that NIEHS has consistently encouraged multidisciplinary applications since the original 2022 NOSI. He clarified that the simplified diagram presented during the talk did not fully represent all participating disciplines.

- Dr. Maureen Gwinn commended the proposal and emphasized the importance of the outreach and engagement component. She noted that the Coordination Center could help define research priorities across federal agencies while minimizing duplication of effort. She encouraged Dr. Dzierlenga and Dr. Ravichandran to build upon lessons learned from nanomaterials research, maintain close communication with other federal programs, carefully define the Center's scope, and actively recruit expertise from disciplines not traditionally engaged in environmental health research.
 - **Response:** Dr. Dzierlenga agreed and emphasized that one of the primary purposes of the proposed Center is to serve as a coordinating mechanism that strengthens collaboration rather than creating parallel efforts.
- Dr. Jason Aungst asked how the proposed Center would address laboratory contamination during sample collection and analysis.
 - **Response:** Dr. Ravichandran explained that NIEHS currently supports research specifically addressing contamination during sample collection and processing. Investigators are evaluating alternative collection materials and protocols to determine how contamination can be minimized. He noted that lessons learned from these studies would be disseminated through the proposed Coordination Center so that investigators across the field could adopt standardized best practices.
- Dr. Darryl Hood suggested that the outreach component could be more prescriptive regarding community engagement and recommended considering EPA's Climate Pollution Reduction Grants Program as a possible model. He also asked whether inhalation studies should distinguish between pulmonary exposure and olfactory transport into the brain, noting emerging evidence suggesting olfactory neurons may provide a direct pathway for nanoplastics to bypass the blood-brain barrier.
 - **Response:** Dr. Ravichandran explained that most existing studies have focused primarily on pulmonary exposure pathways, but recent findings have raised important questions regarding olfactory transport. He described newly funded studies examining whether nanoplastics enter the brain through olfactory neurons rather than exclusively through systemic circulation. He emphasized that the proposed Coordination Center would not limit investigators to particular exposure pathways and would encourage research exploring all biologically plausible mechanisms.

Following discussion, Dr. Balshaw called for a motion to approve the concept. Dr. Keri Hornbuckle first moved the concept to a vote, and Dr. Stephania Cormier seconded the motion. Council members voted to approve the motion.

XI. Concept: Health and Extreme Weather Program Next Steps

Dr. Walsh introduced Dr. Ashlinn Quinn, Health Scientist Administrator in the Population Health Branch, to present the second concept of the afternoon. Dr. Quinn began by providing an overview of the NIH Health and Extreme Weather (HEW) Program, reminding Council that she had presented a comprehensive program update during the March 2026 Council meeting. The Executive Committee has expanded substantially and now includes representatives from seventeen NIH Institutes, Centers, and Offices. This broad participation reflects the recognition that extreme weather influences virtually every area of human health, including cardiovascular disease, respiratory illness, infectious diseases, mental health, maternal and child health, aging, and many other disease domains represented across the NIH. Dr. Quinn stressed that the complexity of these interactions requires multidisciplinary collaboration that extends well beyond the traditional scope of environmental health sciences.

Turning to the current extramural portfolio, Dr. Quinn summarized the structure of the existing HEW awards network. She noted that NIH also supports a substantial portfolio of unsolicited investigator-initiated grants related to HEW. She reviewed funding trends from fiscal years 2021 through 2025, demonstrating that both the number of awards and overall funding have increased steadily over time. Approximately one-half of these awards are administered by NIEHS, while the remainder are distributed among other participating NIH Institutes and Centers according to scientific scope. She noted that this growing investigator-initiated portfolio illustrates increasing interest from the broader scientific community in understanding the health consequences of extreme weather.

She also highlighted publication of a new NIH Highlighted Topic announcement for HEW, which serves to notify the extramural community of NIH's continuing interest in supporting research in this area. Thirteen NIH Institutes, Centers, and Offices have joined this announcement, further illustrating the cross-cutting nature of the initiative.

Dr. Quinn next presented the results of a comprehensive portfolio analysis designed to identify strengths and gaps within the existing HEW research portfolio. The analysis demonstrated that current investments are particularly strong in exposure assessment, epidemiology, behavioral and social science, risk assessment, community engagement, research infrastructure, and data integration. Intervention science emerged as one of the largest gaps, with relatively few studies focused on developing, implementing, or evaluating interventions capable of reducing health impacts associated with extreme weather. Similarly, implementation science, nutrition research, exposomics, and

workforce training were all found to be comparatively underdeveloped. She emphasized that these deficiencies represent opportunities for strategic investment rather than shortcomings of the current program, reflecting the natural evolution of an emerging scientific field.

She then described a complementary portfolio analysis conducted by the NIH Office of Disease Prevention, which found that among all HEW-related NIH-funded projects between 2015 and 2024, seventy-eight percent of funded projects could be classified as prevention research, indicating strong alignment with the Office of Disease Prevention's mission. However, nearly all of these studies focused on primary prevention through observational research, whereas only approximately twelve percent involved intervention studies designed to evaluate practical public health strategies. The Office also found that important high-risk populations—including American Indian and Alaska Native communities, incarcerated individuals, institutionalized populations, and persons experiencing homelessness—were relatively underrepresented within the portfolio.

The Office of Disease Prevention analysis further demonstrated that most funded studies focused on heat, hurricanes, floods, and wildfires. Comparatively little research has addressed drought, extreme cold, snowpack loss, harmful algal blooms, or other emerging weather related hazards despite their increasing public health importance. Together, these portfolio analyses suggested that while observational science has matured considerably, future investments should increasingly emphasize intervention development, implementation research, underserved populations, and additional weather hazards.

Building upon these findings, Dr. Quinn introduced the proposed concept, which consists of two coordinated funding announcements. The first would establish a national network of Solutions-Focused Research Hubs, while the second would create a Research Coordination and Data Resource Center to support both the hubs and the broader HEW research community. These complementary initiatives would advance transdisciplinary, collaborative, and solutions oriented research while strengthening workforce development and community engagement.

Dr. Quinn explained that the proposed Solutions-Focused Research Hubs would emphasize development, testing, and evaluation of interventions designed to prevent, mitigate, or respond to health risks associated with extreme weather. Rather than continuing to focus primarily on documenting associations between weather events and health outcomes, investigators would be expected to generate actionable knowledge capable of informing public health practice, clinical care, community preparedness, and policy. Each hub would focus on regionally relevant weather hazards and populations at heightened risk while maintaining flexibility to address the full spectrum of weather-related environmental challenges.

Dr. Quinn then described the second component of the concept: the Research Coordination and Data Resource Center. This center would consist of two integrated components. The Research Coordination Component would facilitate communication across the HEW network through annual meetings, working groups, educational programs, dissemination activities, and collaborative partnerships. It would also support pilot project coordination and facilitate communication among NIH funded investigators and the broader research community.

The Data Resource Component would focus specifically on improving access to environmental and health datasets, developing standardized approaches for data linkage and interoperability, harmonizing common data elements, and providing training in advanced data analysis. Dr. Quinn explained that this component would work closely with existing NIH-wide data initiatives to reduce duplication of effort while improving reproducibility and data sharing across the research community. The ultimate objective is to create a coordinated national infrastructure supporting rigorous, interoperable environmental health research related to extreme weather.

Dr. Quinn concluded by describing how these two initiatives would interact with existing NIH funded centers, Alliance for Community Engagement hubs, National Science Foundation natural hazards centers, intramural researchers, and other NIH data initiatives under the guidance of the NIH HEW Steering Committee. She acknowledged the extensive collaboration among numerous NIH Institutes, Centers, and Offices that contributed to development of the concept and expressed appreciation for the many individuals involved in shaping the proposed initiative.

Council Discussion

- Dr. Darryl Hood and Dr. Cathrine Hoyo expressed support for the overall concept while identifying several areas that could further strengthen the program. They noted that the current P20 centers are approaching the end of their funding periods and suggested clarifying how existing centers would be evaluated for future participation. They also encouraged more explicit guidance regarding community engagement, governance, power sharing with communities, regional relevance, underserved populations, implementation pathways, and measurable public health outcomes. Dr. Hood remarked that while the concept is ambitious, its complexity would require careful administrative planning to ensure successful implementation.
 - **Response:** Dr. Quinn agreed that additional clarity regarding evaluation criteria, community engagement, and implementation strategies would strengthen the eventual funding announcements.

Following discussion, Dr. Balshaw called for a motion to approve the concept. Dr. Timothy Greenamyre first moved the concept to a vote, and Dr. Stephanie Cormier seconded the motion. Council members voted to approve the motion.

XII. Concept: Supporting Programs to Advance Research Knowledge in the Environmental Health Sciences (SPARK-EHS)

Dr. Walsh introduced Dr. Carol Shreffler, Health Scientist Administrator in the Exposure, Response, and Technology Branch and Director of Training and Career Development Programs. He noted that Dr. Shreffler has overseen NIEHS training and career development programs for more than two decades and would present the final concept of the open session, Supporting Programs to Advance Research Knowledge in the Environmental Health Sciences (SPARK-EHS).

Dr. Shreffler explained that the SPARK-EHS concept was developed collaboratively with Ms. Jenny Collins and Dr. Mike Humble, with guidance from Dr. Srikanth Nadadur, and is intended to address limitations within the current institutional training portfolio while encouraging innovative approaches to environmental health sciences education. She organized her presentation into three sections: an overview of the current NIEHS institutional training program, the rationale for creating a new funding mechanism, and the proposed structure of the SPARK-EHS program.

Dr. Shreffler began by reviewing the continuum of NIH and NIEHS research training opportunities that support investigators from undergraduate education through independent research careers. She explained that institutional T32 training grants represent one of the Institute's primary mechanisms for developing future environmental health scientists. At NIEHS, these programs support research spanning the full breadth of environmental health sciences, including basic science, clinical research, epidemiology, toxicology, exposure science, and population health.

She presented historical data demonstrating that NIEHS has supported approximately 400 trainees annually for the past four decades and has made nearly 12,000 training appointments through more than one hundred institutional programs. Although total funding devoted to institutional training has steadily increased over time, the number of trainees supported each year has gradually declined, largely because of increasing trainee stipend levels. Dr. Shreffler also noted that most institutional training grants are located at universities that already host Environmental Health Sciences Core Centers or Superfund Research Programs. These institutions benefit from extensive research infrastructure, pilot funding, administrative support, and established faculty networks, which strengthen their competitiveness when applying for renewal of training grants.

Dr. Shreffler explained that this concentration of training awards at long established institutions has made it increasingly difficult for new institutions to enter the NIEHS training portfolio. Since approximately 2010, the Institute has funded relatively few new institutional training grants, and the majority of awards have been renewals of existing programs. She further noted that many current training programs have remained continuously funded for decades, with approximately half of the active portfolio having existed for at least twenty-five years and several programs exceeding forty years of continuous support. Although these long-standing programs have made substantial contributions to workforce development, their longevity limits opportunities for new institutions and emerging scientific disciplines to compete for NIEHS supported training awards.

Dr. Shreffler presented analyses of the scientific themes represented within existing training grants. Using NIH RePORTER data, the team evaluated how the NIEHS portfolio has evolved over time. The analysis demonstrated that while traditional areas such as pathology and disease mechanisms remain important, newer topics—including precision environmental health, genomics, gene-by-environment interactions, community and rural environmental health, and climate related research have become increasingly prominent. Importantly, these emerging scientific areas have largely entered the portfolio through the newly funded training programs. Additional analyses demonstrated that new institutional training grants consistently introduce greater scientific novelty than renewal applications, reinforcing the value of creating opportunities for new institutions and innovative training approaches.

Based on these observations, Dr. Shreffler introduced the proposed SPARK-EHS program. The initiative is designed to broaden institutional participation in NIEHS supported training while encouraging development of multidisciplinary environmental health sciences programs at institutions that have not recently received NIEHS T32 funding. Eligibility would therefore be limited to institutions that have not held a NIEHS institutional training grant during the previous five years. Institutions with previously completed training programs would remain eligible provided that the earlier program had concluded and the proposed training represented a substantially new effort. Applicants would also be required to demonstrate an active environmental health sciences research base through at least one NIEHS R01 or equivalent research award. Multi-institutional collaborations would be encouraged to capitalize on complementary scientific strengths while maintaining an appropriate NIEHS research foundation at each participating institution.

Dr. Shreffler explained that the proposed program would initially support only predoctoral trainees. She noted that new institutional training programs frequently experience difficulty developing cohesive postdoctoral training components because reviewers expect integrated programmatic experiences rather than collections of

individual laboratory appointments. Limiting the program initially to predoctoral education would allow institutions to establish strong organizational foundations before potentially expanding to postdoctoral training during future renewals.

A distinguishing feature of SPARK-EHS is its proposed two-phase funding structure. During the first year, institutions would receive support specifically for program development rather than trainee appointments. This planning year would allow awardees to establish NIEHS specific curricula, mentor training, grantsmanship instruction, professional development activities, administrative infrastructure, and recruitment strategies before enrolling trainees. Dr. Shreffler explained that this approach would provide new programs sufficient time to develop high-quality training environments rather than requiring immediate recruitment upon receipt of funding. After completion of the planning year, successful programs would transition into the traditional T32 training phase.

Finally, Dr. Shreffler provided an overview of the potential applicant pool, demonstrating that more than 150 institutions currently hold active NIEHS R01 equivalent awards but do not receive NIEHS institutional training support. She concluded that SPARK-EHS would expand geographic and institutional diversity within the training portfolio, encourage innovative multidisciplinary educational models, and provide new opportunities to prepare the next generation of environmental health scientists in emerging areas of research.

Council Discussion

- Dr. Gökhan Mutlu asked how SPARK-EHS programs would compete for continued funding after completion of their initial six-year project period. He also asked whether NIEHS anticipated creating a similar mechanism specifically for postdoctoral training.
 - **Response:** Dr. Shreffler explained that, at present, the expectation is that successful SPARK-EHS programs would compete subsequently through the standard NIH omnibus T32 funding mechanism. She further explained that the decision to limit the new program to predoctoral trainees reflected experience showing that new institutional training programs often struggle to develop cohesive postdoctoral training structures. Programs would have the opportunity to add postdoctoral training during future renewal applications after establishing strong predoctoral programs.
- Dr. Darryl Hood asked whether the Institute had determined approximately how many awards might ultimately be supported and what timeline was anticipated for release of the funding announcement.

- **Response:** Dr. Shreffler replied that although an anticipated funding level may eventually be included in the announcement, sufficient flexibility would be retained to accommodate the quality of applications received.

Following discussion, Dr. Balshaw called for a motion to approve the concept. Dr. Stephania Cormier first moved the concept to a vote, and Dr. Gökhan Mutlu seconded the motion. Council members voted to approve the motion.

XIII. Adjournment of Open Session

Dr. Kyle Walsh thanked the Council members for their work on the meeting, and all attendees for their participation. Dr. David Balshaw added thanks to Council for its engagement and important advice. Dr. Walsh adjourned the open session of the meeting at 3:34 p.m. EST on June 24, 2026.

CLOSED SESSION

This portion of the meeting was closed to the public in accordance with the determination that it concerned matters exempt from mandatory disclosures under Sections Section 552b(c)(4) and 552b(c)(6), Title 5, U.S. Code and Section 10(d) of the Federal Advisory Committee Act, as amended. The closed session adjourned at 4:27 p.m. EST on June 24, 2026.

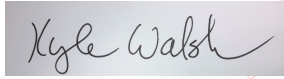
I. ACCEPTANCE OF NIEHS INTRAMURAL RESEARCH BOARD OF SCIENTIFIC COUNSELORS REPORT

This portion of the closed session is concerning the NIEHS Intramural research only. The most recent NIEHS Intramural Divisions' Board of Scientific Counselors (BSC) report was provided to the Council members and concurrence was achieved for acceptance of the report.

II. REVIEW OF APPLICATIONS

The session included a discussion of procedures and policies regarding voting and confidentiality of application materials, committee discussions and recommendations. Members absented themselves from the meeting during the discussion of, and voting on, applications from their own institutions or other applications in which there was a potential conflict of interest, real or apparent. Members were asked to sign a statement to this effect. The Council considered and recommended 142 discussed, NIEHS primary applications requesting \$72,766,186 in total costs. For the record, it is noted that competitive, not discussed primary and all secondary applications were also considered en bloc.

CERTIFICATION:

A digital signature of Kyle M. Walsh in black ink on a light gray background.

Digitally signed by KYLE M.
WALSH -S
Date: 2026.09.25 15:14:02 -04'00'

Kyle Walsh, PhD
Chairperson
National Advisory Environmental
Health Sciences Council

Attachment:
Council Roster

**DAVID M.
BALSHAW -S**

A digital signature of David M. Balshaw in red ink on a light gray background.

Digitally signed by DAVID M.
BALSHAW -S
Date: 2026.09.28 08:36:52 -04'00'

David Balshaw, PhD
Executive Secretary
National Advisory Environmental
Health Sciences Council