

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

**MINUTES OF THE ONE HUNDRED SIXTY-SIXTH MEETING OF THE
NATIONAL ADVISORY ENVIRONMENTAL HEALTH SCIENCES COUNCIL**

June 7-8, 2022

The National Advisory Environmental Health Sciences Council convened the open session of its one hundred sixty-sixth regular meeting on June 7 and 8 2022 as a Zoom virtual meeting. The closed session of the meeting was held earlier in the day June 7.

The meeting was open to the public on June 7, 2022 from 12:00 p.m. to 2:30 p.m. and on June 8, 2022 from 11:00 a.m. to 3:00 p.m. 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 7, 2022 from 11:00 a.m. to 11:45 a.m. for consideration of grant applications. Notice of the meeting was published in the *Federal Register*. Dr. Rick Woychik presided as Chair.

Participating Council Members

Philip Bourne, PhD
William Cibulas, Jr., PhD (*ex officio*)
Suzanne Fitzpatrick, PhD (*ex officio*)
Lynn Goldman, MD, MPH
Irva Hertz-Picciotto, PhD
Andrij Holian, PhD
Jani Ingram, PhD
Terrance Kavanagh, PhD
Gary Miller, PhD
Trevor Penning, PhD
Marla Pérez-Lugo, PhD
Karen Vasquez, PhD

NIEHS Staff

Sara Amolegbe
Trevor Archer, PhD
David Balshaw, PhD
Martha Barnes
Talin Barnes
Linda Bass, PhD
L. Michelle Bennett, PhD

Brian Berridge, DVM, PhD
Abee Boyles, PhD
Danielle Carlin, PhD
Toccaro Chamberlain
Jennifer Collins
Gwen Collman, PhD
Yuxia Cui, PhD
Christie Drew, PhD
Beverly Duncan, PhD
Chris Duncan, PhD
Anika Dzierlenga, PhD
Benny Encarnacion
Amanda Garton
Nidhi Gera, PhD
Barbara Gittleman
Kimberly Gray, PhD
Jenny Greer
Arshya Gurbani
Janet Hall, MD, MS
Astrid Haugen
Michelle Heacock, PhD
Heather Henry, PhD
Jon Hollander, PhD
Mike Humble, PhD
Mary Jacobson
Bonnie Joubert, PhD
Helena Kennedy
Alfonso Latoni, PhD
Cindy Lawler, PhD
Quentin Li, MD, PhD
Mbeja Lomotey, Dr.P.H.
Tina Loos
Francine Mahase
Lindsey Martin, PhD
John Maruca
Jacqui Marzec
J. Patrick Mastin, PhD
Katy McGinnis
Liz McNair
Nathan Mitchiner
Rosemary Moody
Srikanth Nadadur, PhD
Liam O'Fallon
Suzy Osborne
Anant Parekh, D.Phil.
Beth Perry

Kristi Pettibone, PhD
Nicole Popovich
Alicia Ramsaran
Lingamanaidu Ravichandran, PhD
Kirsten Reid
Jim Remington
Thad Schug, PhD
Carol Shreffler, PhD
Dan Shaughnessy, PhD
Varsha Shukla, PhD
Melissa Smarr, PhD
Bill Suk, PhD, MPH
Claudia Thompson, PhD
Brittany Trottier
Fred Tyson, PhD
Mitch Williams
Leroy Worth, PhD
Rick Woychik, PhD
Demia Wright, MPH
Darryl Zeldin, MD

Members of the Public Present

Julia Brody, PhD, Silent Spring Institute
Lisa Davis
Jodie Fleming, PhD, CSR
Ernie Hood, Bridport Services, LLC
Katrina Korfmacher, PhD, University of Rochester
Arsenio Mataka, JD, HHS
Edith Parker, DrPH
Eliseo Pérez-Stable, MD, NIMHD
Matt Sherman

I. Call To Order and Opening Remarks, Review of Confidentiality and Conflict of Interest

NIEHS and NTP Director Rick Woychik, Ph.D., welcomed attendees and called the meeting to order. He asked Council members in the Zoom call to introduce themselves. *Ex officio* Council member Dr. Andrew Geller was unable to attend. Deputy DERT Director J. Patrick Mastin, Ph.D., went over some of the logistics for the meeting, including the conflict of interest statement.

II. Consideration of February 2022 Meeting Minutes

Approval of the February 2022 meeting minutes was moved and seconded, and Council voted to approve the minutes, with all in favor.

III. Report of the Director, NIEHS

Dr. Woychik briefed Council on Institute developments since the February 2022 Council meeting.

He described what he would be doing differently during his presentation. He said he would spend more time discussing strategy, would allow more time to hear from Council members, and would return to topics raised previously, providing updates.

Turning to budgetary matters, Dr. Woychik reported that although it took almost six months for Congress to pass a budget for the current fiscal year, in the end there was good news for the NIH. NIEHS received a 3.4% increase for its primary allocation, while Superfund received only a 1.23% increase. Overall, NIEHS received \$935 million. The hoped-for \$100 million increase to fund climate change and health research did not pass, but it does appear in the President's FY23 budget request.

Dr. Woychik described recent Congressional briefings on February 16 and May 3, as well as House and Senate Appropriations Committee hearings held May 11 and May 23 respectively, where a wide range of topics were discussed, including many relevant to NIEHS.

He reported on progress related to ARPA-H, the Advanced Research Projects Agency for Health, a new initiative modeled on DARPA. He noted that it would be complementary to NIH, not duplicative of NIH programs and efforts. It will draw on NIH's vast knowledge, expertise, and infrastructure, but will remain distinct, with a unique culture and organization. It was announced May 25 as an independent entity within NIH, and Dr. Adam H. Russell has been named as Acting Deputy Director for ARPA-H.

Dr. Woychik congratulated Dr. David Balshaw on his appointment as Acting Director of DERT, and J'Ingrid Mathis on her appointment as Associate Director for Management.

He described the five NIEHS scientific focus areas, each of which have been featured at recent Council meetings:

- Precision Environmental Health
- The Exposome
- Climate Change and Health
- Mechanistic & Translational Toxicology
- Environmental Justice & Health Disparities

He provided background information about Precision Environmental Health (PEH). He announced an upcoming Catalytic Workshop Series called Accelerating Precision Environmental Health: Demonstrating the Value of the Exposome. The five virtual workshops, to be held in late July and throughout August, will cover these topic areas:

- Tools, Technologies, and Methodologies
- Biological Responses and Impact on Health and Disease
- Future of Clinical & Prevention Trials, Cohorts, and Epidemiology
- Social and Societal Impacts
- Data Infrastructure and Data Analytics

Dr. Woychik discussed several aspects of the NIH Initiative on Climate Change and Health (CCH), including the program's Strategic Framework, funding opportunities, and promotion within the NIH Intramural Research Program. He described several efforts to forge partnerships with related programs.

Turning to environmental justice and health disparities, he noted that NIEHS has an extensive history of working in those arenas, but that there is more work to do to address them. He mentioned that the institute has developed cross-cutting, interdisciplinary groups across divisions to develop plans.

He reported on progress in the NIH UNITE Initiative and described the Racial and Ethnic Equity Plan (REEP) process. As it applies to NIEHS, it would:

- Apply the Racial and Ethnic Equity Lens (REEL) Framework to NIEHS's workforce, structures, and systems.
- Identify and dismantle any racial and ethnic disparities in the NIEHS workforce.
- Enhance the diversity of the NIEHS workforce.

Dr. Woychik opened the floor for discussion by the Council members.

Dr. Bourne said that he found the new format being employed by Dr. Woychik to be more interesting. He asked whether a high-risk proposal received by the institute could be passed along to ARPA-H, and about the general relationship between the two. Dr. Woychik said that his sense is that ARPA-H is an independent infrastructure within NIH, so there would not be seamless transfer of grants submitted to an IC to ARPA-H. He recommended that alignment with the goals of ARPA-H should be incorporated into any grant proposals designed for ARPA-H, being more like a DARPA proposal, which is very different from a typical NIH grant. He encouraged everyone to be thinking about bold, transformative projects that would be appropriate for ARPA-H.

Dr. Penning asked about the \$100 million climate change and health funding that was not appropriated. He said that at his institution, there was much interest and activity

about sustainability and fossil fuels, but less related to climate change and health. He wondered whether an educational component would be required to move the envelope. Dr. Woychik asked Dr. Collman to reply. She agreed that there are varying levels of literacy around the climate change and health issues in various places. She noted the NIH's monthly webinar series that is open to the public. She said there is also an effort to educate a variety of stakeholders and encouraged Council members to do the same. Dr. Penning added that his center is planning a symposium dedicated to climate change and health, to tackle the educational component that is lacking.

Regarding the exposome, Dr. Penning asked whether high resolution mass spectrometry would be cost-effective and scalable to individual risk assessment as a population level tool. Dr. Woychik agreed that new, cost-effective technologies are needed. He asked Dr. Miller to respond to Dr. Penning's question. Dr. Miller said that the technology has not been fit for the needed purposes and that there is much that could be done to drive down the cost, to potentially get closer to an ability to measure at the population level. He agreed that technology development is needed, and that mass spec is an example of an approach with great potential. Dr. Woychik reminded that audience that ARPA-H is a potential strategy to facilitate new ideas in the field. Dr. Miller pointed out that DARPA asks for specific ideas, but it is not yet known what needs will be called for by ARPA-H. He brought up the issue of the expertise of study sections in areas of research that have not historically been funded by NIH. Dr. Collman wondered if the working group would be advising CSR on how create the right type of expertise. Dr. Collman agreed and noted that the working group has created a subcommittee with leadership from CSR and from NIEHS, which has been considering the issue. Dr. Woychik commented that the question will be how to use the anticipated \$100 million in a catalytic mode to increase awareness and education on climate change and health.

Dr. Kavanagh said that ARPA-H is a great opportunity for people to put out bold initiatives with great impact. He voiced concern about early stage investigators, and asked if there would be any efforts to encourage them to participate. Dr. Woychik said the answer would lie in mentoring in more institutions. He noted that as with DARPA funding, investigators will be under a microscope with project managers. Early stage investigators would be advised to have NIH funding in place when they apply for ARPA-H funding. Dr. Kavanagh said it might be good for them to work with a team along with more senior investigators. Dr. Woychik felt that was a good idea. Dr. Goldman agreed. Dr. Vasquez said that at her university, there had been much discussion about group/team efforts as a way for junior faculty to get involved in high-risk work, but it could also be problematic, as the senior people tend to get more credit. In terms of tenure, being part of a team will not help a junior faculty member get tenure. So, to achieve tenure, junior faculty at her university are encouraged to have other grants such

as an R01 in place, and then become involved in high-risk or group projects. Dr. Woychik reiterated the importance of having strong mentoring, such as mentoring committees. Dr. Vasquez said those are in place at her institution.

Dr. Hertz-Picciotto noted that climate change initiatives may not achieve milestones in a disciplined way. Regarding the new NOSIs, she asked if there would be special emphasis panels for them. She also referred to the multidisciplinary nature of the work. Dr. Collman said that submissions to the NOSIs would be monitored, and there will be close consultation with CSR to understand the review issues. She added that the decision was made not to put every NIH mechanism on them, so that the system would not become overwhelmed. Regarding the multidisciplinary work, the intent is to build a transdisciplinary team, she added. Eventually, the vision is for a centers program to utilize such teams. Ultimately, the hope is for an appropriation that will match the dreamed vision. Dr. Woychik said there would be much work ahead to define the message about the health-related effects of climate change, including development of talking points. Dr. Hertz-Picciotto suggested that it would be particularly important to educate journalists about climate change and health.

Dr. Bourne commented on early-stage investigators. He felt that the idea of suppressing innovation until achievement of tenure would be a lost opportunity. He agreed that mentoring is important. He said it would be good to see proposals that are targeted at young investigators. Dr. Woychik agreed, and related his experiences as a young investigator. Dr. Kavanagh described his early career, in particular a project that utilized the team approach he had described.

Dr. Holian said it would be important to integrate communication with the lay public, who have the power to influence policy by influencing lawmakers.

IV. Reporting Back Environmental Health Research Results

In a follow-up to the discussion at the February 2022 Council meeting, Liam O'Fallon presented the results of recent activities related to reporting back research results (RBRR). He and former Council members Drs. Katrina Korfmacher (University of Rochester) and Julia Brody (Silent Spring Institute) were charged with assembling a set of recommended actions for NIEHS to consider.

Mr. O'Fallon described the draft document, "Moving forward with Reporting Back Environmental Health Research Results," that he and Drs. Korfmacher and Brody had developed. The document provides an outline for how efforts can be structured and implemented to enable NIEHS to become a recognized leader in RBRR. The document encompasses three main themes: Guidelines, Training, and Resources.

Under Guidelines, potential activities include:

- Director's Corner discussion on RBRR
- Communicate in different venues the importance of RBRR for Environmental Justice (EJ) and Health Equity
- Develop language for NIEHS-led FOAs
- Write and disseminate a synthesis document of guidelines
- Evaluation & Dissemination

Under Training, proposed activities include:

- Develop Training Materials
- Reviewer Materials
- Research Partner Training
- Institutional Outreach to the IRB Training Programs

Under Resources, proposed activities include:

- RBRR Material Repository
- Supplements
- Conference Grants

The team suggested continued action related to RBRR:

- Coordination with the NIH Office of Science Policy (which is supportive of pilot efforts to advance RBRR)
- Establishment of smaller working teams to flesh out and consider more carefully these topics and the proposed activities
 - These smaller teams could include Council members, NIEHS staff, and Leaders in RBRR

Dr. Brody said she was pleased that the Council was considering activities related to RBRR, which she and her team have been working on for a long time.

Dr. Korfmacher said that given the previous work related to RBRR, it has been shown to be feasible, and the time has come for it to be scaled up.

Dr. Kavanagh asked about reviewers, and whether the OSP would be asked to engage with CSR to ensure that proposals will be handled through the concept of report back. He asked if there was a sense or perception that it needs to be augmented. Mr. O'Fallon said that the notion of working with and providing supports for reviewers is critical, and there will be further conversations with OSP on that topic.

Dr. Ingram asked how community advisement would be incorporated in thinking about the RBRR process going forward. Dr. Korfmacher said that it would be important to

consider at what level people are being offered principles, guidelines, and processes of engagement.

Dr. Hertz-Picciotto said she had been impressed with the depth of thinking that had gone into the development of the guidelines. She felt that supplements were an especially good idea.

V. CRAC Calcium Channels: A New Therapeutic for Environment-Based Disease

Dr. Zeldin introduced Dr. Anant Parekh, Chief of the Signal Transduction Laboratory and Senior Investigator.

Dr. Parekh described his laboratory's study of how aberrant calcium signals may contribute to human diseases, particularly allergies and asthma.

A rise in cytosolic Ca^{2+} is used as a key intracellular messenger in virtually every cell throughout the phylogenetic tree. The rise activates a remarkable range of physiological responses, from the heartbeat and neurotransmission to cell growth and proliferation, and even cell death. Aberrant cytosolic Ca^{2+} is linked to a growing list of human disorders, including cardiovascular disease, neurodegeneration, and various cancers. Targeting proteins that control Ca^{2+} is proving an effective strategy in treating these diseases. One such protein is the Ca^{2+} Release-Activated Ca^{2+} (CRAC) channel that is expressed in the cell surface membrane.

CRAC channels are a major route for raising cytosolic Ca^{2+} in eukaryotic cells. These channels are robustly expressed in immune cells, where they are indispensable for proper functioning of the immune system. Loss-of-function and gain-of-function mutants have revealed important roles for the channel in numerous human diseases, making the channel a clinically relevant target.

The working hypothesis for the research is that house dust mite (HDM) allergens activate CRAC channels to drive inflammation in the lung. Experiments have shown that the active component in the process is a serine protein, DerP3.

Studies have shown that blocking CRAC channels reduces the severity of HDM-induced asthma in a mouse model, leading to speculation that CRAC channels may be an attractive therapeutic target.

Several CRAC channel blockers currently exist or are in various stages of clinical development. Dr. Parekh and his team are running screens to identify FDA-approved drugs that could be repurposed. They are also screening novel molecules for their potential as CRAC channel blocking therapeutic agents.

Dr. Zeldin asked Dr. Parekh to describe on a molecular basis how DerP3 activates CRAC. Dr. Parekh said that it was originally thought that the serine protease might cleave the CRAC channel directly, but experiments showed no evidence for that. The team stumbled serendipitously on the protease-activating receptors. It was seen that the lung mast cells and airway epithelia express PAR4 receptors, and it was shown that the PAR4 receptor was cleaved by either HDM extract or DerP3, and when cleaved, stimulates production of a second messenger, which then leads to activation of the CRAC channel. Thus, it is an indirect mechanism.

Dr. Kavanagh asked Dr. Parekh whether his group has looked at IL-2 cells in the context of asthma and sensitivity to house dust mites. He also asked about the thiol redox status in the functioning of CRAC channels. Dr. Parekh said that his team had been unable to patch clamp IL-2 cells because they are quite small. He said the calcium entry is there, and it is blocked by CRAC channel blockers. He said the mast cell in particular is very sensitive to redox issues. He noted that his group had not yet had an opportunity to look at the house dust mite PAR4 signaling pathway in terms of redox potential.

VI. Report of the Deputy Director, DERT

DERT Deputy Director Dr. J. Patrick Mastin briefed Council on DERT activities and accomplishments since the February 2022 Council meeting.

He provided staff updates and added his congratulations to Dr. Balshaw on being named Acting DERT Director. He listed the meetings DERT had been part of since the last Council meeting and described upcoming DERT meetings.

Dr. Mastin turned to DERT initiatives related to Environmental Justice (EJ) and Environmental Health Disparities (EHDs). He summarized the many research programs, community-engaged activities, and training and education programs supported by NIEHS over the past two decades, along with other NIEHS contributions to advancing EJ, including the EHD-EJ Faculty, which was established in 2020. The faculty sponsored three recent EHD-EJ workshops. DERT staff have been involved in drafting the new HHS EJ Strategic Plan. Dr. Mastin went over several other initiatives and programs undertaken by DERT recently. He introduced Dr. Melissa Smarr from the Population Health Branch to discuss updates on Diversity, Equity, and Inclusion (DEI).

Dr. Smarr summarized the key themes and recommendations from a recent series of listening sessions with HBCUs and other MSIs. She listed DERT's DEI goals, reaching toward a more diverse, equitable and inclusive EHS community:

- Promote an internal culture of DEI
- Coordination of DEI efforts

- Building partnerships with MSIs
- Intentional grantee engagement
- New funding opportunities
- Evaluation and analysis

She presented a timeline of DERT DEI milestones, and described the utilization of information gathered during the listening sessions with HBCUs and other MSIs. The goal of the four listening sessions was to learn about barriers that researchers at HBCUs and other MSIs face in receiving NIH funding. Key themes included:

- Need for additional grant writing and other training
- Inequitable support for research capacity and infrastructure
- Inequitable funding
- Perceived bias in the review process
- Limited opportunities to partner with resourced institutions

A follow-up town hall is planned in August to advance the responses and recommendations from the listening sessions.

Dr. Mastin described DERT diversity-related funding opportunities, in training and career development, research capacity and infrastructure, and DEIA related research.

Returning to the topic of climate change and health, he said that “even though we didn’t get the \$100 million for the CCH research program, we are still dedicated to doing research in this very important area.” He listed some of the ongoing programs being supported by DERT.

Dr. Bourne asked about evaluation. He said at the beginning of an intervention process, a mechanism for evaluation needs to be put in place. He felt that the UNITE process had not established much provision for evaluation. Dr. Mastin replied that it was sometimes a “tough needle to move,” particularly when looking at metrics about underrepresented groups being successful in getting NIH funding. Dr. Archer noted that the UNITE program is just one year and three months old, and the formal process to undertake an evaluation has begun. Dr. Mastin said that the metrics in the area are difficult.

Dr. Pérez-Lugo asked Dr. Smarr to provide more details about the perceptions from the participants in the listening sessions. Dr. Smarr said the hope is to get that type of feedback from participants at the August 11 town hall, particularly regarding grant funding and support.

Dr. Penning noted that to acquire good outcome metrics, there needs to be good baseline data, both for the intramural program and the extramural program. He said it

would be good to put together a report on that topic. He emphasized the need to evaluate the intramural program to look at current diversity and to identify any gaps and problems that could be addressed.

Dr. Vasquez, the chair of the Council's DEI working group, responded. She said that Dr. Christie Drew had provided much information to the working group, even though some of the numbers, facts, and figures, are not simple to define, calculate, and characterize. She asked Dr. Drew to give the Council the presentation she had delivered to the working group. Dr. Drew said that her branch is entirely focused on evaluation of NIEHS extramural grants. She noted that "the data are really, really complex." She said her group had responded to the previous Council discussion by assessing the data they had readily available and presenting it to Dr. Vasquez's panel. She said that she would be happy to present that information to the full Council.

VII. Partnerships for Environmental Public Health Update

Mr. O'Fallon, program lead for Partnerships for Environmental Public Health (PEPH), provided an update and a vision for the next 10 years.

He related background information on PEPH, which was initiated in 2009. It has evolved into a Community of Practice that breaks down programmatic silos to promote interactions among NIEHS grantees, community partners, and NIEHS program staff. Its goals have been to coordinate programs and projects that involve community and scientist collaborations, to develop and evaluate strategies to communicate environmental public health messages, and to create and distribute materials to increase awareness and literacy about environmental public health risks. PEPH has seen considerable growth since its founding.

O'Fallon outlined four focus areas for PEPH for the next 10 years:

- Antiracist agenda
- Collaborative and facilitating role
- Action-oriented and sustainable approaches
- Measuring success

Mr. O'Fallon described several recent activities leading up to establishment of an updated vision for PEPH. He listed a variety of recommendations that emerged, which were organized under research, capacity building, communication, action & sustainability, evaluation, and coordination.

He discussed the next steps for the organization:

- Refresh the PEPH workgroup

- Re-engage with Council
- Organize a PEPH retreat
- Convene PEPH 2023 conference

Dr. Pérez-Lugo was the first Council discussant. She noted two significant PEPH developments. First, she noted that the new focus on a framework of action and sustainability is important because many grant programs do not pay sufficient attention to the sustainability of their relationships. Second, she called attention to the PEPH focus on its antiracist agenda. She asked Mr. O'Fallon to provide more detail about it, particularly regarding actions. He replied that the action element will be necessary, which will require further conversation to ensure the appropriate input from the extramural community and grantees.

Dr. Ingram was the second Council discussant. She also focused on the antiracist agenda and noted that making sure that what is done is going in a positive direction will be tricky. She said that working to get as many voices as possible involved will be important, and that she is excited about the many approaches already in place.

Dr. Mastin commented that the webinars produced by PEPH are quite revealing, for both scientists and the community.

Dr. Penning said that the issue of sustainability is really important. He observed that there is nothing more damaging to a community to work with them and then walk away because the grant has run out. He suggested that there should be a supplement program for grants that fall between the cracks, to allow sustaining of relationships. He noted that many other institutes, such as NCI, are now emphasizing community engagement. He speculated that more could be learned by forming partnerships with some of those other institutes and asked if any effort had been put into that. Mr. O'Fallon said that PEPH has been in touch with NCI. He agreed with the need for increased interactions with other NIH ICOs.

Dr. Ingram added that such interactions are also important at the investigator level. For example, she recommended bringing environmental health researchers who are good community engagement into advisory committees, to gain that expertise in different areas.

Dr. Holian approved of the idea of developing a logic model for PEPH. He asked whether PEPH has any information about its impact on Congress and other policymakers. Mr. O'Fallon cited several examples of impact at the national level.

Dr. Hertz-Picciotto congratulated Mr. O'Fallon on the degree to which PEPH has developed and matured. She asked him about the push and pull between the research side of grants and the need to make a difference in communities. Mr. O'Fallon agreed

that there is a range, a spectrum of community engagement balanced with research needs. He said the outcome may be another grant or a need for additional NIH or state funding, but ultimately there needs to be some type of action that helps to reduce or mitigate a particular issue through public health policy. Dr. Hertz-Picciotto asked the status of the Research-to-Action program. Mr. O'Fallon said there had been internal work on that, and that she should watch for progress. Dr. Mastin noted that it is an area that NIEHS is still devoted to.

Dr. Vasquez noted that everything NIEHS does affects the community. She asked Mr. O'Fallon if there would be a way to engage the community in all of the research conducted by NIEHS as a way to involve more people, both scientists and non-scientists. Mr. O'Fallon said that ideas like that are the reason to engage with the Council, to help set the direction for PEPH going forward. Dr. Vasquez suggested adding to events by showing the entirety of the NIH portfolio.

Dr. Kavanagh suggested that when looking forward to the next ten years for PEPH, some effort should be put into hypothesis testing of interventions, to help determine which ones work and which do not. Mr. O'Fallon agreed, while cautioning that budgetary concerns should be taken into account.

VIII. NIMHD Research Agenda on Environmental Health Disparities

Dr. Eliseo Pérez-Stable, Director of the National Institute on Minority Health and Health Disparities (NIMHD), briefed the Council on the NIMHD research agenda on EHDs.

He provided background information on EHDs and on NIMHD. He discussed EHD research funding by NIH IC. He examined the NIMHD research framework and described several programs. He described NIMHD and NIEHS collaborations in HDs research:

- Three funded Centers of Excellence on Environmental Health
- Climate Change and Health Initiative
- Research Coordinating Committee on Social Determinants of Health
- Environmental Justice
- Model of community engagement as a sustainable research platform
- RADx for Underserved Populations (RADx-UP)

He provided more details about the RADx-UP program, which thus far has funded 127 unique projects. He described the NIH Community Engagement Alliance (CEAL) Against COVID-19 Disparities, and several other federal programs on racism.

He delineated what is needed in community-engaged research to reduce health disparities:

- Seek equal partnership among community organizations, scientists, and other sectors
- Recognize the importance of health and well-being and not just health care
- Shift models of health care to population health built on strong primary care
- Engage community resources in promoting health: access to real food and safe places
- Recognize and manage structural and interpersonal discrimination

He concluded by listing NIMHD funding opportunity announcements, and contact information for NIMHD.

IX. Pursuing Environmental Justice

The Council was briefed on recent federal government initiatives on EJ by Arsenio Mataka, J.D., Senior Advisor for Climate and Health Equity in the Office of the Assistant Secretary for Health, Department of Health and Human Services.

Mr. Mataka began with his story of growing up with pollution in a small, agricultural community in Central California. He compared it to other EJ communities around the country, and discussed prevalence of pollution and health effects in each.

He turned to EJ efforts within the federal government. The existing situation is that too many disadvantaged, low-income communities, including communities of color, continue to bear the brunt of health impacts from industrial development, agricultural practices, and cumulative impacts of land use decisions, transportation, and trade corridors.

He noted that with Executive Order 14008, President Biden directed federal agencies to make achieving environmental justice part of its mission by developing programs, policies, and activities to address the disproportionately high and adverse human health, environmental, and climate-related and other cumulative impacts on disadvantaged communities.

He described the recently announced HHS Office of Environmental Justice, which has been mandated to:

- Develop and implement EJ strategy
- Establish an EJ Index
- Provide Justice40 assistance
- Support civil rights investigations

He closed with his five tips for advancing EJ:

- Work with Intentionality

- Prioritize EJ
- Rule of Three for working with communities
- Find the Merging Lane, to work with people identifying community-level problems
- Respect for the communities

X. Council Discussion

Dr. L. Michelle Bennett, Senior Advisor for Strategic Initiatives in the Office of the Director, led a Council discussion session, which focused on these questions:

- What is needed to advance the science of measuring structural racism and discrimination (SRD) in environmental health science?
- How can the science of structural-level interventions—interventions that target the upstream factors that contribute to EHD—be advanced?
- How can we successfully integrate Social Determinants of Health (SDoH) and principles of environmental justice into how we assess exposure impact? Especially in the context of exposomics and precision environmental health?
- Recognizing the multi-sectoral nature of these EHD/EJ issues, who are other partners that NIEHS should work with to advance efforts to understand and address environmental health disparities and bring about health equity?

Thinking about prioritization, Dr. Vasquez observed that “there is way too much to do, and there are not enough funds to clean everything up and take care of all the inequities.” So how can prioritization take place? She noted that there must be local, state, and federal entities involved in policymaking and funding, and wondered how NIEHS could fit into it, and the NIEHS role in the whole process.

Mr. Mataka responded to Dr. Vasquez by remarking that it would be useful to adopt a place-based perspective in working to prioritize efforts, citing some of the locale examples he had mentioned in his presentation, with the Cumulative Impact tool he had shown. He also noted that there are situations where NIEHS may not have direct control, but could still have a significant impact on policymaking and intervention strategies.

Dr. Pérez-Stable commented that there is a need to actively break siloes and think about collaborations. He cited housing, transportation, and health care as potential sectors for partnerships.

Dr. Bourne said that he was seeing a surge in the number of undergraduates wanting to practice data science, with a huge interest in the field at all levels. He wanted to ask how to utilize these people, who are greatly interested in data science for societal benefit. He expressed a need to create funding mechanisms to encourage these students. Dr. Pérez-Stable replied, citing the example of the program which is designed

to build capacity at under-resourced institutions including HBCUs. He asked Dr. Bourne for a follow-up conversation to see how NIMHD could facilitate more capacity. Dr. Mataka said that the Office of Climate Change and Health Equity and the Office of Environmental Justice will eventually be places where there will be opportunities in that area, working with communities. He also noted that other professions doing EJ legal work will have an interest in the data side as well. Dr. Bennett said that sounded like the need for interdisciplinary and transdisciplinary collaborations.

Dr. Hertz-Picciotto noted that the Justice40 requirement “ups the ante” compared to California’s 25% requirement. She felt that it represents a structural, high-level intervention (referring to the second discussion question). She asked whether Mr. Mataka and Dr. Pérez-Stable had a feel for what is working in terms of the science. Mr. Mataka said that for Justice40, it will be difficult to evaluate effectiveness. In terms of what is working in terms of interventions, looking at the California model, he cited the Transformative Climate Communities project as an effective program according to evaluations. However, he said, with some of the existing programs, it is still unknown how effective they are. He felt that the interventions that are specific in their missions but open to flexibilities seem to work better. However, “you have to try these interventions, or else you’ll just be stuck in neutral,” he said. Dr. Pérez-Stable said that there is a need to start with healthy community models, even at the neighborhood level. Linking positive factors such as good community clinics and access to healthy foods with NIEHS priorities would be a good direction. He noted that one institute cannot do everything. He said he remains optimistic that “we have the tools, and we can make a difference.”

Dr. Ingram asked about the establishment of the Environmental Justice Index, and how communities will be able to see it. She wondered how to establish partnerships between a community and people who can actually investigate issues and provide data, particularly as to the needs of smaller tribal communities who have major environmental issues. She noted that students are very interested in returning to and helping their communities. She said that tools such as the Index should be available to help grassroots communities connect to resources and partnerships. Mr. Mataka said that the Index will help reach the corners of the nation that do not have resources such as local universities. Having that information available to all will be important to getting a dialogue going. He said that at some point there will need to be a series of trainings for community members and tribes to understand the data. He described his experience with developing training courses and modules in California. He cited the Research to Action projects as a valuable resource for learning about how to implement interventions and partner with communities. Dr. Pérez-Stable added that it is important to embrace the community engagement model at the start, because partnerships are vital to ensuring impact.

Dr. Kavanagh asked what are some of the major impediments to seeing successes more broadly embraced and put into action in other areas, particularly in terms of political science, in such issues as environmental law and literacy. Mr. Mataka related his experience with environmental law. With regard to EJ and environmental health, he observed that the power dynamics in California have shifted considerably from the traditional environmental organizations such as Sierra Club and Natural Resources Defense Council (NRDC) to groups with social justice and EJ at the forefront of their missions. He predicted a similar trend nationally within the next decade. He said it has been remarkable to see that shift, with policies now reflecting situations people are experiencing on the ground. Dr. Pérez-Stable noted that there were restrictions on what NIH can do in terms of policy interventions and lobbying. He felt that local jurisdictions should be partners in some of the structural interventions being discussed, and that there is no real limitation at that level. That is where there could be opportunities, including funding, he noted.

Dr. Penning said he was delighted to hear that HHS will have the new Office of Environmental Justice (OEJ). He asked whether it would be putting some of its funding toward cleaning up Superfund sites. Mr. Mataka replied that OEJ would not be directly funding Superfund cleanup, but would be working with adjacent communities. He said there is an effort underway between HUD, EPA, and HHS to address Superfund site cleanup, which is currently being prioritized.

Dr. Woychik noted that EJ communities want their communities cleaned up. He asked Mr. Mataka how NIEHS could join forces with other federal government agencies who have responsibilities for cleanup to address EJ communities not just as a research organization but also as a partner to speak to their concerns, from research to cleanup. Mr. Mataka said that a role for NIEHS might be in the post-cleanup phase. He noted that some of the legacy cleanup projects have timelines out to one thousand years. He mentioned a Superfund site in Birmingham, Alabama, and wondered what the NIEHS team might think it could contribute in terms of its available tools. Dr. Woychik replied that NIEHS has a working group that would be building suggestions on what the institute could be doing on those issues.

Dr. Bennett summarized the discussion. The importance of data science and big data was emphasized, not just for today but for the next generation as well. There was much discussion of implementation science, involving different levels. Community health also received much attention. Dr. Bennett thanked all participants for a robust conversation.

XI. Adjournment

Dr. Woychik thanked Dr. Bennett for excellent facilitation.

