Report to the National Advisory Environmental Health Sciences Council
Director, NIEHS

May 24–25, 2016

Budget and Legislative Report

	FY 2015 Omnibus Appropriation	FY 2016 President's Request	FY 2016 House Appr Committee	FY 2016 Senate Appr Committee	FY 2016 Omnibus Appropriation
NIEHS	$ 667,333,000[a]	$ 681,782,000	$ 675,783,000	$ 695,900,000	$ 693,533,000[a]
NIH (LHHS)	$30,084,000,000	$31,084,000,000	$31,184,000,000	$32,084,000,000	$32,084,000,000
Common Fund	$ 545,639,000[b/]	$ 565,639,000[b/]	$ 688,239,000[b/]	$ 556,677,000[b/]	$ 675,639,000[b/]
Superfund	$ 77,349,000	$ 77,349,000	$ 77,349,000	$ 77,349,000	$ 77,349,000
NIEHS/DOE Training	$ 10,000,000		$ 10,000,000		$ 10,000,000

a/ Reduced by $169,000 transfer to the NIH Office of AIDS Research.
b/ Includes addition of $12.6 million for the Gabriella Miller Kids First Act pediatric research initiative.

Budget Comparison ($ in millions)

	NIEHS	Superfund	Total
2010	689.781	79.212	768.993
2016	693.533*	77.349	770.882
2017 PB	693.533	77.349	770.882

Including the reduction in Superfund appropriation, the overall NIEHS budget for FY2016 is barely $2M greater than the appropriation for FY2010.

Congressional Meetings and Briefings

Endometriosis Awareness

On March 3, 2016, Dr. Birnbaum joined Ms. Padma Lakshmi, cofounder of the Endometriosis Foundation of America and the host of Bravo's "*Top Chef*", in raising awareness on Capitol Hill about endometriosis and the need for more research about this disease through a staff briefing and meetings with three U.S. Senators. Both principals spoke at a briefing in Room 902 of the Hart Senate Office Building that was attended by approximately 50 staffers and entitled "*Endometriosis Awareness: Prevalence, Impact and Environmental Dimensions of a Major Women's Health Issue*." This briefing was organized by the Environmental Working Group (EWG) and hosted by U.S. Senator Dianne Feinstein of California. Dr. Birnbaum and Ms. Lakshmi also called upon Senators Charles Schumer of New York, Elizabeth Warren of Massachusetts, and Kirsten Gillibrand of New York. Additionally, they met with Brian McKeon, Chief of Staff for Senator Jeanne Shaheen of New Hampshire. Senator Gillibrand expressed interest in working with the American Congress of Obstetricians and Gynecologists, as well as other professional medical groups, to update guidelines that can help practitioners increase accurate and early diagnosis of endometriosis. Each Senator also expressed interest in helping expand funding for educational programs and research about the disease. At the end of the day, Dr. Birnbaum and Ms. Lakshmi also met with Nancy Lee, M.D., Deputy Assistant Secretary of Women's Health and Director of the Office on Women's Health at HHS. Attending the briefing and certain meetings from EWG was Ken Cook, President and Cofounder; Scott Faber, Vice President of Government Affairs; Christine Hill, Director of Government Affairs; and Robert Coleman, Administrative Assistant. Ms. Lakshmi was accompanied by her assistant, Ms. Nidhi Bhatt. Attending the briefing and certain meetings from HHS was Aubrey Miller, M.D., ODB Supervisor and NIEHS Senior Medical Advisor; Dr. Mark Miller, NIEHS Chief of Staff; Jed Bullock, NIEHS Legislative Liaison; Anne Tatem, NIH OLPA Senior Legislative Analyst; and Alexandra "Alex" Khalife, Legislative Analyst in the HHS Office of the Assistant Secretary for Legislation.

BPA Research

On April 8, 2016, Dr. John Bucher, Associate Director, National Toxicology Program (NTP) and Dr. Gwen Collman, Director, Division of Extramural Research and Training (DERT) at NIEHS, briefed four majority staff members of the House Oversight and Government Reform (OGR) Committee for approximately one hour about research funded by NIEHS to investigate the toxicity, and human health effects of exposure to, Bisphenol A (BPA). The four OGR staff members who received this briefing were: William "Bill" McGrath, Staff Director, Subcommittee on the Interior; Drew Feeley, Counsel; Ryan Hambleton, Senior Professional Staff Member; and Melissa Beaumont, Professional Staff Member. Mr. McGrath noted that the minority was invited to attend the briefing, but no minority staff was present. Accompanying Dr. Bucher and Dr. Collman to the briefing were Dr. Aubrey Miller, ODB Supervisor and NIEHS Senior Medical Advisor; Jed Bullock, NIEHS Legislative Liaison; Laura Berkson, NIH OLPA Legislative Analyst; and Tamara Alexander, Counselor on Oversight in the HHS Office of the Assistant Secretary for Legislation (ASL) and formerly of the OGR minority staff. Dr. Bucher opened the briefing by providing an overview of the history of BPA research at NTP and specifically of the "Consortium Linking Academic and Regulatory Insights on BPA Toxicity" (CLARITY-BPA) Program. Dr. Collman followed by providing an overview of the NIH extramural grants policy to include an explanation of the award decision-making process, the NIEHS Scientific Advisory Board, and the grants awarded for BPA

research with funds that were appropriated in 2009 under the *American Recovery and Reinvestment Act* (ARRA). Following these overviews, Mr. McGrath and Mr. Feeley asked a series of questions about the precise timing for, and protocols surrounding, release of raw data and conclusions from the funded BPA research with respect to both ARRA grantees and the CLARITY studies. Dr. Collman explained that DERT grantees are currently in year four of their five-year awards and that the grantee is in control of releasing the raw data and publishing conclusions. Dr. Bucher explained that CLARITY studies would be published together once the data is aggregated about a year from now, and that protocols require pre-publication review of draft papers by a steering committee comprised of both FDA and NIEHS personnel to ensure any published material is devoid of any policy statements or recommendations. At the conclusion of the briefing, Mr. McGrath indicated that the committee staff would review and discuss the information that was presented. He further indicated that he would resume communication if Chairman Jason Chaffetz should have additional questions for NIEHS or if he elects to send a second letter with a narrower scope and focus than his original letter of March 3, 2016, to Dr. Birnbaum, which precipitated the briefing.

On April 25, 2016, Dr. John Bucher, Associate Director, National Toxicology Program (NTP) and Dr. Gwen Collman, Director, Division of Extramural Research and Training (DERT) at NIEHS, briefed minority staff members of the House Oversight and Government Reform (OGR) Committee and a member's office for less an hour about research funded by NIEHS to investigate the toxicity, and human health effects of exposure to Bisphenol A (BPA). The three staff members who received this briefing were: Christy Gamble, House OGR Minority Health Counsel; and Michael Wilkins, House OGR Minority Professional Staff; and Varun Krovie, Policy Advisor for Representative Brenda Lawrence (D-MI). Accompanying Dr. Bucher and Dr. Collman on the call were Dr. Aubrey Miller, ODB Supervisor and NIEHS Senior Medical Advisor; April Bennett, NIEHS ODB Program Manager; Anne Tatem, NIH OLPA Senior Legislative Analyst; and Tamara Alexander, Counselor on Oversight in the HHS Office of the Assistant Secretary for Legislation (ASL). Dr. Bucher opened by giving the background history of BPA research at NTP and specifically discussed the CLARITY studies with the staff. Dr. Collman provided an overview of the NIH extramural grants policy to include an explanation of the award decision-making process, the NIEHS Scientific Advisory Board, and the grants awarded for BPA research with funds that were appropriated. The staff asked some questions on how the CLARITY study and the extramural awards were funded, who funded the studies and if we could provide who received the funding for the BPA awards and who did not. And if there were certain applicants were seeing funding more often than others. The staff also asked clarifying questions on what the academic vs. regulatory BPA studies results was seeing.

U.S. Senator Barbara Mikulski Farewell Visit to NIH

On April 11, 2016, U.S. Senator Barbara Mikulski of Maryland, who is retiring this December after 40 years of service in Congress (10 years in the House and 30 years in the Senate), returned to the NIH Bethesda campus for a final visit as a sitting Senator. Senator Mikulski addressed a couple hundred NIH employees, including several IC Directors, who gathered for the occasion in the Masur Auditorium of the Clinical Center. Dr. Aubrey Miller, April Bennett, and Jed Bullock attended as NIEHS representatives. After having been introduced by Dr. Collins, Senator Mikulski, who is the Ranking Member of the Senate Appropriations Committee, thanked the scores of NIH researchers and support staff for their dedication to the NIH mission and to keeping the doors of the "National Institutes of

Hope" open in difficult budget times. She recounted a moving visit she made to the Clinical Center in 2013, on the brinks of sequester, when she met Felicia Sanchez, a patient stricken with Valley Fever. Sanchez, representative of the patients that rotate through the Clinical Center, gave added reason and personal testimony for the Senator to work through the political complexities at the time to champion the NIH budget. The Senator affirmed her commitment to remain engaged post her retirement from the Senate, and said she will continue to be a voice for biomedical research. She touched on progress made during her 40 years of public service in the areas of cancer, stroke, heart disease, HIV/AIDS research, and most of all, with respect to the growth of NIH's Office of Research on Women's Health (ORWH). She recounted her work with former Senator Olympia Snowe, former Congresswoman Pat Schroeder, and former Congresswoman Connie Morella, in securing opportunities for women to participate in, and benefit from, NIH clinical research. Then President George H.W. Bush responded to their call and in 1991 appointed the late Dr. Bernadine Healy to head the NIH. The Senator forged a friendship with Dr. Healy and also with Dr. Vivian Pinn, the first ORWH Director, who was on hand for the Senator's final visit to NIH. In closing her remarks, the Senator, in expressing the way she feels about NIH, shared a quote from the late Helen Keller, who remarked "all that you deeply love, you'll never lose." Dr. Collins presented her with a commemorative plaque—with a mounted gold-plated petri dish—and pair of earrings that are shaped like the "NIH Hope" guitar pick lapel pins that became popular during the time of the 2013 government shutdown.

Appropriations

House Appropriations Subcommittee FY2017 NIH Budget Hearing
The House Appropriations Subcommittee on Labor, Health and Human Services, Education, and Related Agencies held its hearing on the FY2017 President's budget request for NIH on March 16, 2016. Francis Collins, Director, NIH, testified and was accompanied by Anthony Fauci, Director, NIAID; Richard Hodes, Director, NIA; Doug Lowy, Acting Director, NCI; and Nora Volkow, Director, NIDA.

Senate Appropriations Subcommittee FY2017 NIH Budget Hearing
The Senate Appropriations Subcommittee on Labor, Health and Human Services, Education, and Related Agencies, Chair, Roy Blunt (R-MO), held a hearing on the FY2017 President's budget for NIH on April 7, 2016. Francis Collins, Director, NIH, testified and was accompanied by Douglas Lowy, Acting Director, NCI; Walter Koroshetz, Director, NINDS; Richard Hodes, Director, NIA; Christopher Austin, NCATS; and Nora Volkow, Director, NIDA. A written statement justifying the NIEHS budget request was prepared with OPPE leadership and inserted into the formal hearing record together with similar statements that were prepared by other Institutes and Centers at NIH.

Research-Relevant Legislation

The Next Generation Researcher Act. (S. 2014) – On April 4, 2016, the Senate HELP Committee reported S. 2014, the Next Generation Researcher Act. The bill establishes the Next Generation Researchers Initiative through which the NIH Director will coordinate all policies and programs within the agency aimed at promoting and providing opportunities for new researchers and earlier research independence. The legislation also consolidates NIH's current loan repayment programs (LRPs) into extramural and intramural LRPs with the current LRPs listed as subcategories under each section and

raises the cap to $50,000. Finally, the bill requires a GAO report within 18 months after enactment on NIH efforts to attract, retain, and develop emerging scientists. The Committee intends to combine this legislation into a comprehensive Senate innovation bill.

The FDA and NIH Workforce Authorities Modernization Act (S. 2700)- On April 18, 2016, the Senate HELP Committee reported with an amendment in the nature of a substitute, S. 2700, the FDA and NIH Workforce Authorities Modernization Act. Of interest to NIH, the bill exempts scientific meetings from reporting requirements and restrictions based on OMB Memo 12-12 in annual appropriations acts, exempts NIH research from Paperwork Education Act requirements, and expands the Senior Biomedical Research Service appointment authority primarily by increasing the cap on slots from 500 to 2,000 and raising the salary cap to that of the President's ($400,000). The bill was placed on the Senate Legislative Calendar under General Orders. The Committee intends to combine this legislation into a comprehensive Senate innovation bill.

The Advancing Precision Medicine Act of 2016 (S. 2713) – On April 18, 2016, the Senate HELP Committee reported with an amendment in the nature of a substitute S. 2713, the Advancing Precision Medicine Act of 2016. The bill provides a broad authorization for the HHS Secretary to establish and carry out the Precision Medicine Initiative. The bill also authorizes the NIH Director to require data sharing; provides Other Transactions Authority to ICs and OD offices; and allows the Secretary to exempt from disclosure under FOIA biomedical information that is about an individual and that is gathered or used during the course of biomedical research. The bill was placed on the Senate Legislative Calendar under General Orders. The Committee intends to combine this legislation into a comprehensive Senate innovation bill.

The Promoting Biomedical Research and Public Health for Patients Act (S. 2742) – On April 18, 2016, the Senate HELP Committee reported with an amendment in the nature of a substitute S. 2742, the Promoting Biomedical Research and Public Health for Patients Act. The bill has a number of provisions of interest to NIH including on reporting, administrative burden of grantees, reimbursement for research substances and living organisms, amendments to clinicaltrials.gov, terms for IC Directors, and some relief from NCATS clinical trials restrictions. The bill was placed on the Senate Legislative Calendar under General Orders. The Committee intends to combine this legislation into a comprehensive Senate innovation bill.

The Advancing NIH Strategic Planning and Representation in Medical Research Act (S. 2745) – On April 5, 2016, Senator Susan Collins (R-ME), introduced S. 2745, the Advancing NIH Strategic Planning and Representation in Medical Research Act. On April 6, the Senate HELP Committee ordered to be reported, as amended, by voice vote, S. 2745. This bill requires NIH to develop a six year, NIH wide strategic plan, and includes several provisions promoting the inclusion of women, racial and ethnic minorities, sexual and gender minorities, and various age groups in clinical research. The Committee intends to combine this legislation into a comprehensive Senate innovation bill.

SBIR and STTR Reauthorization and Improvement Act of 2016 (S. 2793) – On April 13, 2016, Senator Jeanne Shaheen (D-NH) and Senator David Vitter (R-LA), introduced S. 2793, the SBIR and STTR Reauthorization and Improvement Act of 2016. The bill makes the two programs permanent and

incrementally increases the SBIR set aside from 3.2 percent in FY18 to 6.0 percent in FY28 and the STTR set side from 0.45 percent in FY18 to 1.00 percent in FY28. The bill also updates references to NIH as HHS as other OPDIVS participate in these programs; makes the commercialization pilot program for civilian agencies permanent; requires agencies to put in place a goal for Federal research and R&D with small business of not less than 10 percent by FY18; allows costs for seeking intellectual property protections for SBIR/STTR technologies as indirect cost expenses; replaces annual agency self-reports with GAO audits of key commercialization goals; directs HHS to shorten application review and decision from one year to 10 months; and extends the administration funds pilot program through FY21. The bill also establishes a pilot program at SBA to provide grants to regional, multi-state collaboratives to address the needs of small business concerns in the bottom half of the SBIR program and reauthorizes the Federal and State Technology Partnership (FAST) program. The bill requires agencies to contribute 15 percent of their administration funds to SBA for to carry out these two programs and deploy outreach initiatives in a coordinated and streamlined way. S. 2793 was referred to the Senate Committee on Small Business and Entrepreneurship.

Science Advances

One NIEHS **(NIEHS authors' groups in parens)**

- ***DNA Methylation in Newborns and Maternal Smoking in Pregnancy: Genome-wide Consortium Meta-analysis.*** *Joubert BR (DERT), JF Felix, P Yousefi, KM Bakulski, AC Just, C Breton, SE Reese (DIR), CA Markunas (DIR), RC Richmond, CJ Xu, LK Kupers, SS Oh, C Hoyo, O Gruzieva, C Soderhall, LA Salas, N Baiz, H Zhang, J Lepeule, C Ruiz, S Ligthart, T Wang (DIR), JA Taylor (DIR), L Duijts, GC Sharp, SA Jankipersadsing, RM Nilsen, A Vaez, MD Fallin, D Hu, AA Litonjua, BF Fuemmeler, K Huen, J Kere, I Kull, MC Munthe-Kaas, U Gehring, M Bustamante, MJ Saurel-Coubizolles, BM Quraishi, J Ren, J Tost, JR Gonzalez, MJ Peters, SE Haberg, Z Xu (DIR), JB van Meurs, TR Gaunt, M Kerkhof, E Corpeleijn, AP Feinberg, C Eng, AA Baccarelli, SE Benjamin Neelon, A Bradman, SK Merid, A Bergstrom, Z Herceg, H Hernandez-Vargas, B Brunekreef, M Pinart, B Heude, S Ewart, J Yao, N Lemonnier, OH Franco, MC Wu, A Hofman, W McArdle, P Van der Vlies, F Falahi, MW Gillman, LF Barcellos, A Kumar, M Wickman, S Guerra, MA Charles, J Holloway, C Auffray, HW Tiemeier, GD Smith, D Postma, MF Hivert, B Eskenazi, M Vrijheid, H Arshad, JM Anto, A Dehghan, W Karmaus, I Annesi-Maesano, J Sunyer, A Ghantous, G Pershagen, N Holland, SK Murphy, DL DeMeo, EG Burchard, C Ladd-Acosta, H Snieder, W Nystad, GH Koppelman, CL Relton, VW Jaddoe, A Wilcox (DIR), E Melen and SJ London (DIR). Am J Hum Genet* (2016) v. 98 (4): pp. 680-96.
  http://dx.doi.org/10.1016/j.ajhg.2016.02.019
  SP Goal 1, 2, 3

DNTP

- ***Chemical reactivity and respiratory toxicity of the alpha-diketone flavoring agents: 2,3-butanedione, 2,3-pentanedione, and 2,3-hexanedione.*** *Morgan, DL (DNTP), Jokinen, MP,*

Johnson, CL, Price, HC, Gwinn, WM (DNTP), Bousquet, RW, Flake, GP (DNTP). Toxicol Pathol. 2016. 2016/03/31
http://dx.doi.org/10.1177/0192623316638962
SP Goal 1, 5

- ***Subchronic exposures to fungal bioaerosols promotes allergic pulmonary inflammation in naive mice.*** *Nayak, AP, Green, BJ, Lemons, AR, Marshall, NB, Goldsmith, WT, Kashon, ML, Anderson, SE, Germolec, DR (DNTP), Beezhold, DH. Clin Exp Allergy.* 2016. 2016/02/20
http://dx.doi.org/10.1111/cea.12724
SP Goal 1, 5

- ***Neurite outgrowth in human induced pluripotent stem cell-derived neurons as a high-throughput screen for developmental neurotoxicity or neurotoxicity.*** *Ryan, KR (DNTP), Sirenko, O, Parham, F (DNTP), Hsieh, JH (DNTP), Cromwell, EF, Tice, RR (DNTP), Behl, M (DNTP). Neurotoxicology.* 2016. 2016/02/09
http://dx.doi.org/10.1016/j.neuro.2016.02.003
SP Goal 1

- ***Histology atlas of the developing mouse hepatobiliary hemolymphatic vascular system with emphasis on embryonic days 11.5-18.5 and early postnatal development.*** *Swartley, OM, Foley, JF (DNTP), Livingston, DP, 3rd, Cullen, JM, Elmore, SA (DNTP). Toxicol Pathol.* 2016. 2016/03/11
http://dx.doi.org/10.1177/0192623316630836
SP Goal 1, 7

DIR

- ***A family-based, genome-wide association study of young-onset breast cancer: inherited variants and maternally mediated effects.*** *O'Brien KM (DIR), Shi M (DIR), Sandler DP (DIR), Taylor JA (DIR), Zaykin DV (DIR), Keller J, Wise AS (DIR), Weinberg CR (DIR).* Eur J Hum Genet. 2016 Feb 17.
http://www.ncbi.nlm.nih.gov/pubmed/26883092
SP Goal 2

- ***Early Life Factors Associated with Adult-Onset Systemic Lupus Erythematosus in Women.*** *Parks CG (DIR), AA D'Aloisio (DIR) and DP Sandler (DIR). Front. Immunol.* (2016) v. 7 pp. 103.
http://dx.doi.org/10.3389/fimmu.2016.00103
SP Goal 2

- ***Skeletal muscle action of estrogen receptor alpha is critical for the maintenance of mitochondrial function and metabolic homeostasis in females.*** *Ribas V, BG Drew, Z Zhou, J Phun, NY Kalajian, T Soleymani, P Daraei, K Widjaja, J Wanagat, TQ de Aguiar Vallim, AH Fluitt, S Bensinger, T Le, C Radu, JP Whitelegge, SW Beaven, P Tontonoz, AJ Lusis, BW Parks, L Vergnes, K Reue, H Singh, JC Bopassa, L Toro, E Stefani, MJ Watt, S Schenk, T Akerstrom, M Kelly, BK*

Pedersen, SC Hewitt (DIR), KS Korach (DIR) and AL Hevener. Sci. Transl. Med. (2016) v. 8 (334): pp. 334ra54.
http://dx.doi.org/10.1126/scitranslmed.aad3815
SP Goal 1

- ***Combined Effects of High-Dose Bisphenol A and Oxidizing Agent (KBrO) on Cellular Microenvironment, Gene Expression, and Chromatin Structure of Ku70-deficient Mouse Embryonic Fibroblasts.*** *Gassman NR (DIR), E Coskun, P Jaruga, M Dizdaroglu and SH Wilson (DIR). Environ Health Perspect* (2016) [InPress]
  http://dx.doi.org/10.1289/ehp237
  SP Goal 1, 4

- ***Reversal of DNA damage induced Topoisomerase 2 DNA-protein crosslinks by Tdp2.*** *Schellenberg MJ (DIR), L Perera (DIR), CN Strom, CA Waters, B Monian (DIR), CD Appel (DIR), CK Vilas (DIR), JG Williams (DIR), DA Ramsden and RS Williams (DIR). Nucleic Acids Res* (2016) [ePub]
  http://dx.doi.org/10.1093/nar/gkw228
  SP Goal 1

DERT

- ***Association between prenatal exposure to ambient diesel particulate matter and perchloroethylene with children's 3rd grade standardized test scores.*** *Stingone JA, McVeigh KH, Claudio L.* Environ Res. 2016 Apr 5;148:144-153.
  http://www.ncbi.nlm.nih.gov/pubmed/27058443
  SP Goal 2, 4

- ***Maternal phthalate exposure during pregnancy is associated with DNA methylation of LINE-1 and Alu repetitive elements in Mexican-American children.*** *Huen K, Calafat AM, Bradman A, Yousefi P, Eskenazi B, Holland N.* Environ Res. 2016 Mar 25;148:55-62.
  http://www.ncbi.nlm.nih.gov/pubmed/27019040
  SP Goal 1, 2, 6

- ***Parental whole life cycle exposure to dietary methylmercury in zebrafish (Danio rerio) affects the behavior of offspring.*** *Mora-Zamorano FX, Klingler R, Murphy C, Basu N, Head JH, Carvan Iii MJ.* Environ Sci Technol. 2016 Mar 29. [Epub ahead of print]
  http://www.ncbi.nlm.nih.gov/pubmed/27023211
  SP Goal 2, 3

- ***Metabolomic network analysis of estrogen-stimulated MCF-7 cells: a comparison of overrepresentation analysis, quantitative enrichment analysis and pathway analysis versus metabolite network analysis.*** *Maertens A, Bouhifd M, Zhao L, Odwin-DaCosta S, Kleensang A, Yager JD, Hartung T.* Arch Toxicol. 2016 Apr 2. [Epub ahead of print]

http://www.ncbi.nlm.nih.gov/pubmed/27039105
SP Goal 1

- ***Direct measurement of Bisphenol A (BPA), BPA glucuronide and BPA sulfate in a diverse and low-income population of pregnant women reveals high exposure, with potential implications for previous exposure estimates: a cross-sectional study.*** *Gerona RR, Pan J, Zota AR, Schwartz JM, Friesen M, Taylor JA, Hunt PA, Woodruff TJ.* Environ Health. 2016 Apr 12;15(1):50.
  http://www.ncbi.nlm.nih.gov/pubmed/27071747
  SP Goal 5, 6

- ***Recent Fast Food Consumption and Bisphenol A and Phthalates Exposures among the U.S. Population in NHANES, 2003-2010.*** *Zota AR, Phillips CA, Mitro SD.* Environ Health Perspect. 2016 Apr 13. [Epub ahead of print]
  http://www.ncbi.nlm.nih.gov/pubmed/27072648
  SP Goal 4, 5

- **Exposure to Greenness and Mortality in a Nationwide Prospective Cohort Study of Women.** James P, Hart JE, Banay RF, Laden F. Environ Health Perspect. 2016 Apr 14. [Epub ahead of print]
  http://www.ncbi.nlm.nih.gov/pubmed/27074702
  SP Goal 2

NIEHS News and Highlights

50th Anniversary

The NIEHS will host a Global Environmental Health Day on June 29 as part of our 50th Anniversary ongoing celebrations. The Institute has a long history of work around the world on environmental health issues including in the developing world. Presentations will highlight this work and current efforts, as well as bring in area academic, NGO, and private organizations working in this area to spur opportunities for future collaboration.

The 2016 Society of Toxicology (SOT) Council meeting will be held at NIEHS on July 12-13. Following the meeting, SOT will host a reception for NIEHS staff in celebration of the Institute's 50th anniversary and its long, productive engagement with the SOT.

Flint Update

HHS SPiRIT. NIEHS OD-Bethesda coordinates the HHS Assistant Secretary for Preparedness and Response's (ASPR) Science Preparedness Research Interagency Team (SPiRIT) for Flint (comprised of NIEHS, FIC, NICHD, NLM, NIMHD, NIMH), CDC/ATSDR, HRSA, SAMHSA, ACF). The group is focusing on Representatives also share information regarding their current activities in order to foster opportunities and collaborations for needed research in the future. At this time HHS and Agency representatives continue to work with differing groups and respond to specific

issues as part of the acute response. Efforts will continue to coordinate both at the agency level and through the HHS SPiRIT to work with the community to examine potential research needs, opportunities to build off current activities, and to facilitate helpful scientific collaborations between the various stakeholders. Representatives also share information regarding their current activities in order to foster opportunities and collaborations for needed research in the future. At this time HHS and Agency representatives continue to work with differing groups and respond to specific issues as part of the acute response. Efforts will continue to coordinate both at the Agency level and through the HHS SPiRIT to work with the community to examine potential research needs, opportunities to build off current activities, and to facilitate helpful scientific collaborations between the various stakeholders.

Lead Strategy Update. The President's Task Force on Environmental Health Risks and Safety Risks to Children has established a lead status report working group to work on an update following the previous strategy on lead published by the Task Force in 2000 "*A Federal Strategy Targeting Lead Paint Hazards."* (http://www.cdc.gov/nceh/lead/about/fedstrategy2000.pdf). The goal is to identify programs that address lead exposures and to have input from each Task Force agency involved in reducing lead exposure. The document will also update the lead health effects information, current lower exposure and blood lead levels, address the multiple sources of lead that adversely impact children, and outline intervention to mitigate health effects from nutrition to education. NIEHS/NTP lead on this activity is Andy Rooney, Ph.D.

*NTP Monograph Health Effects of Low-Level Lead***.** This information, along with other NIEHS lead-facts, etc. is being used as part of the Flint response efforts to help support improved understanding of the health effects associated with lead exposures and issues of concern.

NIH Disaster Research Response (DR2) Program. NIEHS continues to lead the DR2 Program to improve our capacity to perform timely research response to situations like Flint, MI, through the development of improved processes, tools, researcher training and preparedness, and development of new national networks involving academia, public health, community stakeholders, emergency responders, and others.

Hearings and Briefings

- Briefings to Research Community. Linda Birnbaum, NIEHS/NTP Director, provided a briefing on the Flint situation to the NIH IC Directors. John Bucher, Associate Director NTP, provided a similar briefing to the NIH Scientific Directors.
- ASPR Testimony on Federal Response. On April 6, 2016, technical edits were provided to draft testimony circulated by HHS/ASL for the HHS Assistant Secretary for Preparedness and Response (ASPR) to deliver at the April 13, 2016, hearing in the House Energy and Commerce Committee. The testimony is entitled "*Flint, Michigan: A Coordinated Response*." The edits were included in Dr. Lurie's written testimony included a sentence summarizing and specifically highlighting NIEHS contributions to incident response in Flint, Michigan: "We [ASPR] are also engaging the federal and academic research communities through the National Institute of Environmental Health Sciences, a

component of the National Institutes of Health, to study the health impact of lead exposure and inform the public health response in the Flint community over the long term." Other witnesses at the hearing included: Mr. Joel Beauvais, EPA Deputy Assistant Administrator in the Office of Water, as a federal witness. Mr. Nick Lyon, Director, Michigan Department of Health and Human Services and Mr. Keith Creagh, Director of the Michigan Department of Environmental Quality will testify from the state perspective along with Ms. June Swallow, Chief of the Rhode Island Department of Health Office of Drinking Water Quality and Mr. Steve Estes-Smargiassi, Director of Planning and Sustainability at the Massachusetts Water Resources Authority. Dr. Mona Hanna-Attisha, Program Director, Pediatric Residency, Hurley Children's Hospital and Assistant Professor of Pediatrics, Michigan State University College of Human Medicine.

Extramural Support to Advance Meritorious Research. NIEHS has met with researchers from Flint to discuss their interests, our available extramural awards, NIEHS funded research Centers in the Flint-area, and is facilitating between area researchers and the NIEHS funded research community focusing on lead issues. NIEHS continues to review research proposals being submitted.

- NIEHS awarded $235,333 to Shawn McElmurry, Ph.D., at Wayne State University, for research related to the Flint water situation. ("Rapid Response to Contaminants in Flint Drinking Water", PI: This represents funds from the NIEHS RPG line, not new money. Description: Quantify the concentrations of residual chlorine, disinfection-by-products (DBP), and lead (PB) and evaluate the toxicity of these complex chemical mixtures; understand exposure to toxic chemicals using hydraulic and geochemical models to help predict areas where exposure to Pb and DBPs will likely occur; and communicate results to water utility operators, government officials (city, state, and federal), public health agencies and residents.
- NIEHS supported researchers at Michigan Lifestage Environmental Exposures and Disease (M-LEEaD) including Rita Loch-Caruso of the EHS Core Center, University of Michigan are providing support, in coordination with Detroit Hispanic Development Corporation (DHDC), the development and translation of information into Spanish. DHDC representatives with LaSalud and UM-SPH students are coordinating and going door-to-door to talk with Spanish-speaking Flint residents.

Worker Training Program. The NIEHS Worker Training Program (WTP) is coordinating efforts to ensure the safety of workers replacing lead water infrastructure in Flint. NTP staff has met with local officials and Jim Remington, a program analyst, has been deployed to coordinate local partnership activities. In addition, several supplemental training grants applicable to the situation have been awarded:

- International Chemical Workers Union Council (ICWUC) has been funded to conduct lead awareness and "train the trainer" classes in the Flint Michigan area. The three-day

class will permit all new trainers to have time to prepare and present lead awareness modules. They are working with Coalition of Black Trade Unionists (CBTU) chapters in Detroit, Flint, and Lansing, as well as the Detroit Fire Academy. Two local chapters of the Labor Council For Latin American Advancement (LCLAA), in Pontiac and Lansing, have recruited bilingual trainers. Since at least half of the fact sheets are available in Spanish, ICWUC has translated the small group activity into Spanish and is presenting it to Latino community groups recruited by these LCLAA chapters in Flint through Our Lady of Guadalupe Church. These LCLAA chapters, with other faith based organizations, are assisting in a pressing situation where the demand for identification is preventing undocumented populations from receiving drinking water in Flint.

- The Center for Construction Research and Training (CPWR), in partnership with the Genesee, Shiawasee and Thumb (GST) Michigan Works Program and the Michigan Building Trades Councils and their affiliated construction unions, is establishing a year-long Environmental Career Worker Training Program (ECWTP) to equip 25 minority, low-income unemployed/underemployed or dislocated worker residents of Flint to participate in environmental awareness training and certification, with the end goal of opportunities to become engaged in meaningful, long-term careers in and beyond the cleanup and restoration of the Flint water system remediation processes. By leveraging community services and financial resources, the program will implement an adaptation of its comprehensive training program to expeditiously prepare program eligible residents of Flint to become immediately employed with an opportunity to join union apprenticeships to further advance their careers in the construction industry.
- The Green Door Initiative (GDI), a member of the University of Cincinnati, Midwest Consortium for Hazardous Waste Worker Training (MWC), has been working with the NAACP National and Flint Chapter to develop community training strategies for addressing the lead crisis. Green Door participated in a Town Hall meeting with the NAACP on Tuesday, January 26 where they provided information about lead, disseminating the *NIEHS Understanding PBT's (Persistent Bio-Toxics)* curriculum to approximately 350 attendees. They are doing outreach to set up other training including *Toxic Use Reduction* and *Reporting Environmental Releases*, in addition to providing some general hazard awareness. Finally, GDI/MWC is partnering with Mott Community College to offer the Environmental Careers Training to ensure that those residents most impacted are provided the opportunity for training that will help with the eventual mitigation of the infrastructure issues that are contributing to the lead poisoning in the city. GDI/MWC is also providing lead awareness training to Job Corps volunteers as well as recruit visitors and residents through churches, who will assist with the distribution of water and water sampling kits.

John Oliver. In a recent satirical video designed to educate the public about lead while entertaining, comedian John Oliver referenced the *2000 President's Task Force Federal Strategy to Eliminate Lead Paint Hazards*. In the same video, the Sesame Street character Oscar the Grouch cited landmark work on lead published in *Environmental Health Perspectives* by NIEHS

grantee Herbert Needleman, Ph.D. (though he was not named). The video has received nearly 4 million views on YouTube.

Staff Updates

- NIEHS is actively recruiting for a new Executive Officer. The search has been narrowed to four candidates who each presented a seminar to the NIEHS community. A final decision is expected by May 20.
- NIEHS is actively recruiting for a Deputy Scientific Director. Council should refer possible candidates to Scientific Director Darryl Zeldin, M.D. or Tom Kunkel, PhD., who is chairing the search committee.
- NIEHS will soon begin a search for a new Scientific Director for the Division of the National Toxicology Program. Current Associate Director John Bucher, Ph.D. has announced his intentions to retire after the transition to a new Associate Director.
- Jian-Liang (Jason) Li, Ph.D., has joined NIEHS as Director of the Integrated Bioinformatics Core. Li was formerly a contractor in the group.
- David Miller, Ph.D., former Acting Scientific Director, and Chief, Laboratory of Toxicology and Pharmacology, retired from NIEHS in February with nearly 31 years of service.
- Jim Putney, Ph.D., former Chief, Signal Transduction Laboratory, retired from NIEHS in March with over 29 years of service. Dr. Putney been approved as an NIEHS Investigator Emeritus.
- NIH: Matthew W. Gillman, M.D., has been named as the Environmental Influences on Child Health Outcomes (ECHO) Program Director. ECHO is a seven-year NIH initiative to use large, existing study cohorts to conduct research on high-impact pediatric health outcomes. He will begin his role with the NIH in July 2016. Gillman is Professor and Director of the Obesity Prevention Program in the Department of Population Medicine of Harvard Medical School. Gillman received his medical degree in 1981 from Duke University School of Medicine, interned and served his residency at North Carolina Memorial Hospital, Chapel Hill, and completed his clinical research fellowship in the Harvard General Internal Medicine and Faculty Development Fellowship Program.

Special Visitors

- Yvonne Maddox. NIEHS welcomed Yvonne Maddox, Ph.D., on March 4 as this year's Spirit Lecture Series Award winner. Maddox, vice president for research at the Uniformed Services University of the Health Sciences, previously held leadership positions at the National Institutes of Health (NIH). As the latest in an inspiring series of female scientists to speak at this annual event, Maddox discussed "Building a Meaningful Career: Insights From Precision Medicine."
- Janine Clayton. NIEHS welcomed Janine Clayton, M.D., director of the NIH Office of Research on Women's Health, for a seminar on May 13 discussing "Better With Both: Frontier for Discovery" on issues of inclusion of women in biomedical research.

Other Highlights

- *NetZero Energy Warehouse*. On April 2015, NIEHS broke ground on a new building designed to generate as much or more power than it uses, which is referred to as net zero energy. The new LEED certified warehouse, located away from main NIEHS buildings for added security, is scheduled for completion in 2017.
- *First Environments 30 Year Anniversary.* The NIEHS-EPA parent cooperative daycare, First Environments Early Learning Center, celebrated its founding in 1986 in March. The center, which is a great benefit to employees, is the most highly accredited day care program in the park, and one of the top programs in the nation.
- *Pregnancy and Childhood Epigenetics Consortium*. NIEHS scientists, including Stephanie London, M.D., D.Ph., deputy chief of the NIEHS Epidemiology Branch, have played a leading role in forming the Pregnancy And Childhood Epigenetics (PACE) consortium, an international group of researchers using epigenetics to study how environmental exposures in early life affect human disease. PACE has a flexible organization modeled after GWAS consortia and research conducted by PACE scientists is organized by project. At present, more than 120 scientists working on 24 different studies examine respiratory and allergic conditions, ear infections, and anthropometry, or collection of an individual's physical measurements. Pregnancy outcomes under study include gestational hypertension and preeclampsia. PACE scientists are also collaborating on several methodological issues involved in analyzing methylation data.

Feature: 50 Years of Environmental Health Training

The NIEHS emphasis on training has resulted in a variety of mechanisms to support development of outstanding environmental health scientists. It is an extremely important part of who we are as an Institute. So much so that the NIEHS Strategic Plan Goal 9 is to: "Inspire a diverse and well-trained cadre of scientists to move our transformative environmental health science forward, and train the next generation of EHS leaders from a wider range of scientific disciplines and diverse backgrounds."

NIEHS routinely ranks at the top among NIH institutes and centers (ICs) on the annual survey of "Best Places to Work" for postdocs conducted by *The Scientist* magazine. This ranking reflects the Institute's opportunities for fellows to train with preeminent scientists and take advantage of cutting edge technologies.

Beyond postdoctoral fellowships, the NIEHS supports a variety of other training mechanisms. For example, NIEHS offers a one-year research fellowship for third-year medical students at Duke to train in environmental medicine. The NTP offers a training program in toxicological pathology.

On April 29, the NIEHS held its 19th Annual Biomedical Career Symposium to give postdoctoral fellows an opportunity to meet, hear from, and network with a wide variety of potential employers. This activity is planned by the fellows, in conjunction with the NIEHS Office of Fellow's Career Development, directed by Tammy Collins, Ph.D.

The NIEHS Scholars Connect program is designed to provide an opportunity for highly motivated science, technology, engineering, and math (STEM) focused undergraduate students from the surrounding community colleges, Historically Black Colleges & Universities (HBCU), and other nearby academic institutions with students from underrepresented groups. The Summer Internship Program offers high school, undergraduate, and graduate students the opportunity to work in an NIEHS lab and pursue interests in science.

Just this year, an NIEHS partnership with the North Carolina Association for Biomedical Research celebrates its 21st anniversary. Over the years, this program has provided training for more than 700 science teachers and administrators.

Extramurally, training is integrated throughout funding programs. The Worker Training Program (WTP) trains workers engaged in activities related to containment, removal, and transportation of hazardous materials, and emergency response. Over the past 25 years, this program has provided health and safety training to over 3 million workers and mobilized WTP trainees to natural disasters, such as Hurricanes Katrina and Sandy and the Deepwater Horizon oil spill.

NIEHS Environmental Health Sciences Centers ("Core Centers") as well as Superfund Research Centers incorporate multiple training opportunities. Examples include the Transdisciplinary Training at the Intersection of Environmental Health and Social Science program co-directed by Northeastern University's Social Science Environmental Health Research Institute and the Silent Spring Institute and the Interdisciplinary Training in Climate and Health program administered through the Environmental Health Sciences (EHS) Department at Columbia University.

But the training is not limited to the United States. Global training support includes the Hubs of Interdisciplinary Research and Training in Global Environmental and Occupational Health (GEOHealth) program that provides Low- and Middle-Income Countries (LMIC) institutions with funding to pursue innovative multidisciplinary public health-relevant research, and training activities of the WHO-NIEHS Collaborating Centre for Environmental Health Sciences in areas such as climate change, ewaste, cookstoves, and children's environmental health. GEOHealth Hubs are supported in India, Bangladesh, Ethiopia, Thailand, Suriname, Peru, and Ghana.

Past Meetings and Events

NIEHS celebrated 50 years of environmental health research with a community forum held in Research Triangle Park (RTP) on February 19. The event was held as part of the **RTP 180** series, which focuses on emerging technologies and trends, and attracts employees of the high tech, biotech, pharmaceutical, and other companies located in RTP. NIEHS Director Linda Birnbaum, Ph.D., was joined by four local grantees: Susan Sumner, Ph.D., from RTI International, Dave Peden, M.D., from the University of North Carolina at Chapel Hill, Heather Patisaul, Ph.D., from North Carolina State University, and Joel Meyer, Ph.D., from Duke University. Birnbaum discussed the research, mission and goals of the NIEHS over the past 50 years. **SP Goals: 4, 5, 10, 11**

Project **TENDR, "Targeting Environment and Neurodevelopmental Risks**," was recently launched with the overarching goal to reduce the incidence of childhood conditions of autism spectrum disorder, intellectual disability, attention deficits, hyperactivity and other learning and neurodevelopmental disabilities. NIEHS grantees at the University of California Davis MIND (Medical Investigations of Neurodevelopmental Disorders) Institute along with the Learning Disabilities Association of America are leading this effort. NIEHS staff met with the group in Monterey, CA, on February 29-March 3 to work toward a Consensus Statement to be released in June and published in *EHP*. **SP Goals: 1, 2, 6, 11**

Many people experience interruptions in light-dark cycles due to their lifestyle choices (e.g. use of electronic devices at night), location of their residences (e.g., urban light pollution), or working at night (e.g., shift work). Exposures to artificial light at night (ALAN) or changes in the timing of exposures to natural light (such as with 'jet lag') may disrupt biological processes controlled by endogenous circadian rhythms, potentially resulting in adverse health outcomes. NTP convened a workshop, **Shift Work at Night, Artificial Light at Night, and Circadian Disruption,** on March 10-11, 2016 at NIEHS, to obtain external scientific input on topics important for informing the literature-based health hazard assessments including strategies for integrating data across evidence streams and exposure scenarios, and on data gaps and research needs. **SP Goals: 1, 3, 4, 5**

At the final meeting of the Deepwater Horizon Research Consortia March 7-8 in Mobile, Alabama, NIEHS grantees discussed research findings, including mental health impacts, factors contributing to community resilience, and the safety of locally caught seafood. The NIEHS-led program was organized to study how the April 2010 Deepwater Horizon oil spill affected the health of communities around the Gulf of Mexico. The $25.2 million, five-year program involved partnerships between four universities and over 45 community organizations. **SP Goals: 4, 5, 6, 11**

On April 4, the first day of National Public Health Week, the White House led an event to launch a new interagency report, **The Impacts of Climate Change on Human Health in the United States.** Three years in development by NIEHS and other agencies, the report provides a quantitative assessment of current and future health impacts of climate change, as well as a review of the state of the science across multiple health outcomes including heat, air pollution, foodborne and waterborne illness, vectorborne disease, and extreme events, as well as chapters on mental health and populations of concern. NIEHS staff participated in the event alongside John P. Holdren, White House science advisor, Gina McCarthy, EPA Administrator, and Vivek Murthy, U.S. Surgeon General. **SP Goals: 3, 5, 6, 11**

NIEHS Superfund Research Program (SRP) staff and grantees shared their expertise and addressed pressing environmental health issues at the **Central and Eastern European Conference on Health and the Environment (CEECHE)**, April 10-14 in Prague. The conference, sponsored in part by the SRP, provided a forum for scientists, engineers, and organizations to focus on Central and Eastern European concerns. Presentations highlighted promising approaches to prevent or reduce exposures in the region. Conference participants came from 19 countries on four continents and included grantees from seven SRP Centers. **SP Goals: 3, 4, 9**

NIEHS grantees discussed new research about how ocean and lake environments affect human health at an April 13-14 meeting at the NIEHS. The **Oceans and Human Health (OHH)** research program, which has led to new drug discovery and tools for prediction of oceanic harmful algal blooms, has expanded to study blooms in the Great Lakes and health impacts from pollutants. NIEHS has supported research related to conditions in the oceans and Great Lakes since the 1970s. In 2004, NIEHS and the National Science Foundation (NSF) began the joint OHH program, which now funds research around the country. **SP Goals: 3, 4, 5**

The **NIEHS Division of Intramural Research** held a **Research Retreat** in Raleigh on April 26. Topics discussed included: Environmental Damage and Stress Response as a Unifying Paradigm for DIR Research, Technology at the Institute: Defining Priorities for New Technology at the NIEHS, and Advancing Translational and Clinical Research at the NIEHS. Tenure track investigators also gave presentations. **SP Goals: 1, 7, 9**

The safety of botanical dietary supplements, hereafter referred to as botanicals, is an important public health issue. According to the 2012 National Health Interview Survey, 17.7 percent of Americans reported having used nonvitamin, nonmineral dietary supplements (including botanicals) in the past 12 months. To further understanding of these safety issues, the National Toxicology Program held a workshop at NIH on April 26-27, **Addressing Challenges in the Assessment of Botanical Dietary Supplement Safety** .The workshop engaged experts on the interrelated challenges associated with the evaluation of botanicals include: (1) developing methods and criteria for assessing phytoequivalence (i.e., similarity in chemical composition and biological activity) of botanicals, (2) identifying the active constituent(s) or patterns of biological response of botanicals, and (3) assessing absorption, distribution, metabolism, and elimination (ADME) of botanicals. **SP Goals: 1, 3**

Upcoming Meetings and Events

- 2016 Tribal Environmental Health Summit, Flagstaff AZ, June 20-21
- Peer Review of the Draft NTP Monograph on Immunotoxicity Associated with Exposure to Perfluorooctanoic Acid (PFOA) or Perfluorooctane Sulfonate (PFOS), NIEHS, July 19
- NIEHS Worker Training Program Grantees and Disaster Research Response (DR2) Science Preparedness Exercise, Boston, July 18-20
- Appalachian Kentucky Community Forum, Hazard, KY, July 25-26
- Dioxin 2016, Florence, Italy, August 28-September 3
- International Society of Environmental Epidemiology (ISEE), Rome, Italy, September 1-4
- 25th Anniversary of NIEHS Endocrine Disruptor Research workshop, NIH, September 19-21
- NIEHS Obesity Grantee meeting, NIH, September 21-22

Honors and Awards

NIEHS

- Teratology Society honored **Nicole Kleinstreuer, Ph.D.**, deputy director of the National Toxicology Program Interagency Center for the Evaluation of Toxicological Methods (NICEATM), with the 2016 F. Clarke Fraser New Investigator Award
- NTP predoctoral trainee **Dierdre Tucker,** in the Reproductive Endocrinology Group, recently received three travel awards for her studies on health effects of alternatives to bisphenol A: The Edward W. Carney Trainee Award, the David Holbrook Travel Award, and the Leon Goldberg Memorial Travel Award. Tucker used one of her awards to travel to the Society of Toxicology annual meeting in New Orleans.

- The NIEHS Scholars Connect Program attracts students from area colleges and universities to spend an academic year working on their own research projects with mentors in NIEHS labs. This year's Scholars Connect Outstanding Scholar was given to **Lucas Van Gorder**, who plans to attend the University of Pennsylvania and study gene therapy and vaccines.
- **Danielle Carlin, Ph.D.**, from the DERT Hazardous Substances Research Branch, and **Erik Tokar, Ph.D.**, of the Division of the National Toxicology Program, have been elected the N.C. Society of Toxicology president-elect and vice-president-elect, respectively.

Grantees

- Outstanding New Environmental Scientist (ONES) Awardees:
    - **Daniel Gorelick, Ph.D.,** from the University of Alabama at Birmingham, will study how pollutants, such as dioxins, use the aryl hydrocarbon receptor protein to cause toxic effects on the heart.
    - **Michele La Merrill, Ph.D.,** from the University of California, Davis, will explore whether exposure to the pesticide DDT during pregnancy causes insulin resistance, by interfering with the production of body heat.
    - **Maitreyi Mazumdar, M.D.,** from Harvard Medical School, the Harvard T.H. Chan School of Public Health, and Boston Children's Hospital (BCH), will research whether prenatal exposure to arsenic may increase the risk of infant neural tube defects.
    - **Somshuvra Mukhopadhyay, M.B.B.S , Ph.D.,** at the University of Texas at Austin, will study the process cells use to remove the toxin manganese, which can cause a syndrome like Parkinson's disease.
    - **Cheryl Rockwell, Ph.D.,** of Michigan State University, will study how the food additive tert-butylhydroquinone, or TBHQ, promotes allergies, in order to identify similar environmental chemicals that may affect the immune system.
- **Trudy Mackay, Ph.D.,** geneticist at North Carolina State University, has won the prestigious Wolf Prize. Each year, Israel's Wolf Foundation recognizes individuals in several scientific and artistic disciplines. Mackay was honored for "pioneering studies on the genetic architecture of complex traits and the discovery of fundamental principles of quantitative genetics with broad applications for agricultural improvements."
- **Michelle Williams, Sc.D.,** an epidemiologist and former member of NIEHS Board of Scientific Counselors, has been named Dean of the Harvard University T.H. Chan School of Public Health.
- **Bruce Hammock, Ph.D.,** a toxicologist and entomologist at the University of California, Davis (UCD), is the first recipient of the John C. McGiff Memorial Award for Contributions to Eicosanoid Research.