National Institutes of Health (NIH)
National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)

Network of Minority Health Research Investigators (NMRI)
14th Annual Workshop

DoubleTree Hotel Bethesda
Bethesda, Maryland
April 21–22, 2016

Draft Meeting Summary

Thursday, April 21, 2016

INTRODUCTIONS

Winnie Martinez, Program Officer, NIDDK, NIH
Heather Tarleton, Ph.D., Assistant Professor, Loyola Marymount University

Ms. Winnie Martinez welcomed the participants to the meeting and thanked the members of the Planning and Oversight Committees for their efforts in organizing the meeting.

Dr. Heather Tarleton extended her welcome to the participants. She recognized the NMRI Annual Meeting as her favorite meeting of the year because of its personal appeal and the excellent opportunities it affords for networking and collaborating. In particular, she welcomed new NMRI members and those participants who were attending their first national NMRI meeting, encouraging them to participate actively.

The NMRI was established in 2003 by the Office of Minority Health Research Coordination (OMHRC) at the NIDDK. The NMRI's members are researchers and technical personnel interested in minority health research, including individuals from traditionally underserved communities. The fourfold mission of the NMRI is to (1) encourage minority health investigators to be researchers in fields of interest to the NIDDK; (2) promote two-way communication between members of the NMRI and the NIDDK; (3) gather recommendations and strategies to enhance opportunities for and support of groups underrepresented in biomedical research; and (4) advance scientific knowledge and contribute to the reduction and eventual elimination of racial and ethnic health disparities. Dr. Tarleton emphasized to new members the sincere interest that the NIDDK has in receiving their feedback.

The NMRI provides an opportunity to volunteer to be a mentor younger students and researchers. Dr. Tarleton thanked all of the current mentoring volunteers. She provided examples of how interactions with NMRI members had inspired two of her students to pursue graduate careers in research.

Dr. Tarleton acknowledged NIDDK director Dr. Griffin P. Rodgers, OMHRC director Dr. Lawrence Agodoa, and NMRI coordinator Ms. Martinez. In addition, she thanked members of the NMRI Oversight Committee for their guidance and acknowledged the financial support of professional societies and cosponsors that made the previous night's reception possible and supported many of the NMRI's travel awards. She congratulated NMRI members Drs. Evan Dale Abel and Glenn Chertow on their induction

into the National Academy of Medicine, formerly known as the Institute of Medicine. She suggested dedicating the meeting to the memory of Dr. Marion Sewer, who had been a member of the NMRI and an advocate and educator dedicated to helping her colleagues and fostering the professional development of her students.

Dr. Tarleton presented the goals for the meeting, the first of which was to network and collaborate. She noted that the schedule for the meeting included multiple opportunities to connect with current collaborators and for new investigators to meet with members. She expressed the hope that participants would use the meeting to make tangible progress on their research. She urged participants to find or become a mentor. Benefits of being mentored include receiving advice on the grant writing process and identifying funding opportunities to pursue. Dr. Tarleton concluded by inviting all of the meeting participants to introduce themselves to the group.

WELCOMING REMARKS

Embracing the Extraordinary Value of a Diverse Community

Gregory Germino, M.D., Deputy Director, NIDDK, NIH

Dr. Gregory Germino welcomed the meeting participants on behalf of Dr. Rodgers and the NIDDK. He noted that the NMRI is an important part of the NIDDK and that its future is important to science. He stated that the research mission of the NIDDK, one of the NIH's 27 Institutes and Centers (ICs), is to support and conduct research on common, costly and consequential diseases, including diabetes and other endocrine and metabolic diseases; liver and other digestive diseases; nutritional disorders; obesity; and kidney, urologic, and hematologic diseases. Dr. Germino discussed the NIDDK's fiscal year (FY) 2015 budget of $1.7 billion, with an additional $150 million special appropriation for type 1 diabetes research that also includes funds to other Institutes, as well as the Centers for Disease Control and Prevention. He noted that the majority of the budget, 64 percent, funded research project grants and only 4 percent was spent on administration.

Dr. Germino stated that the NIDDK aligns its budget with its core principles, which are to (1) maintain a vigorous investigator-initiated research portfolio, (2) support pivotal clinical studies and trials, (3) preserve a stable pool of talented new investigators, (4) foster exceptional research training and mentoring opportunities, and (5) ensure knowledge dissemination about clinically significant research. Dr. Germino emphasized the importance of ensuring that the NIDDK maintains the most qualified pool of researchers possible.

Dr. Germino commented on the research problems facing the NIDDK: The diseases studied are chronic, there are complex interactions among conditions, the diseases often are difficult to model in animals, and the risks for patients and tolls on investigators often are both high. He remarked that many diseases that fall within the NIDDK's primary mission disproportionately affect African Americans, Native Americans, Hispanic Americans, Pacific Islanders, and Asian Americans, which is why the NIDDK sets aside a significant portion of resources to help recruit a diverse workforce of excellent researchers. Dr. Germino described some of the available resources: the Short-Term Research Experience for Underrepresented Persons (STEP-UP) program provides research and training opportunities for students, encouraging them to become excited about learning and research; R03 and National Research Service Award (NRSA) F31 grants are available for scientists of underrepresented backgrounds; R21 awards and the NRSA T32 Diversity Supplement Award help promote diversity in health-related research; and travel awards are available to help researchers attend meetings.

Dr. Germino noted that the NMRI provides an important opportunity for new, emerging, mid-career, and senior investigators to establish relationships. He emphasized that joining a network builds a community and can help spread the group's message. Not only are members able to gain more knowledge on their chosen topic—to become "in the know"—but new career investigators can become "known" by connecting to senior experts who can help them build their career. Dr. Germino also mentioned the NIH's National Research Mentoring Network (NRMN) as a productive resource for investigators to build connections.

Dr. Germino illustrated the progression of the NIH's and NIDDK's budgets over the last two fiscal years. In FY 2016, the NIDDK's budget was $1.97 billion, an increase of 3.6 percent from the $1.90 billion budget of FY 2015. However, the NIH's total budget increased 6.6 percent in that time. Dr. Germino described some areas of targeted budget increases that contributed to the difference, such as research on precision medicine and antimicrobial resistance, the Brain Research through Advancing Innovative Neurotechnologies® (BRAIN) Initiative, and studies of Alzheimer's disease. He noted that the NIDDK participated in some aspects of the Alzheimer's studies because of its connection with diabetes, but most of the budget was directly appropriated to the National Institute on Aging.

Dr. Germino described the NIDDK's grant funding policy for FY 2016. R01 awards have a payline at the 13th percentile in general; R01 applications requesting more than $500,000 have a more stringent 8th percentile payline, and applications from early stage investigators (ESIs) receive a more generous 18th percentile payline. Dr. Germino noted the policy of fully funding Type 5S noncompeting renewals and giving a nominal payline (15th percentile) to the first competitive renewal applications for R01 awards for researchers who were ESIs when they competed for the initial NIDDK Type 1 R01 award.

Dr. Germino then explained that the NIH budget requested for FY 2017 would fund the NIDDK at $1.97 billion, the same amount as FY 2016. He described the targeted initiatives that would receive significant amounts under this budget, including the National Cancer Moonshot, the Precision Medicine Initiative Cohort, and the BRAIN initiative. He noted that almost all ICs would otherwise be flat-funded. Dr. Germino explained that although Congressional appropriators seem supportive of an NIH increase, it is difficult to predict how the process will end, so the NIDDK is planning a conservative budget in the event that they are flat-funded.

Dr. Germino then demonstrated the use of the NIDDK's website, which was redesigned with investigators in mind. He emphasized the importance of researchers' keeping themselves informed and commented that his team has worked hard to ensure that the website is understandable, intuitive, and easy to use; the NIDDK intends to be as transparent as possible in its funding practices. He pointed out that the website lists current funding opportunities and allows users to filter the opportunities according to their career stage. Annual reports are available that feature the newest science, patient stories, and general updates on nonscience activities at the NIDDK, including funding trends.

The NIH Common Fund is another resource that offers many sources for research opportunities and a range of research foci that could be of interest to NIDDK investigators. Dr. Germino noted several new initiatives, including the $240 million Stimulating Peripheral Activity to Relieve Conditions (SPARC) project, the Human Microbiome project, and the Metabolomics project. He encouraged researchers to investigate these opportunities.

Dr. Germino then emphasized the importance of mentors, who play a critical role in the success of young investigators. Mentors can serve as advisors and advocates, as well as help researchers make connections and build bridges. He emphasized the NIDDK's pride in the NMRI, explaining that it sets a paradigm for developing an effective research community. Dr. Germino thanked the participants for their commitment

to the program and encouraged new members to stay with the group, recruit colleagues, and continue working within the network long enough to become mentors for the generation that follows them.

Discussion

A meeting participant suggested that the NIDDK could improve its support and promotion of the NMRI. She explained that she had received an NIDDK minority supplement award, which helped mentors take a chance on her and move her into the area of research in which she is now building her career, and she thanked Dr. Germino for the opportunity. However, during her time as a minority award recipient, she was not informed about the existence of the NMRI; she could have benefited greatly from the community had she become involved earlier. She suggested that the NIDDK encourage minority award applicants or recipients to create a profile to help share information about opportunities. Dr. Germino agreed that the NIDDK could improve in this area but added that working within a government organization involves many rules that restrict the ability to do direct outreach about many of the available initiatives. Researchers often must opt in rather than being recruited because privacy concerns make it difficult to promote available programs. Dr. Tarleton added that encouraging participants to update their profiles and spread the word about the NMRI would be emphasized again later in the conference.

An audience member asked Dr. Germino to elaborate on the complexities of funding projects through multiple ICs, such as Alzheimer's and diabetes research, and to explain which ICs take responsibility for a project that crosses institutional boundaries. Dr. Germino replied that the direct appropriation funding structure of the NIH is both an advantage and a problem. The funds are appropriated with a specific mission, which allows the ICs to focus on the project, and the use of the funds is clearly designated. This becomes a challenge, however, for projects that cross institutional boundaries, and creating robust funding strategies can become complicated. He noted that the NIDDK works with its partners to provide funding for needed research areas and attempts to do direct outreach. Many funding announcements are shared, allowing several ICs to pool their money to fund a particular project; these grants are assigned a primary and secondary funder, meaning that the secondary IC can pick up a grant should the primary IC choose not to fund it. Dr. Germino agreed that such complexities can make it difficult to fund important research.

KEYNOTE SPEAKER

Teams: Leveraging the Power of Collaboration to Advance Your Science
Lewis Roberts, M.D., Ph.D., Professor of Medicine, Mayo Clinic

Dr. Lewis Roberts presented on the power of collaboration, noting that team dynamics are more of an art than a science. He shared a few key quotes illustrating that collaboration allows individuals and organizations to go further and achieve more. Teams are stronger than individuals working alone, and continuing collaboration promotes success. Dr. Roberts shared his top 10 "don'ts" list, with correlates, to foster successful coordination:

1. Don't isolate yourself. (Correlate: Everyone needs mentors.)
2. Don't be afraid to share. (Correlate: Don't think of yourself only; you will get back more than you give.)
3. Don't think of your tribe only. (Correlate: Identity has dark and bright sides.)
4. Don't slack off. (Correlate: Commit to the team and continue to work; this is the source of inspiration.)
5. Don't overdo work. (Correlate: This is the counterpoint to "Don't slack off"; one key is control.)
6. Don't be timid. (Correlate: Pick a significant problem in the world that needs to be addressed.)
7. Don't try to do it all by yourself. (Correlate: Harness the wisdom of diverse teams.)

8. Don’t take all the credit to yourself. (Correlate: Pay attention to the author list.)
9. Don’t believe everything people tell you. (Correlate: Be critical.)
10. Don’t give up simply because people don’t believe you. (Correlate: Believe in yourself; keep pressing on.)

Dr. Roberts shared anecdotes from his life that taught him resilience and the importance of education. He said he is lucky that his mother, a public health nurse, encouraged him to learn vicariously by taking note of the lessons learned by others who had made mistakes. He also learned that family is important and that taking individual responsibility is essential to demonstrating good character and leadership. Dr. Roberts was encouraged to pursue medical research while at the University of Ghana Medical School and was particularly influenced by a young man with liver cancer. When he began his studies at a U.S. graduate school, his research advisor warned him that all of the easy experiments had been performed already; Dr. Roberts embraced the challenge. When he was transitioning to his clinical training, he was advised to apply to all of the institutions he dreamed of attending and to not count himself out over fears of not qualifying. Heeding this advice, Dr. Roberts applied to the Mayo Clinic for his residency and was accepted. He learned the importance of taking risks and pressing forward, even when things did not go well or might be discouraging.

Dr. Roberts stressed the importance of mentors, embracing new ideas, and pushing boundaries. At every level, the team works together, and this work provides inspiration to the team members. Finally, Dr. Roberts noted the global disparities in wealth and health, using a chart to highlight the fact that, in general, the health of a society and its wealth are positively correlated. He also noted that countries with similar per-capita incomes can have substantially different health profiles (e.g., Nigeria and Vietnam). It is possible to transform health without a good deal of wealth (“You can be healthy without being wealthy.”) This is the key issue for the NMRI group: What can those present at this meeting collaborate on that will be transformative in the world of health?

BIOSTATISTICS: ALL ABOUT THE BASICS

Fern Webb, Ph.D., Assistant Professor, University of Florida

Dr. Fern Webb hosted an interactive presentation on the guidelines for designing a statistical study and choosing the correct analysis. Throughout the session, she collected quiz answers through her website (www.fernjwebb.participoll.com) and used the answers to inform her discussion. She invited the audience to ask questions throughout, commenting that there are no wrong questions and that often more is learned from being wrong than from being right.

Dr. Webb described epidemiology as the science of public health and offered two formal definitions: (1) a branch of medical sciences involving the analysis of the incidence, distribution, and control of disease and/or health in a population; and (2) the study of the distribution and determinants of disease frequency and health in the population. The underlying assumption of both definitions is that disease or health distributions are not random events and do not happen in a vacuum.

Dr. Webb outlined the typical epidemiologic research cycle, noting that the cycle is not guaranteed to happen exactly in the sequence presented. The question to be studied is identified, and the literature is researched; the study protocol—including variables, study population, and research design—is planned; the study is conducted; the findings are disseminated to key stakeholders and the scientific community; and the results are reviewed to determine the next steps for further study.

The study should begin by determining the exposures and outcomes of interest. Dr. Webb informed attendees that one variable can have multiple names. For example, exposure, treatment, independent

variable, antecedent, and predictor are all synonyms. Outcome, condition, dependent variable, consequent and criterion also have the same meaning. She likened the use of these synonyms to the availability of multiple routes to the same destination. Dr. Webb then outlined the four types of data: nominal data, which consist of categories without inherent ranking or order, such as ethnicity or blood type; ordinal data, which consist of ordered categories at undefined intervals, such as pain scales or Likert scales; interval data, which have a defined order and comparable intervals but no true zero, such as temperature; and ratio or continuous data, which have a defined order and interval but begin or end at zero, such as age or blood pressure. Dr. Webb led the audience in a series of quizzes to review these data types.

Dr. Webb shifted the focus to the creation of an analysis plan and introduced two kinds of measures. Measures of frequency are used in descriptive analysis to describe information (measured by variables) or characteristics of people or animals participating in the study. Basic measures of frequency include counts (e.g., *n*), proportions (e.g., $a/[a + b]$), rates (e.g., $a/[a + b]$ over a period of time), and ratios (e.g., a/b, with the numerator and denominator being mutually exclusive). Measures of association are used in statistical and inferential analysis to describe how information (usually measured by variables) is associated or related—in other words, what the study results mean in the real world. An association can be understood as the extent to which variables occur together (nondirectional) or as the statistical dependence between two variables. Dr. Webb commented that measures of association are used to try to determine causality between variables, but sometimes this is not possible.

Dr. Webb explained the 2 × 2 table, a hallmark of epidemiology in which the independent variable or exposure is aligned along the vertical axis, and the dependent variable or outcome is placed along the horizontal axis. She noted that this table is used for measures of frequency, measures of association, measures of screening, and hypothesis testing. She emphasized that the appropriate statistic must be chosen to measure each type of association, and the choice is determined by the type and number of independent and dependent variables—each type of measure maps onto a particular study design. She referred the audience to a handout illustrating the appropriate statistics for various combinations of variable numbers and types, and the audience practiced choosing statistics for example studies. Statistics to measure the association of variables include Chi-square tests of independence, analysis of variance, multiple regression, and logistic regression.

Dr. Webb introduced a discussion of inferential analysis, asking how data from a study reflect truth in a population. She noted that the statistical methods to evaluate the role of chance are the same in every study. Testing an alternative hypothesis against a null hypothesis—the theory that there is no association between variables—will return a 2 × 2 table charting whether the hypotheses are true or false in reality, and this can help determine whether the results are correct or what kind of error (type I or type II) is shown. In the estimation of confidence intervals, a value of 1.0 indicates no association between variables and fails to reject the null hypothesis. A statistically significant confidence interval, which does not include 1.0, will reject the null hypothesis. The *p*-value and confidence interval always must be consistent with each other. The group practiced applying these guidelines to sample data.

An attendee asked what to do when a study does not have enough data to find statistical significance. Dr. Webb responded that this should be explained when describing the limitations of the study and advised suggesting further studies be conducted. She reminded the audience that this would be a type II error.

Dr. Webb emphasized three important points for the study of biostatistics. First, researchers should choose a measure of association based on the data and variable type for both independent and dependent variables. Second, there is no need to guess or memorize the appropriate statistics for each type—researchers can use the handout provided. Third, researchers should consult with a biostatistician in the study planning phase before finalizing the study design and beginning data collection.

SESSION I: ROUND TABLE DISCUSSIONS

Participants attended one of six round table discussions focused on various career-oriented topics. Meeting participants attended the session of their choice.

Table 1: Health Disparities Research and Community-based Participatory Research
Myra Kleinpeter, Ph.D., Associate Professor, Tulane University School of Medicine

Table 2: Charting Your Course for Success (Postdoctoral Scholars/Junior Faculty)
Bessie Young, M.D., Professor, University of Washington
Lewis Roberts, M.D., Ph.D., Professor of Medicine, Mayo Clinic

Table 3: Beyond NIH Funding Sources
Heather Tarleton, Ph.D., Assistant Professor, Loyola Marymount University
Jose Romero, Ph.D., Associate Physiologist, Brigham and Women's Hospital/Harvard Medical School

Table 4: R01/R21/R03/R15 (R Mechanisms)
Carlos Isales, M.D., Professor, Augusta University
Ann Jerkins, Ph.D., Scientific Review Officer, NIDDK, NIH

Table 5: K Awards
Bridgett Rahim-Williams, Ph.D., Professor and Associate Dean, Bethune-Cookman University
Robert Wellner, Ph.D., Scientific Review Officer, NIDDK, NIH
James Hyde, Ph.D., Program Director, NIDDK, NIH

Table 6: Research Supplements to Promote Diversity
Robert Rivers, Ph.D., Program Officer, NIDDK, NIH

SESSION II: ROUND TABLE DISCUSSIONS

Participants attended one of three round table discussions. Two sessions covered different types of NIH awards—R01 Basic/Clinical and K01 Basic/Clinical—and during these sessions, session leaders were given sample grant applications to review and critique. A third session reviewed R03 grants and focused on grant writing basics. Types of grants and the grant process were discussed.

Mock Study Section 1: R01 Basic/Clinical
Carlos Isales, M.D., Professor, Augusta University
Ann Jerkins, Ph.D., Scientific Review Officer, NIDDK, NIH

Mock Study Section 2: K01 Basic/Clinical
Bridgett Rahim-Williams, Ph.D., Professor and Associate Dean, Bethune-Cookman University
Robert Wellner, Ph.D., Scientific Review Officer, NIDDK, NIH

Grant Writing Basics and Pilot Studies: Preparation for an R03
Mark Lawson, Ph.D., Professor, University of California, San Diego
Patricia Heyn, Ph.D., Associate Professor, University of Colorado, Anschutz Medical Campus

PARALLEL SESSIONS

Two parallel sessions provided the opportunity for participants to engage in career development activities. The sessions were intended to allow informal, interactive discussions among participants. Meeting participants attended the session of their choice.

Specific Aim Review with Senior Member

Participants who signed up for an appointment with a senior NMRI member had the opportunity to discuss the specific aims of their upcoming grant proposal. During the session, senior members reviewed the participant's specific aims, provided feedback, and advised on areas for improvement.

Opportunities for Collaboration

Participants who chose to attend this structured networking session had the opportunity to connect with fellow researchers on shared research interests, ongoing projects, data analysis needs, and any other research concerns.

MARCO CABRERA POSTER AND NETWORKING SESSION

All meeting participants were invited to view the posters submitted to the NMRI 14th Annual Workshop and to converse with their presenters. Judges observed the posters and discussed the described research with their presenters. Winners were chosen for each of three categories—Basic Science, Translational Science, and Clinical Science—and awards were presented to the winning recipients in the final session of the workshop. (See "Poster Session Awards.")

DINNER SPEAKER

My Scientific Journey: A Marriage of Epidemiology, Molecular Endocrinology, and Diabetes
Sherita Hill Golden, M.D., M.H.S., Hugh P. McCormick Family Professor of Endocrinology and Metabolism, Johns Hopkins University School of Medicine

Dr. Sherita Hill Golden shared with the meeting participants her journey through science, which began with the foresight and bravery of her grandmother, who was an inspiration to her and her family. Dr. Golden was in the fourth grade when her teacher first recognized that she should be tested for the talented and gifted program. In fifth grade, Dr. Golden fell in love with science and the function of the human body. As a result, she eventually attended a science and technology magnet school, and her parents supported and encouraged her scientific curiosity. After receiving her Bachelor's degree in Biology from the University of Maryland, College Park, she chose to pursue a medical degree from the University of Virginia School of Medicine. Eventually, she chose internal medicine as her specialty.

Ultimately, Dr. Golden decided to focus specifically on clinical research in diabetes, an exponentially growing public health epidemic that disproportionately affects minority and underserved populations, particularly the African American and Latino populations. Her decision was partially influenced by the September 1993 publication of the Diabetes Control and Complications Trial, which revolutionized the care and treatment of diabetes. Her initial research focused on endocrine risk factors for insulin resistance and type 2 diabetes, as she attempted to determine the upstream factors that lead to obesity and insulin resistance, as well as how stress affects the neuroendocrine response. She hypothesized that depression affects hormonal factors, which in turn increase diabetes risk. Depression and chronic stress cause hypothalamic-pituitary-adrenal (HPA) axis hyperactivity and activation of the sympathetic nervous

system (i.e., “fight or flight” response) at a low level chronically, causing an increase in cortisol, catecholamines, and inflammatory markers. All of these biomarkers are associated with insulin resistance.

The Multi-Ethnic Study of Atherosclerosis (MESA), funded by the National Heart, Lung, and Blood Institute, is a multicenter, longitudinal cohort study of the occurrence and correlates of subclinical cardiovascular disease (CVD) and the factors influencing its progression. The study found a 42 percent higher risk of developing diabetes in those subjects exhibiting depression at baseline. Adjusting for lifestyle factors reduced this risk somewhat but not entirely explain the association, indicating a missing link. To find this missing link, neuroendocrine hormones were assessed while considering the following questions: Are neuroendocrine hormones related to metabolic outcomes? If so, how can they be assessed in population-based studies? Creation of a transgenic mouse model showed that overexpression of 11-beta hydroxysteroid dehydrogenase, the enzyme that generates active cortisol (corticosterone) from inactive cortisone and 11-dehydrocorticosterone, results in insulin resistance and glucose intolerance.

The next step was to determine how to assess subclinical hypercortisolism and ascertain whether the condition is associated with diabetes, independent of depression. As a result, the MESA Stress Ancillary Studies were funded, and diurnal salivary cortisol was assessed in a subset of participants. Results indicated that subjects with diabetes had lower cortisol awakening responses (CARs) and a slower early cortisol decline than those without diabetes. This blunted profile is seen commonly with depression and obesity as well. Women with diabetes had a higher total area under the curve (AUC) than women without diabetes, driven primarily by a higher late decline AUC; this association was not observed in men. A 6-year follow-up longitudinal study found a lack of significant association between diabetes status and change in CAR, possibly a result of the lack of data on glycemic control and diabetes complications.

Another study examined the association of diurnal cortisol curve features with hyperglycemia. The study found that in individuals with diabetes, cortisol curve parameters suggestive of higher HPA axis activity and dysfunction were associated with higher glycated hemoglobin (HbA1c). Current research is determining whether HPA axis dysfunction leads to hyperglycemia in diabetes, whether hyperglycemia leads to HPA axis dysfunction, or whether the association between the HPA axis and hyperglycemia is bidirectional. Future studies are planned to follow up on this observation.

Dr. Golden highlighted the International Conference on Diabetes and Depression, held in October 2012, which inspired her to consider the whole spectrum of this issue—from molecules to patient care. She also is passionate about translating population science and epidemiology to the health care setting. The Johns Hopkins Hospital Inpatient Glucose Management Program, which she directs, has two key components: clinical consultation and health care delivery (systems intervention). The program implemented a series of evidence-based interventions, which has resulted in a 19 percent reduction in hypoglycemia frequency throughout the hospital over 3 years. Other hospitals are adopting the program’s model. Dr. Golden stressed that clinical work can be turned into a form of scholarship; important clinical activities should be published so that others can learn from them and emulate successful programs.

Dr. Golden stated that she shared her personal experiences and highlights from her academic career path to emphasize the need to diversify support with “hard” money and to pursue opportunities that one enjoys. This realization allowed her to pursue her current leadership position as Executive Vice-Chair of the Department of Medicine, which was not something that she had previously envisioned for herself but does align with all of her passions. Finally, Dr. Golden shared what she considers the guiding principles of an outstanding clinician and scientist: service (community and mentorship), scholarship, family, friends, health, integrity, and balance.

MENTOR/MENTEE SESSION

Junior investigators who had signed up for this session had the opportunity to meet with one of several senior NMRI investigators who offered to serve as mentors. During the session, each mentor hosted a roundtable discussion with his or her mentees, answering questions and providing advice.

ROLE OF SCIENTIFIC SOCIETIES AND PROFESSIONAL ORGANIZATIONS

American Society of Nephrology (ASN)
Raymond Harris, M.D., President, ASN

Dr. Raymond Harris thanked the organizers for the pleasure and honor of speaking, expressing his admiration for the NMRI and its mission. He described the increasing incidence of end-stage renal disease (ESRD) in the last 30 years and emphasized the disproportionate burden on minorities, especially African Americans. Dr. Harris pointed out that individual health is only partly determined by biology and behavior; public policy, social factors, and health services also affect it, and the ASN can help shape these factors with the support of its large global membership.

Dr. Harris explained that kidney disease clinical trials lag behind many other areas and commented on a number of initiatives the ASN supports, such as the ASN Foundation for Kidney Research, the Kidney Health Initiative, and its successful partnership with the U.S. Food and Drug Administration. The ASN recognizes its need for greater inclusion and the importance of recruiting and supporting young investigators from minority backgrounds, particularly in light of the disproportionate effects of kidney disease on minority populations. The first ASN diversity summit was held in the summer of 2013, and the ASN diversity work group began at the end of 2013; in its first 15 months, the group created a new vision statement, increased collection of member demographics, and began several award and representation initiatives. Dr. Harris described the most recent accomplishments of the work group, including recognizing Gentzon Hall, M.D., Ph.D., from Duke University, with the ASN-Harold Amos Medical Faculty Development Program Award. The diversity work group also organized the first Diversity and Inclusion Lunch at Kidney Week 2015, which attracted more than 50 attendees and served as a platform to solicit input and feedback to identify existing gaps in current efforts. The second Diversity and Inclusion Lunch is planned for the ASN's 2016 meeting in Chicago with an anticipated 75 participants, and Dr. Harris encouraged NMRI members to attend. The work group also hosted a reception at the Student National Medical Association Annual Meeting, during which students listened to a presentation on careers in nephrology; at the reception, 10 to 15 students registered for student memberships to the ASN. Dr. Harris also mentioned the ASN's lesbian, gay, bisexual, and transgender (LGBT) inclusion initiatives, including sending a representative to the LGBT Health Workforce Conference to evaluate it for potential ASN involvement. He noted that the ASN funded 20 participants to attend the 2016 NMRI Annual Workshop.

Dr. Harris described other diversity and inclusion efforts at the ASN, including the Michelle P. Winn Endowed Lectureship in Glomerular Diseases and Genetics, an effort to increase the diversity of Kidney Week Speakers, and an increase in travel support and grant funding recipients. The next steps for the ASN include refining the existing mentorship curriculum to help train both mentors and mentees and tracking and reporting the demographics of ASN panels and members, using statistics to gauge the success of diversity and inclusion efforts across all areas of the ASN. He noted that the ASN is in the process of reconfiguring its committee structure to more accurately reflect current concerns and demographics, and it plans to establish a permanent Diversity and Inclusion Committee that will include

some members of the original work group and some new members. Dr. Harris encouraged interested attendees to apply to the open call for committee membership.

Dr. Harris described some of the ASN programs that support early career professionals, such as career development grants, Amos awards, and the William and Sandra Bennett Clinical Scholars Program, which supports aspiring nephrology educators. The ASN also supports students and trainees with research fellowship programs, an international scholars program for trainees from Central and South America, and a summer program to facilitate early exposure to kidney research for medical students and graduate students. Dr. Harris emphasized that the ASN is committed to supporting career development and promoting academicians, physicians, and nephrologists at all levels. He stressed the importance of mentoring and sponsorship and noted that the ASN is developing tools to improve these, such as a "How to Mentor" package to ensure the best results for all parties. He also outlined the ASN's five-point guidance for diversity and inclusion values: inclusiveness, mentorship, health equity, patient advocacy, and engagement.

Discussion

Dr. Mariya Sweetwyne explained that as a trainee member of the ASN, she has received some announcements about upcoming diversity initiatives but has not heard about the progress these initiatives have made. She asked how this information is being distributed to the group and broadly to the ASN membership, which would include trainee mentors who need to be kept informed. Dr. Harris acknowledged that the ASN could improve in this important aspect of the initiative and said that the diversity work group plans to address this. He stressed the importance of figuring out how to craft the message to reach potential participants, as well as the membership as a whole, because the membership may not be aware these initiatives exist. Dr. Jonathan Himmelfarb, one of the chairs of the ASN diversity work group, added that they have started online communities to increase involvement; any member can facilitate a discussion, and although beta testing still is ongoing, 20 percent of the existing posts have related to diversity, which is promising for increasing the discussion when the online communities become fully accessible.

A meeting participant asked how the effort to increase diversity complements the efforts to increase awareness of the field of nephrology. Dr. Harris replied that he perceives the efforts as congruent; when young researchers are made aware of the possibilities early in their career, the number of people, including minorities, entering the field of nephrology increases. He emphasized that the field is important and exciting and that it contains many opportunities.

An experienced attendee complimented the ASN on taking these bold steps toward increasing diversity, noting that many researchers of his generation have been waiting a long time for such efforts. Dr. Harris agreed that these initiatives bode well for the future of the ASN.

A participant thanked the ASN for sponsoring a large group of attendees. Dr. Harris noted that the ASN plans to continue its sponsorship for the 2017 NMRI Annual Workshop.

American Association for the Study of Liver Disease (AASLD)
Steven Echard, Chief Executive Officer, AASLD

Mr. Steven Echard conveyed apologies for Dr. Charles Howell, chief of internal medicine at Howard University and chair of the AASLD's Diversity Task Force, who had planned to deliver the presentation but was unable to attend. He described the AASLD's Strategic Plan and its mission to advance and disseminate the science and practice of hepatology and to promote liver health and quality patient care. He noted that the AASLD is well known for hosting the Liver Meeting, which had more than 10,000

attendees in 2015, half of whom were from international locations. Mr. Echard emphasized that the AASLD offers many other professional opportunities and meetings year round. This year, Hepatitis B is one of the AASLD's foci; the AASLD plans to focus on disparities research soon, which Dr. Howell strongly promotes.

Mr. Echard described the Liver*Learning*® tool, available on the AASLD website, which captures all sessions at their conferences. The website has 3 years of content, presentations, and slides available for members to view and use. One of the AASLD's most popular productions is the journal *Hepatology*, which is highly competitive and has an impact factor of more than 11. Mr. Echard explained that the competition to publish in *Hepatology* might be prohibitive for early career researchers, so he offered several other options for publishing through the AASLD. The journal *Liver Transplantation*, despite its name, focuses on many aspects of clinical research, and the journal *Clinical Liver Disease* highlights primary care applications. Multimedia productions, such as expert podcasts, also are available. The AASLD is planning to create an open-access journal with the tentative title *Hepatology Communications*, which will be available later this year.

Mr. Echard also noted that the AASLD is well known for publishing clinical practice guidelines and updates for treatments in the hepatology field. Most guidelines use the Grading of Recommendation Assessment, Development and Evaluation (GRADE) approach, with systematic evidence reviews. AASLD has begun using the GRADE approach and published its first GRADE guidelines on hepatitis B virus in January; AASLD now is developing hepatocellular carcinoma guidelines for publication in early 2017. AASLD also has developed a hepatitis C virus guidance that provides up-to-date recommendations to health care practitioners on the optimal screening, management, and treatment for adults with hepatitis C virus infection in the United States, considering the best available evidence. The guidance is updated regularly as new data, information, and tools and treatments become available, and it is updated within a few days for every new therapy released. A dedicated website hosts the guidance (www.hcvguidelines.org). Mr. Echard explained that all of the AASLD guidelines are designed for use by both specialists and primary care providers (PCPs). He also described the AASLD's global outreach initiatives, including partnerships with international organizations, sponsorship of international conferences, and funding for international travel awards.

As one of the smaller gastrointestinal societies, the AASLD's biggest strength is its membership of more than 5,000 hepatologists, surgeons, scientists, trainees, and other health care professionals. The AASLD supports a membership category called AASLD Fellows, comprising individuals with longer than 10 years of membership who have participated significantly in Society events; the Fellows make a commitment to serve as mentors to members earlier in their careers. The AASLD also has more than 600 trainee members, a category to which members can belong for 3 to 4 years after their training.

Mr. Echard explained that the AASLD Diversity Task Force is being reorganized as the Diversity Committee to increase the AASLD's support for both diversity and inclusion. This is the Association's second year sponsoring attendees to the NMRI, and it looks forward to increasing sponsorship for attendees interested in hepatology. Mr. Echard described the increased efforts to focus on gender equality, noting that although its membership is only about 33 percent female, AASLD has been able to maintain up to 40 percent of its leadership positions for women. He highlighted that both the immediate past President and the President-elect are women.

Mr. Echard highlighted a number of special interest groups that offer opportunities for interested researchers; any member can join any group. The Innovation Fund is being created to allow the special interest groups to develop and fund larger projects. He also described the opportunities available through the AASLD's committees, which recently were reorganized and expanded to focus on current initiatives.

Mr. Echard explained that the AASLD offers a mentor program that matches AASLD Fellows with trainees and members who are within 2 years of having finished their training. The mentorship program allows trainees and mentors to discuss research, career development, work/life balance, clinical practice, and more. Mr. Echard also described the Emerging Liver Scholars Program, which offers grants for trainees and early-career gastroenterologists to be paired with a mentor who will attend the Liver Meeting with them and guide them; since 2013, this program has supported more than 100 Scholars.

Mr. Echard discussed the recent creation of the AASLD Foundation, which gathers funds specifically for research, rather than the Liver Meeting or other well-known nonclinical initiatives. The mission of the Foundation is to support liver research and educate PCPs about liver disease and its treatment. It funds liver research, supports advanced hepatology training, and creates broader education platforms for non-hepatologists. The Foundation also plans to develop programs to enhance public awareness and patient education. The AASLD Foundation offers Research and Career Development Awards in several categories: multiyear, single-year, and abstract awards. The Foundation plans to double the amount of funding available over the next 5 years, from $2.5 million to $5 million. The AASLD also plans to increase its commitment to sponsoring attendees to the NMRI Annual Workshop. Mr. Echard emphasized that the scientists who have been funded by the AASLD in the past have demonstrated success; half of all recipients reported receiving NIH funding during or after their award, and most have remained in hepatology. He invited attendees to apply for the Research and Career Development Awards before the December 1, 2016, deadline and noted that information is available on the AASLD website.

Discussion

An attendee thanked Mr. Echard for the AASLD's anticipated increase in funding for NMRI attendees and asked if there is a fee for trainee membership. Mr. Echard responded that the trainee membership fee is $125, which is a significantly reduced cost, and that residents and medical students can join without a fee. He added that trainees also can register to attend the Liver Meeting at a reduced cost of $100.

A nephrologist representing the ASN noted that the ASN also had difficulty capturing demographic information on ethnicity. She recommended that the AASLD's regular membership renewal process include an opt-out question about ethnicity, which would highlight the information without requiring an answer. She noted that this increased their response rate by about 200 percent.

American Diabetes Association (ADA)
Allison McElvaine, Ph.D., Director, Research Communications, ADA

Dr. Allison McElvaine noted that kidney and liver research is important to helping people with diabetes and thanked the previous speakers. She described the growing health crisis of diabetes. Over the past 5 years, the rate of diabetes has increased from one in 13 Americans to one in 11, and the economic burden has increased from $174 billion per year to $245 billion per year. At this rate, by 2050 diabetes will affect one in three Americans, or more than 100 million people, and at a catastrophic cost. Minorities are disproportionately affected by diabetes, obesity, and their complications; it is predicted that by 2050, half of Americans in high-risk minority populations will have diabetes.

Maintaining a normal range of blood glucose levels is difficult but vital for good health. People with diabetes struggle with this constant, complicated, and expensive process. The ADA's vision is for a life free of diabetes and its burdens; its mission is to prevent and cure diabetes and to improve the lives of all people affected by diabetes.

The ADA supports four primary paths for research: professional initiatives, such as conferences and journals; medical initiatives, such as increasing the standard of care; community initiatives like health

education programs; and advocacy to help support research. The ADA began funding research in 1952 and in 2015 made $31 million available for research. Its Core Research Program funds investigator-initiated projects, as well as development and training. A new initiative called Pathway to Stop Diabetes® is a competitive fund for which candidates must be nominated by their institutions. The ADA also offers a Targeted Research Program, which issues periodic proposal solicitations regarding specific research needs. Dr. McElvaine explained the portions of research funding supporting studies of type 1, type 2, and gestational diabetes, as well as prediabetes.

Dr. McElvaine noted that the ADA provides opportunities across career stages, such as the minority undergraduate research fellowship and grant opportunities in basic science, clinical research, and translational research. She explained the Pathway to Stop Diabetes® program further. The program differs from other programs in that it invests in people, rather than in specific projects. Its long-term structure provides protected time and autonomy for researchers to focus on and explore ideas, following where the science leads them. Only one nominee per institution is allowed, leading to rigorous institutional competition, but the nominee can be awarded up to $1.625 million. There have been three annual cycles to date, with more than 100 applications per year, and 17 awardees have been selected in total. Dr. McElvaine noted that the call for nominations is now open, and she encouraged attendees to ensure that their institutions nominate someone.

The ADA recently conducted a retrospective analysis of its core research program to measure successes against the program's objectives. Awardees have been successful in diabetes research careers; 99 percent have remained in diabetes research in the 5 years following the award. Dr. McElvaine reiterated that the Pathway Call for Nominations is currently open with a July 1 application deadline and noted that the Core Research Program has a standing annual grant cycle with applications due April 15 each year. The Targeted Research Program does not currently have any open calls, but interested researchers should check the website for opportunities. She described other ways to become involved in the ADA, including through publications, presentations, involvement with field offices, and participation in local events. Dr. McElvaine closed by inviting listeners to attend the upcoming Scientific Sessions meeting in New Orleans, June 10–14.

Discussion

A meeting participant asked whether the ADA provides grant mechanisms for medical students. Dr. McElvaine replied that the ADA offers undergraduate internships and postdoctoral opportunities, but currently no grants exist for medical students. The participant noted that endocrinology is a potential path into diabetes research.

An audience member asked whether the ADA supports initiatives focusing on dentists, explaining that many dentists help diagnose diabetes. Dr. McElvaine responded that the ADA does not have any specific initiatives for dentists, but certain research areas within their current programs could be explored. She noted that two-thirds of people with diabetes are unaware that they are affected, so it is important to find any potential paths for increasing awareness of biological links and improving health care delivery.

A participant explained that she trained as a Ph.D., rather than as a clinician, but her research focuses on clinical outcomes, health systems, and health service delivery. She asked whether the ADA is seeing a shift toward funding research in those areas, and Dr. McElvaine confirmed that the ADA is funding this kind of research.

BUSINESS MEETING AND COMMITTEE REPORTS

Oversight Committee Report

Luis Cubano, Ph.D., Professor, Universidad Central Del Caribe

Dr. Luis Cubano reported on the recent activities of the Oversight Committee. He began by acknowledging the support that the NMRI has received for regional meetings and annual workshops from professional societies and thanking the standing and *ad hoc* members of the Oversight Committee. The NMRI is composed of more than 500 members and was established in 2003. The NMRI seeks to increase the size of the network; accordingly, Dr. Cubano asked the members to contact their colleagues who might benefit from the NMRI by obtaining mentorship and support. The NMRI is a comprehensive and collaborative organization that encompasses all of the areas of research supported by the NIDDK.

Dr. Cubano reminded the members to update the information in their profiles. Based on the completed profiles, meeting attendees include 54 members with doctorate degrees, 31 medical doctors, three members with dual M.D.-Ph.D. degrees, five postdoctoral scholars, 22 assistant professors, six associate professors, and 10 full professors. Some of the 96 participants have not yet completed their profiles.

The NMRI has surveyed its membership to determine how the network had contributed to the members' professional lives and what it can do to help members in the future. The NMRI contributes to members' earning potential by providing leadership opportunities, including volunteer opportunities to organize regional meetings and annual workshops; networking opportunities, including letters of reference; and opportunities for seminar presentation recruitment.

The NMRI's Mentorship Program helps identify mentors for members who need them and creates a framework to help the mentee meet his or her goals. NMRI members can assist in this program by providing biosketches, signing up at registration, attending a mentor-mentee session, and providing information for inclusion in the NMRI directory. The NMRI mentorship agreement form can be used to help establish the relationship between a mentor and mentee, provide a timeline for contacting the mentor, select educational objectives, and provide feedback from the mentee and from the mentor. Participation in the NMRI Mentorship Program is a strong motivation for attending the annual workshop. For 70 percent of members surveyed, the mentorship program was the second reason cited for attending the annual workshop. Fifteen percent listed mentorship advice as a specific benefit for the tenure process. Dr. Cubano encouraged members to participate in the Mentorship Program and provide feedback on it to the Oversight Committee.

The NMRI is responsive to members' needs. Dr. Cubano noted that collaboration tables were provided at this year's workshop in response to members' survey responses from last year. Based on members' suggestions, abstracts now will be published in the NMRI directory and newsletter. Filling out this year's evaluation form will continue to provide the Oversight and Planning Committees with ideas for improving the meetings and the network.

The NMRI's next annual workshop is scheduled for April 26–28, 2017. Travel awards will be available to attend the meeting for those who meet membership eligibility. Filling out online profiles (https://forms.niddk.nih.gov/nmri), including society information, will enable awards to be assigned to eligible members. Dr. Cubano advocated for members to submit abstracts, volunteer to be a mentor, and invite colleagues to NMRI 2017. Dr. Cubano acknowledged Dr. Myra Kleinpeter, chair of the South Regional Planning Committee. A regional meeting in the Midwest has been proposed for 2017, but volunteers are needed to organize it. Dr. Cubano asked members to sign up for the NMRI's various committees. He explained that the Oversight Committee facilitates the development of mentoring relationships, the identification of new members, and the recruitment of professional organizations to

support the network; the Planning Committee organizes the annual workshop; and the Regional Planning Committee plans the regional meeting.

Local NMRI chapters have been formed in Puerto Rico and Colorado. Dr. Cubano advocated for volunteers to organize other local NMRI chapters to continue at a local level the collaborations formed at the annual workshop. The process established for organizing chapters has been kept informal to minimize the burden on organizers. Forming a chapter involves identifying officers (president, vice-president, and secretary), establishing goals that are aligned with the national organization, developing a mission statement, and organizing activities. The application form contains recommendations for activities.

Planning Committee Report
Heather Tarleton, Ph.D., Assistant Professor, Loyola Marymount University

Dr. Tarleton acknowledged her fellow members of the Planning Committee and Dr. Lincoln Edwards, who will lead the Planning Committee in 2017. Priorities this year included providing opportunities for networking and collaboration; helping members develop transferrable skills; and empowering participants to make tangible progress in their research design, implementation, and/or analysis. She commented that the scale of such progress is less important than that it be tangible and help the participant move forward. Dr. Tarleton recognized that the efforts of Ms. Martinez were key in accomplishing these goals. Listening to participant feedback from the 2015 survey also helped the Planning Committee accomplish its goals, and Dr. Tarleton, too, emphasized the importance of participants' completing evaluation surveys for this meeting so that the 2017 meeting can continue to meet the members' needs. Dr. Tarleton recognized the 45 new members, many of whom are recipients of K awards, among the workshop's 100 attendees. The participants joined together to thank the senior members for their dedication toward mentorship, as well as their contributions to abstract and specific aims review.

Feedback on this meeting's venue will be important in deciding next year's location. In addition, completing the NMRI profile will help identify members who are eligible for awards and fellowships. In the coming year, the Planning Committee looks forward to hearing about the publications and grants that resulted from NMRI collaborations. The Planning Committee also seeks to maintain the network's external funding and identify new cosponsors (professional societies, academic institutions, nonprofits, small grants). Next year's goals also include strengthening and expanding the mentorship network. Dr. Tarleton concluded by asking participants to consider joining the Planning or Oversight Committees and reminding them to fill out the meeting evaluation.

Discussion

A participant raised the issue of continuing engagement with other NMRI members throughout the year. She suggested something similar to a Facebook group for women of color in academia, of which she is a member. The group has provided a safe space to share challenges, solicit support, and receive feedback in near-real time. Social media might provide a strategic way for NMRI members to remain actively connected, and the NMRI website might provide a trusted platform for social media engagement. LinkedIn was suggested as an alternative to Facebook. An NMRI listserv might be useful for providing information about such topics as employment or fellowship opportunities. The point was made that not all members participate in social media. A repository of *curriculae vitae* was suggested as an alternative. Joining a local chapter or participating in regional meetings also are ways to stay engaged. It was suggested that participants use the meeting evaluation to make other suggestions for maintaining connections.

Dr. Lawson commented that perhaps NMRI members are not as active in helping each other with proposals as they could be. He proposed that the NMRI facilitate matching members who would like help

with writing proposals with those who might be willing to act as readers. Ms. Martinez noted that members can refer to the resource tab on the NMRI website, where they can look for potential mentors throughout the year. Dr. Webb recommended using the phrase "volunteer to review" because some members might not feel qualified to characterize themselves as "mentors," but might still be willing to help as readers.

A participant recommended forming listserv subgroups by topic so that members could send notes or questions to only the small group of people with a certain shared interest. Ms. Martinez suggested using NMRI member profiles to identify characteristics, such as research areas of interest, which could be used to form such groups. A participant advocated for members' being given the option to opt into groups of interest to them that might not be captured by the information in their profiles.

An audience member noted that maintaining participation of senior mentors in NMRI workshops as they advance in their careers has been challenging. She proposed holding a session that targets senior mentors (e.g., leadership skills). Dr. Agodoa agreed with the importance of continued participation of senior mentors.

Dr. Agodoa presented plaques to Drs. Tarleton and Cubano in recognition for their service chairing the Planning and Oversight Committees, respectively.

SCIENTIFIC PRESENTATIONS

Primary Care Utilization and Mortality and ESRD Risk among Older Adults with Chronic Kidney Disease

Raquel Greer, M.D., Assistant Professor, Johns Hopkins University School of Medicine

Dr. Raquel Greer presented her research on primary care utilization among older adults with chronic kidney disease (CKD), noting that CKD affects more than 26 million U.S. adults and is associated with an increased risk of CVD, hospitalizations, and mortality. More than 600,000 U.S. adults have ESRD, resulting in treatment costs of $30 billion in 2013. African Americans and other minorities are disproportionately affected; for example, African Americans exhibit a fourfold increased incidence of ESRD. PCPs care for the majority of patients with CKD, which provides opportunities for these providers to identify and manage their patients' CKD risks, engage patients in risk factor modification, and provide preventative care. The effect of primary care utilization on clinical outcomes among patients with CKD is unknown.

The objective of Dr. Greer's study was to quantify the association between primary care utilization and ESRD incidence or mortality among older adults with CKD. The retrospective cohort study used data from a 5 percent random sample of Medicare beneficiary claims linked with data from the U.S. Renal Data System from 2005 to 2010. The study population included nearly 88,000 adults older than 65 years of age diagnosed with CKD as defined by ICD-9-DM diagnosis codes in one inpatient claim or two outpatient claims in 2005 to 2006. Patients with a history of ESRD or who were admitted to hospice or a skilled nursing facility were excluded from the study.

The study's independent variable was patients' primary care utilization (defined by at least one visit to the PCP) at baseline. Covariates included patients' demographics, neighborhood-level sociodemographics, region, clinical characteristics, and utilization measures. The independent variable and covariates were assessed in 2006. The researchers followed the participants over time (2007–2010) to determine whether they developed one of the two main outcomes of interest: ESRD or all-cause mortality. The researchers used standard and cause-specific Cox proportional hazard models for statistical analysis.

The study found that 81 percent of participants had at least one visit with a PCP during the baseline year. The researchers did not find a significant difference in PCP visits by age or gender, but they saw a significant difference by race, with greater PCP utilization observed among whites compared to blacks. The prevalence of diabetes, hypertension, and cardiovascular disease was greater among those patients with at least one PCP visit compared to patients who did not utilize primary care. Compared to patients with no primary care visits, patients with at least one visit had a 22 percent lower risk of death and a 19 percent lower risk for ESRD after adjusting for demographic, clinical, neighborhood, and utilization factors.

The researchers performed a variety of sensitivity analyses, which verified their results. Dr. Greer described some of the limitations of the study, which include the use of ICD-9-CM to identify patients with CKD, which may not capture all CKD patients; the lack of clinical information regarding patients' kidney function, which limits the ability to adjust for disease severity at baseline; and unmeasured confounders.

The researchers concluded that primary care utilization is associated with a lower risk of death and development of ESRD among older adults with CKD. Therefore, primary care appears to play an important role in key clinical outcomes for patients with CKD. As such, efforts to improve the engagement of PCPs in the proactive care of patients with CKD represents an important strategy to improve the health of this high-risk population.

Discussion

Dr. Harris commented on the importance of this study, noting how critical it is to educate PCPs about the importance of being aware of CKD early in disease progression.

A participant asked what might be perceived as barriers to primary care utilization based on the study results. Dr. Greer stated that PCPs must engage patients and proactively follow them, rather than waiting until they visit with a problem. PCPs must ensure that patients comply with their diabetes and hypertension follow-up care. The participant asked for clarification regarding the inclusion criteria of the study. Dr. Greer explained that the researchers examined data from a 2-year period to determine whether patients had been diagnosed with CKD.

An attendee congratulated Dr. Greer on highlighting this topic and looks forward to her becoming an advocate on this issue. Addressing this issue is essential and will have a phenomenal impact on patient outcomes.

Multimarker Panel and Incident Chronic Kidney Disease: The Jackson Heart Study
Stanford Mwasongwe, M.P.H., Epidemiologist, Jackson State University

Mr. Stanford Mwasongwe described the results of a study on predicting incident CKD among participants in the Jackson Heart Study. Evidence that new markers are needed for predicting CKD include that established CKD risk factors do not fully explain prevalence in the community, the current risk profile does not identify individuals at risk of kidney disease progression efficiently, and the Modification of Diet in Renal Disease (MDRD) study showed that established CKD risk factors explained only 34 percent of the variance of renal disease progression. In particular, because of the paucity of data for African Americans, the prognostic significance of biomarkers in CKD incidence in this population is not well understood and requires further investigation, considering the ethnic differences that exist in levels of adiposity and circulating biomarkers. The hypotheses for the study were that (1) a multimarker panel representing distinct biologic pathways is associated with the development of CKD over time in the

African American community, and (2) a full model involving biomarkers has a better predictive value than a reduced model without biomarkers.

The Jackson Heart Study is a population-based longitudinal investigation based in Jackson, Mississippi, of the risk factors for CVD among African Americans. The study began in 2000 and entailed three clinical exams, as well as ongoing surveillance for congestive heart disease, stroke, heart failure, and total mortality. The analysis population comprised 2,460 individuals who did not have CKD at baseline, who do have data on serum creatinine at Exams 1 and 3, and who are not missing data on biomarkers and covariates. Incident CKD was defined as an estimated glomerular filtration rate of less than 60 mL/minute/1.73 m^2 at Exam 3.

Two models were evaluated: traditional risk factors (Model 1) and traditional risk factors with a multimarker panel of biomarkers (Model 2). Traditional risk factors for CKD include age, sex, and body mass index; lipids; comorbidity (i.e., diabetes); a positive current smoking status; and blood pressure and blood pressure medications. The eight biomarkers included in the multimarker panel and their associated pathways were high sensitive C-reactive protein (inflammation), adiponectin and leptin (adiposity), b-type natriuretic peptide (natriuretic), aldosterone and renin (neuro-hormonal), and homocysteine and endothelin (endothelial). In the data analyses, biomarkers were log-transformed and gender-standardized, and correlation among the biomarkers was evaluated by the principal component method. Logistic regression models were fit by a linear combination of the components of Models 1 and 2. The data analytical design was that the predictive value for CKD of Models 1 and 2 were to be compared by the likelihood ratio test, and if the entire biomarker panel was found to be significant, backward selection and Akaike Information Content were to be used to identify the most parsimonious set of biomarkers that was significant. Model predictive accuracy was assessed using the c-statistic, and the integrated discrimination index (IDI) was used to measure the biomarker model improvement in average sensitivity without sacrificing average specificity.

The investigators developed descriptive characteristics of the study population. The mean age was 53, 63 percent of the participants were women, 46.5 percent were taking blood pressure medication, and 16 percent had diabetes. The entire biomarker panel was found to be significant ($p = 0.0009$), and of the eight biomarkers, C-reactive protein and adiponectin were found to be the best predictors of incident CKD (odds ratios of 1.46 and 1.24, respectively). C-reactive protein showed a linear, positive relationship with incident CKD. Adiponectin had a positive linear relationship with incident CKD at lower values of the biomarker that plateaued at higher levels. The relative IDI of Model 2 to Model 1 showed a small increase in predictive utility for incident CKD of 6.4 percent with the multimarker biomarker panel. In summary, biomarker data showed that adiposity and inflammation were two important pathways in predicting incident CKD in the study cohort, but the increment in predictive utility of the multimarker panel was modest and might not be of clinical significance. Limitations of the study were that it was located in a single geographic location and might not apply to other populations, serum creatinine levels were available at only two time points 10 years apart, and the availability of biomarkers was limited.

Discussion

A participant asked about potential genetic modifiers of risk for CKD in African Americans, such as *APOL1*. A protective effect has been found for obesity in the association between *APOL1* and CKD progression, implying a possible role for inflammation in CKD progression. Mr. Mwasongwe responded that genetic correlations with CKD risk had been explored.

A suggestion was made that fibroblast growth factor 23 might play a role in CKD progression, but Mr. Mwasongwe replied that the investigators had not explored this possibility in their study.

Phytochemical Profile and *in Vivo* Effects of Plant Extracts Used as Diabetes Adjuvants in Puerto Rico

Michelle Martínez-Montemayor, Ph.D., Associate Professor, Universidad Central del Caribe

Dr. Michelle Martínez-Montemayor described a bioscreening and validation study of antidiabetic herbal remedies used in Puerto Rico. The investigation combined the approaches of ethnopharmacology—which is the study of ethnic groups and their use of drugs, particularly plants as a main delivery of pharmaceuticals—and pharmacognosy, which is the study of drugs from natural origins, to determine the efficacy of the herbal remedies. The study was part of TRAMIL (www.tramil.net), a program that develops methods to validate the use of traditional medicine and is investigating more than 300 plants used to treat different ailments in Caribbean nations. Of the 11 municipalities in southeastern Puerto Rico in the TRAMIL Ethnopharmacological Survey, most (6) rely on medical consultation to treat their condition, but five use other alternatives as the first treatment: two use herbal remedies, and three use self-medication. Twelve of the 228 remedies surveyed were for diabetes, which within the United States occurs at the highest rate in Puerto Rico and is the third leading cause of death in the commonwealth. The most frequently used medical plants used as alternative or complementary treatments for diabetes in southeastern Puerto Rico are *Tapeinochilos ananassae*, *Costus speciosus*, and *Syzgium jambos*. *T. ananassae* and *Costus* spp., which has been widely studied for its antidiabetic effects, look alike and are commonly known as *insulina*, and *S. jambos* is a fruit tree known as *pomarrosa del río*.

Diabetes is a disease with a very complicated etiology. The effects of antidiabetic plant extracts on the physiopathology of diabetes—including protein glycation, sorbitol accumulation, and reactive oxygen species accumulation—are being studied in *in vitro* assays. Qualitative and quantitative characterization of methanolic and aqueous plant extracts revealed the presence of flavonoids, alkaloids, phenolic compounds, saponins, sterols, and tannins. *T. ananassae* had the highest concentrations of flavonoids and tannins, *S. jambos* showed the highest phenolic compounds, and *C. speciosus* had greater amounts of alkaloids. *In vivo* studies were performed using an animal model of type 2 diabetes, the C57BLKS/J (*db/db*) mouse, which is genetically obese as a result of the knockout of the leptin receptor via the *db* mutation and rapidly develops hyperglycemia and insulin resistance. The efficacy of the herbal remedies was tested via glucose and insulin tolerance tests after treatment with decoctions of plant leaves administered daily via oral gavage for 1, 5, and 10 weeks. The treatments had no significant effects on water or feed intake or weight gains. The mice showed better glucose modulation when the plant extracts were administered in complement with an insulin injection, with blood glucose reaching nondetectable levels at 90 minutes after insulin injection for mice treated with *S. jambos* and *T. ananassae* for 10 weeks at levels similar to those consumed by people (2.2 mg/kg body weight).

These results are the first to show the qualitative and quantitative chemical profile of three plants commonly used by the Puerto Rican population to lower blood glucose levels. Phenolic compounds, found at highest concentrations in *S. jambos*, are powerful antioxidants. Flavonoids, which act as insulin secretagogues, and tannins, which may regulate carbohydrate metabolism, were found at higher concentrations in *T. ananassae*. *S. jambos* showed the best *in vivo* efficacy in lowering blood glucose levels, and the plant extracts used with insulin modulated glucose better than controls in animal models.

Discussion

A participant asked about plans for investigating insulin resistance in patients using the teas.
Dr. Martínez-Montemayor responded that although this would be worthwhile to study, her team currently is focusing on mechanistic studies.

A suggestion was made that using a 154-pound body weight might overestimate the dose that patients are receiving, but Dr. Martínez-Montemayor responded that 154 pounds is the standard weight used in the literature.

When asked about consumption of the antidiabetic plants in other regions, Dr. Martínez-Montemayor confirmed that they are used in other islands in the Caribbean region as well.

A participant questioned why diabetes rates are so high if the teas really are protective. Dr. Martínez-Montemayor responded that only a small population uses the teas. This population does not have resources to use other medicines. High diabetes rates also could be caused by genetic factors.

When asked to speculate about the mechanism by which the antidiabetic extracts are working, Dr. Martínez-Montemayor answered that this question still is being explored.

Dr. Martínez-Montemayor was asked whether she collaborates with local healers who use these plants. She responded that her work is trying to promote the validation of the use of natural products and overcome the stigma that the natural compounds are not sufficiently potent. The plants contain a combination of compounds and may be effective cures within their cultural context.

POSTER SESSION AWARDS

The workshop's three scientific presenters, who were selected from the pool of submitted abstracts, were presented with plaques commemorating their achievement. All of the meeting participants who presented posters at this year's workshop were thanked for their time and willingness to share their research with the NMRI community. The three winners of the poster session awards were then announced and congratulated. The winners in the categories of Basic, Translational, and Clinical Science were—

Basic Science Poster Award
Mariya Sweetwyne, Ph.D., Postdoctoral Researcher, University of Washington
"Preservation of Glomerular Architecture in Aged Mice by Systemic Late-stage Intervention with Mitochondrial Protective Peptide, SS-31"

Translational Science Poster Award
Essa Mohamed, Doctoral Student, Mayo Clinic
"Evaluating Knowledge, Attitudes, and Behaviors about Viral Hepatitis and Hepatocellular Carcinoma among Recent African Immigrants in Minnesota: A Community-Engaged Qualitative Study"

Clinical Science Poster Award
Ebele Umeukeje, M.D., Professor, Vanderbilt School of Medicine
"Perceived Competence Is Related to Phosphorus Control in End-stage Renal Disease"

NEXT STEPS AND ADJOURNMENT

Heather Tarleton, Ph.D., Assistant Professor, Loyola Marymount University

Dr. Tarleton invited the current and upcoming chairs of the Oversight and Planning Committees to offer closing comments. Dr. Cubano, chair of the 2016 Oversight Committee, thanked the participants for attending and looks forward to seeing everyone next year. Dr. Edwards, chair of the 2017 Planning Committee, thanked the committee chairs and members who have served this year and said he is looking forward to making next year's meeting a success. Ms. Martinez left the participants with a final request

and reminder to update their NMRI profile; she was thanked by all the attendees with a round of applause for all of her hard work coordinating the workshop. Dr. Tarleton concluded by thanking the participants once again and wishing everyone safe travels.