DEPARTMENT OF HEALTH AND HUMAN SERVICES

Nineteenth Meeting of the

SECRETARY'S ADVISORY COMMITTEE ON GENETICS, HEALTH, AND SOCIETY

June 11-12, 2009

MEETING SUMMARY

Hubert H. Humphrey Building
200 Independence Ave., SW
Washington, DC

Prepared by the Office of Biotechnology Activities
National Institutes of Health

Participants

Committee Members Present

Steven Teutsch, M.D., M.P.H., Chair
Mara Aspinall, M.B.A. (by teleconference)
Sylvia Mann Au, M.S., CGC
Paul Billings, M.D., Ph.D., FACP, FACMG
David Dale, M.D.
Gwen Darien
Rochelle Dreyfuss, M.S., J.D.
James P. Evans, M.D., Ph.D.
Andrea Ferreira-Gonzalez, Ph.D.
Julio Licinio, M.D.
Barbara Burns McGrath, R.N., Ph.D.
Samuel R. Nussbaum, M.D.
Charmaine Royal, Ph.D.
Sheila Walcoff, J.D.
Marc S. Williams, M.D., FAAP, FACMG
Paul Wise, M.D., M.P.H.

Ex officio Members/Alternates Present

Sharon Alexander, on behalf of Stuart Ishimaru, J.D. (Equal Employment Opportunity Commission)
Michael Amos, Ph.D. (Department of Commerce/National Institute of Standards and Technology)
Sarah Botha, J.D. (Federal Trade Commission)
Scott Bowen, M.P.H., on behalf of Muin Khoury, M.D., Ph.D. (HHS/Centers for Disease Control and Prevention)
Michael A. Carome, M.D. (HHS/Office for Human Research Protections and Office of Public Health and Science)
Robinsue Frohboese, J.D., Ph.D. (HHS/Office for Civil Rights)
Denise Geolot, Ph.D., R.N., FAAN (HHS/Health Resources and Services Administration)
Naomi Goldstein, Ph.D. (HHS/Administration for Children and Families)
Alberto Gutierrez, Ph.D. (HHS/Food and Drug Administration)
Alan E. Guttmacher, M.D. (HHS/National Institutes of Health)
Adam B. Kanis, M.D., Ph.D. (U.S. Army, Medical Corps)
Douglas Olsen, Ph.D., R.N.,on behalf of Ellen Fox, M.D. (Department of Veterans Affairs)
Gurvaneet Randhawa, M.D., M.P.H. (HHS/Agency for Healthcare Research and Quality)
Jeffrey Roche, M.D. (HHS/Centers for Medicare & Medicaid Services)

SACGHS Staff

Sarah Carr, Executive Secretary, NIH Office of Biotechnology Activities
Kathryn M. Camp, M.S, R.D.
Andrea Collins, Committee Management Staff, National Cancer Institute
Tara Hurd Faunteroy
Cathy Fomous, Ph.D.
Darren Greninger, J.D.
Brian Haugen, Ph.D., Presidential Management Fellow
Alexander Lynch, Summer Intern

Linda Silversmith, Ph.D., Consultant
Abbe Smith, Capital Consulting Corporation

Speakers

Murray L. Aitken, M.B.A. (IMS Health Incorporated)
Michael S. Barr, M.D., M.B.A. (American College of Physicians)
David Blumenthal, M.D., M.P.P. (Office of the Secretary, HHS)
Vence L. Bonham, Jr., J.D. (National Human Genome Research Institute, National Institutes of Health)
W. Gregory Feero, M.D., Ph.D. (National Human Genome Research Institute, National Institutes of Health)
Sarah J. Gehlert, Ph.D., M.A., M.S.W. (University of Chicago)
Steven Goodman, M.D., Ph.D., M.H.S. (Johns Hopkins University School of Medicine)
Katie Hood, M.B.A. (Michael J. Fox Foundation for Parkinson's Research)
Rebecca Kush, Ph.D. (Clinical Data Interchange Standards Consortium)
Michael S. Lauer, M.D. (National Heart, Lung, and Blood Institute, National Institutes of Health)
Jessica Nadler, Ph.D. (Office of the Secretary, HHS)
William G. Nelson, M.D., Ph.D. (Johns Hopkins University School of Medicine)
Beth A. Pletcher, M.D. (University of Medicine and Dentistry of New Jersey)
Kate Reed, M.P.H., Sc.M. (National Coalition for Health Professional Education in Genetics)
Harold C. Sox, M.D. (Institute of Medicine Committee on Comparative Effectiveness Research Prioritization)
Myrl Weinberg, M.A. (National Health Council)

Public Commenters

Jennifer R. Leib (Association for Molecular Pathology)
Jeffrey D. Voigt (Medical Device Consultants of Ridgewood, LLC)

Others Attending

Sarah Arlien, Intern (Office of the Director, National Institutes of Health)
Alice Bailey (National Human Genome Research Institute, National Institutes of Health)
Benjamin Berkman (National Human Genome Research Institute, National Institutes of Health)
Joann A. Boughman, Ph.D. (American Society of Human Genetics)
Khaled Bouri, Ph.D. (George Washington University)
Nadine Channaoui (Genetic Alliance)
Kevin Cline (deCODE Genetics, Inc.)
Andria Cornell (Genetic Alliance)
Raith Erickson, R.Ph. (deCODE Genetics, Inc.)
Louisa Everitt (Health Canada)
Keolu Fox (National Human Genome Research Institute, National Institutes of Health)
Erin N. Fry (Fabiani & Company)
Claire Giammaria (American Civil Liberties Union)
Jonathan Gitlin, Ph.D. (National Human Genome Research Institute, National Institutes of Health)
Sarah E. Harding, M.P.H. (National Human Genome Research Institute, National Institutes of Health)
Nancy Hughes (National Health Council)
Raqeeb Jamil, student (Food and Drug Administration)
Emma Kurnat-Thoma, M.S., R.N. (National Institute of Nursing Research, National Institutes of Health)
Penny Kyler (Health Resources and Services Administration)
Elizabeth Lee (American Association for the Advancement of Science)

Preyanka Makadia (*Science*, American Association for the Advancement of Science)
Jackie Malasky Genetic Alliance)
Elizabeth Mansfield, Ph.D. (Food and Drug Administration)
Penny Meyers, M.A. (Centers for Medicare & Medicaid Services)
Tamara L. Miller, J.D. (Office for Civil Rights/HHS)
Jonathan Monkemeyer (Researcher/Patient Advocate)
Basim Motiwala (Office of the Secretary, HHS)
Jennifer Nelson
Vann R. Newkirk II (National Human Genome Research Institute, National Institutes of Health)
Samantha Pearlman, Intern (American Association for the Advancement of Science)
Kathryn A. Phillips, Ph.D., University of California at San Francisco
André M. Pilon, Ph.D. (National Human Genome Research Institute, National Institutes of Health)
Amy Plaut, Intern (Genetic Alliance)
Daryl E. Pritchard, Ph.D. (Biotechnology Industry Organization)
Luisel J. Ricks-Santi, Ph.D. National Human Genome Center, Howard University)
Amber Rivers, J.D. (Department of Labor)
Allen Rudman, Ph.D. (Food and Drug Administration)
Benjamin A. Salisbury, Ph.D. (PGx Health)
Laura Sambataro (Biotechnology Industry Organization)
Sheri Dixon Schully, Ph.D. (National Cancer Institute, National Institutes of Health)
Joan A. Scott, M.S., CGC (Johns Hopkins University)
Fay Shamanski, Ph.D. (College of American Pathologists)
Joanna Short (Office of Women's Health, HHS)
Jill Shuger (Health Resources and Services Administration)
Rachael Sorg, Intern (Health Resources and Services Administration)
Tyrone C. Spady, Ph.D. (National Human Genome Research Institute, National Institutes of Health)
Brian R. Stanton, Ph.D. (The REDANDA Group, Inc.)
Leanne Stunkel (Clinical Center, National Institutes of Health)
Kimberly Taylor (National Cancer Institute, National Institutes of Health)
Ilene Tsui (Office of Biotechnology Activities, National Institutes of Health)
Lorely Umayam, Intern (Genetic Alliance)
Jane Wicklund (Berkeley HeartLab, Inc.)
Jordan Wildermuth (Institute for the Advancement of Social Work Research)
Kristi Zonno, M.S., CGC (Genetic Alliance)

June 11, 2009

Opening Remarks

After welcoming everyone, Dr. Steven Teutsch, Chair of the Secretary's Advisory Committee on Genetics, Health, and Society (SACGHS), introduced Dr. Charmaine Royal, a new SACGHS member, and Lieutenant Colonel Adam Kanis, the new *ex officio* for the Department of Defense. He reviewed the meeting agenda and highlighted some federal reports that were relevant to SACGHS. He noted a decision by the Centers for Medicare & Medicaid Services (CMS) not to cover genetic testing for warfarin dosing; however, through its coverage with evidence development procedure such testing will be covered for patients who are enrolled in certain types of trials. Dr. Teutsch also mentioned a report by the Centers for Disease Control and Prevention (CDC) on good laboratory practices for molecular genetic testing, which had just been published in *Morbidity and Mortality Weekly Report* (available on the internet at http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5806a1.htm).

Ms. Sarah Carr, SACGHS Executive Secretary, spoke about the rules of conduct governing special government employees, with sections on conflicts of interest and lobbying.

Genetics Education and Training

Dr. Barbara McGrath, Chair, of the Genetics Education and Training Task Force, indicated that this session would: (1) cover the status of Task Force activities; (2) provide an update on data gathering; and (3) discuss policy directions. She noted that SACGHS feedback is needed before recommendations are drafted for the report on genetics education and training. The Task Force seeks to develop recommendations that are actionable and measurable. It is also concerned about identifying the needs of vulnerable and underserved populations. Dr. McGrath said she expected that the draft report would be completed by October 2009 and the final report by June 2010. She then introduced representatives of the three Task Force workgroups, who reviewed their workgroup's data-gathering activities.

Consumer and Patients Workgroup. Mr. Vence Bonham, Chair of the Consumer and Patient Workgroup, reported that in addition to a review of pertinent literature related to genetics education for consumers, the workgroup chose to focus on: (1) individuals seeking genetic information; (2) gathering qualitative data through expert interviews with educators, molecular geneticists, clinicians, lay advocacy group leaders, industry representatives, and policymakers; (3) targeting 1,000 organizations with a web-based survey developed from the interviews; (4) reviewing the results of a national survey conducted by Cogent Research LLC of a random sample of U.S. residents' knowledge and attitudes regarding genomics; and (5) using the information obtained from a search of published and unpublished literature on the marketing of genetic testing for the public and health professionals commissioned by National Institutes of Health (NIH).

Mr. Bonham explained that the data suggest that primary care professionals are the appropriate first line for information, and the Internet is an additional source of information on genetics and genomics for the public. He noted that patients and consumers need tools, strategies, and models to enhance genetic health literacy. Also, education about the role of genetics in health beginning in grades K-12 would enhance genetic literacy of the public.

Health Care Professionals Workgroup. Dr. Greg Feero, the outgoing Chair of the Workgroup, said that he would discuss surveys that were conducted to assess federal agency and health professional organization

activities in genetic education and training. He reported that the Workgroup is in the process of comparing outcomes from surveys conducted in 2004 to those conducted in 2009.

Based on preliminary analysis of the federal survey, the Workgroup is proposing that HHS fund, empower, and support genomics education activities for health professionals within HHS. The health care professional organization survey targeted genetic-specific organizations, health professional education and credentialing organizations, and genetic-related federal advisory committees. Qualitative and quantitative analysis is underway. A possible policy direction resulting from this analysis is to consider whether the Secretary of HHS should facilitate the development of public-private partnerships with health professional organizations to develop and implement a strategy for genomics education in the United States.

Dr. Feero also mentioned a June 8-9 meeting at NIH on developing a blueprint for primary care physician education on genomic medicine. The following ideas emerged from the meeting: (1) genetics and genomics need to be integrated throughout the existing infrastructure; for example, pharmacology education could include pharmacogenomics; (2) family history could serve as a focal point for genetics and genomics education; (3) the pipeline for genetic specialists needs to be expanded, with particular attention to filling workforce needs in rural communities; (4) an understanding of the benefit of genetic testing is needed for physicians to adopt to adopt genetics and genomics education; and (5) residency review committees and the continuing medical education approval processes are key points of influence that could be utilized in the near term to improve integration of genomics in clinical care.

Public Health Providers Workgroup. Ms. Kate Reed reported for the Workgroup and first noted the challenge in defining the public health provider workforce, due to its broad nature. She then reviewed the online survey that was sent to state genetics coordinators, the American Public Health Association (APHA) state affiliates, members of APHA's Genetics Forum, and the Association of State and Territorial Health Officers. The survey focused on 12 core competencies that were developed by the Workgroup. Preliminary analysis suggests that the awareness of these competencies is good but barriers to incorporating genetics and genomics into public health include difficulties in tailoring training due to the diversity of the public health workforce and a perception that there is lack of evidence that genetics will improve public health. Ms. Reed noted that general education programs for public health professionals may or may not be useful given the diverse roles within the work force.

Based on an initial review of the survey data, Ms. Reed explained that the likely policy directions are: (1) to identify who is currently being trained in public health and discover ways to increase or improve these trainees' education and (2) identify how to educate the current work force. She also noted that as part of the Workgroup's deliberations, Dr. Muin Khoury—CDC's *ex officio* to SACGHS—expressed concern about the clinical translation of genetic research and reported that he is working with the National Cancer Institute (NCI) to improve current educational activities related to genomics in public health.

Discussion. The Committee provided the following suggestions for the Task Force as it continue to work on the draft report and recommendations:

- Consider point-of-care, just-in-time education within an electronic health record environment, which will be critical in terms of ongoing post-graduate education for health care providers.
- Emphasize reaching the practicing clinician.
- Address areas of critical need such as pharmacogenomics (particularly drug labeling), direct-to consumer genetic testing; cancer genetics, and family history.
- Include the role of environmental factors.

- Address within that post-medical school but pre-graduate setting how genetics and genomics can be integrated into care at the bedside.
- Consider the role of laboratorians in educating primary care physicians.

Dr. Teutsch commented that the draft recommendations should be specific, actionable, and measurable.

Public Comment Session

Jennifer Leib spoke on behalf of the Association for Molecular Pathology (AMP) and reviewed comments that AMP submitted to the Federal Coordinating Council for Comparative Effectiveness Research (FCCCER). AMP called for a comprehensive infrastructure for comparative effectiveness research (CER) for laboratory tests that includes a panel of expert stakeholders with molecular diagnostics expertise, a transparent and widely available electronic clearinghouse for information on CER projects, and standards for the collection and storage of data from genetic testing laboratories to permit the interoperability between those databases. AMPs comments to FCCCER also discussed the translation of genomic research into patient care. As more data becomes available linking clinical outcomes to genetic variations, there is a reasonable expectation that it will be quickly incorporated into routine clinical practice. To facilitate this translation AMP urged that funding for large, carefully designed comparative effectiveness trials for molecular tests be coupled with funding for CER that includes patients who would not necessarily meet the inclusion criteria for prospective trials. In addition, AMP noted that for the public to benefit from innovative molecular tests, it is critical that all laboratories meet high performance standards and participate in proficiency testing programs. To meet this goal, AMP recommended funding for a program to develop reference materials, new proficiency testing methods, and appropriate quality assurance guidelines for new technologies such as whole genome sequencing. Ms. Leib concluded her remarks with comments about the SACGHS draft report on gene patents and licensing practices. She noted that while the draft report raises many key questions, it misses an opportunity to explore the negative impact on public health that derives from exclusive and restrictive licensing practices, such as for genes associated with spinal muscular atrophy and connexin 26 and 30 genes that are associated with hearing loss. She encouraged the Committee to consider additional cases that demonstrate this point.

Incorporating Genetics and Genomics Information in Health Information Technology: David Blumenthal, M.D., M.P.P.

Dr. Blumenthal, Director of the HHS Office of the National Coordinator for Health Information Technology (ONC), focused his remarks on the mandate to ONC and HHS through the 2009 American Recovery and Reinvestment Act (ARRA). Most of the $20 billion from ARRA will be utilized by CMS as incentive payments for meaningful users of electronic health records (EHRs). ONC is responsible for policy development and technical support and will use $2 billion in discretionary funds to help health care providers adopt and meaningfully use electronic health records. To assist in these efforts, ONC is advised by the Health Information Technology Policy Committee and the Health Information Technology Standards Committee.

Dr. Blumenthal remarked that it will be a challenge to provide support to hundreds of thousands of physicians and thousands of hospitals to enable the use of EHRs, particularly smaller hospitals and offices. This effort entails more than getting computer equipment in the right places. The equipment must be used appropriately to lead to better health care and research. EHRs will facilitate the collection and linkage of genetic information with data. EHRs can also promote CER and post-marketing surveillance of drugs and devices, including for the possible influenza epidemic in the fall.

Discussion. In response to Dr. Licinio question about maintenance and adaptation of EHRs to changing needs, Dr. Blumenthal indicated that to some extent this is a market problem and will require that vendors produce systems that are intuitive and easy to use. For example, it would be helpful to have software that permits the construction of pedigrees. Dr. Licinio also asked about maintaining the confidentiality of genetic information. Dr. Blumenthal responded that ONC will examine security-related technologies to protect genetic information and will try to assure the public that identifiable information will be protected.

Dr. Marc Williams suggested that ONC might look at the standards developed by the American Health Information Community (AHIC) Personalized Medicine Workgroup around family history. Additional considerations are how to best use EHRs for newborn screening and genetic and genomics testing, particularly pharmacogenomics. Dr. Blumenthal noted that the group that developed the use case standards for AHIC, which included one on newborn screening, has been asked to reconfigure them to align with meaningful use. He also mentioned that the definition of meaningful use of EHRs will go out for public comment shortly, which will provide an opportunity for individuals and groups to submit their recommendations for the definition.

Dr. Nussbaum noted that there will never be sufficient dollars to examine all types of CER and various methods to collect data should be considered. He asked if meaningful use elements would enable observational studies to better understand how genetic tests can be applied, such as pharmacogenomic-guided cancer. Dr. Blumenthal replied that we want to build in the capability to do genomic-related research, which means building in critical data elements so they will be there when they are needed. He welcomed suggestions on what those data elements should be.

Dr. Billings remarked that integration of laboratory data into EHRs can be problematic. He asked that ONC consider new coding or descriptor systems to laboratory data more useful. Dr. Royal asked that ONC consider the provisions of the Genetic Information Nondiscrimination Act (GINA) and the ability to monitor EHRs to determine who has accessed genetic information and how that information was used.

Genetics and the Future of the Health Care System

Dr. Teutsch recalled that SACGHS heard at its last meeting primarily from payers and how they view some of the issues surrounding genomics and potential changes in the health care system. He explained that the current session would cover health disparities and issues of equity, and how reforms in health care delivery could affect providers and patients. Following the presentations, SACGHS would discuss its next steps in this topic area.

Health Disparities and Changes Needed To Promote Health Equity: Sarah Gehlert, Ph.D.

Dr. Gehlert, Director of the University of Chicago's Center for Interdisciplinary Health Disparities Research, reported on research at the Center that has examined the influence of social factors on gene expression in cancer. Five Center scientists, including Gehlert, from different disciplines have come together to address the question of how factors in women's social environments contribute to the African American and white disparity in breast cancer mortality in the United States. Even when access to care is controlled for, there is still a black-white disparity in mortality from breast cancer; that is, black women are 37 percent more likely to die from breast cancer. This finding is true even though white women are more likely to get breast cancer.

In seeking to understand the reasons for this mortality disparity, the research team chose to concentrate on the social factor of social isolation and its role in breast cancer. Social isolation is associated with poorer health outcomes. First, the team studied the effect of social isolation on rats. The researcher on this project found that female rats that were isolated from their group developed more mammary tumors, had

shortened life spans, and were hypervigilant to threats. To understand the link between isolation and tumor development, the researcher next measured stress hormone levels in the rats and found that when both group-housed and isolated rats were exposed to a stressor, the stress hormone levels for the isolated rats remained elevated for a longer period of time than it did for the group-housed rats.

Dr. Gehlert examined the effect of isolation on African-American women and found that factors that impede social interaction—and therefore increase isolation—also affect stress hormone levels. She also found that a fair number of the women showed numbness to stressors because of continual neighborhood threats. Other research showed that an increase in stress hormones can lead to increased inflammation and ultimately cancer.

Based on the results from animal and human studies, Dr. Gehlert and the other researchers on her team have concluded that interventions designed to improve neighborhood conditions would improve health, thereby conserving resources by avoiding costly health care. Dr. Gehlert concluded her presentation by emphasizing the importance of studying how social and genetic factors interact to determine health and cause health disparities.

Q&A. When asked how the medical home model might play a role in solving the problems she identified, Dr. Gehlert answered that the concept of a medical home can be adapted for impoverished neighborhoods by having federally qualified health centers assign not only a clinician but also a social worker or nurse to follow each patient. Dr. Gehlert also suggested using patient navigators at these health centers.

Proposed Reforms in Health Care Delivery and Provider Payment Systems: Michael Barr, M.D., M.B.A.

Dr. Michael Barr, who has worked on provider payment and delivery reform in his role as the Vice President of Practice Advocacy and Improvement for the American College of Physicians (ACP), summed up the case for health reform by saying that (1) there is poor access to health care, especially for the uninsured, (2) high cost does not necessarily mean better quality, (3) the health care system is laden with administrative costs, (4) current payment systems incentivize volume and not necessarily quality and coordination, (5) compared to international data, the United States is lagging behind in health care, and (6) work force issues abound, especially for primary care.

Dr. Barr suggested that the patient-centered medical home is part of the solution to these problems. Dr. Barr explained that a medical home involves a team of providers, led by a primary care clinician overseeing the care of individual patients. Unfortunately, the very strength of the model, which is primary care, is also its greatest weakness. Only 2 percent of fourth-year medical students, in a recent study, decided to go into general internal medicine. Without primary care physicians, this model cannot exist. Also, employers and payers have commented that the medical home model is not sustainable unless the payment system is changed.

Dr. Barr has worked with the National Committee for Quality Assurance (NCQA) to help develop NCQA's Physician Practice Connections for the Patient-Centered Medical Home. This program has nine domains encompassing access, patient tracking, care management, patient self-management support, electronic prescribing, test tracking, referral tracking, performance reporting, and electronic communication. It includes a process to determine whether a practice has the ability and capacity to establish a medical home and can be evaluated based on quality, cost, efficiency, patient experience, and satisfaction.

Dr. Barr explained that there are three levels of the medical home, based upon a point score with increasing complexity. For a level one medical home, a practice has to develop timely access and communication—so patients are seen and helped promptly. The quality of patient charts, whether paper or electronic, should reflect the kind of care being provided. The practice should also identify three important conditions where it strives to provide the best care possible to its population. In addition, the practice should provide support for patients and families, address health literacy, track tests and referrals, and perform self-evaluations.

Levels two and three require such features as advanced access options for patients such as e-mail communication, personalized health records, complex care coordination, population management, advanced reporting, technology solutions, and clinical decision support and guidance. Dr. Barr noted that current systems do not allow opportunities to provide clinicians, particularly point-of-care physicians, with information about genetics, genetic screening, and genetic counseling.

Ideally, medical homes use health care practitioners to the level of their skills and abilities, provide training in cultural competency training and health literacy, and develop vigorous connections to community. Medical home practitioner should also provide written care plans, assess barriers to adherence to those care plans, and try to help patients and their families overcome those barriers. The medical home is not a gatekeeper system or managed care re-do.

Dr. Barr explained that savings from wasteful practices such as avoidable hospitalizations, readmissions, and emergency department usage can help pay for the medical home. The payment process can be improved by revaluing the codes that apply in traditional fee-for-service and by having add-on codes related to the "medical homeness" of the practice—that is, the level the practice has achieved on the NCQA scale. The whole system becomes less volume driven and more dependent on time spent caring for patients. Technology and performance measurement will be important. The whole approach represents a commitment to excellence.

Q&A. Dr. Randhawa asked if counseling, including genetic counseling, can be linked to pay for performance, and Dr. Barr responded that he was not aware of anyone who had considered that issue. Ms. Darien inquired whether ACP has discussed with patients a more appealing name for the medical home. Dr. Barr replied that they are considering a name change. Dr. Nussbaum asked how wellness and related counseling fit in to the medical home model; Dr. Barr indicated that the answer may come as the model evolves.

The Impact of Genomics on the Future of Oncology: William Nelson, M.D., Ph.D.

Dr. Nelson, Director of the Johns Hopkins Sidney Kimmel Comprehensive Cancer Care Center, focused on how genetics and epigenetics have a growing impact on cancer medicine at the practice level. He began his presentation with an overview of cancer and stated that most cancers are diagnosed after age 55, with about 1.5 million diagnoses and nearly 500,000 deaths per year. One in two men and one in three women develop cancer during their lifetime. Costs are spiraling upward, and the price of new cancer drugs is exorbitant. While morbidity and mortality statistics for the common cancers are beginning to improve, treatment benefits are very uneven, with some patients showing remarkable improvements and others none at all. Dr. Nelson explained that some of this variation has a genetic basis in the germline, but, in other cases the difference stems from acquired genetic mutations. Cancer, in general, is a disease of acquired genetic, genomic, and epigenetic variations.

New technologies are beginning to identify molecular targets that can be used to design treatments and biomarkers for detection, screening, and diagnosis. In some cases it is possible to identify a disease

before the symptoms appear. For example, more than three-quarters of the men diagnosed with prostate cancer never have a symptom or physical finding of their disease.

Dr. Nelson noted that there is tremendous inefficiency in developing new cancer drugs. Half to three-quarters of anticancer drugs in clinical development fail in phase III clinical trials. In 2009, there are 861 drugs in clinical trials for cancer treatment, but only one or two are likely to be approved for use. More than $1 billion is spent per approved drug, which reflects the cost of those that did not make it through the development process.

A more efficient approach to developing anticancer therapies is to use genetics to understand the root cause of a cancer and then design a drug that will remedy the root dysfunction. As an example of this approach, Dr. Nelson pointed to a study in which researchers discovered that certain leukemias were caused by a genetic rearrangement that fused the *BCR* and *ABL1* genes. This fusion creates an overactive enzyme, and researchers were able to design a compound that would inhibit the enzyme. For this drug compound, FDA approval came after a phase I-II trial. Cost and time efficiency of development were improved because the drug was tested only in patients with a *BCR-ABL* gene arrangement and the dose of the drug was tested only to the point where it inhibited the enzyme, the pharmacodynamic endpoint.

Dr. Nelson also noted the potential benefits of genetic for cancer prediction. He observed that sequencing DNA from cancer cells is beginning to identify mutant DNA sequences that cluster in families and are associated with specific cancers. This research may lead to inexpensive genetic tests to identify individuals who are at low risk and do not need costly screening tests such as colonoscopies because they do not have the risk variant.

Dr. Nelson explained that the study of epigenetic changes in cancer cells, such as changes in DNA methylation patterns, has also led to progress in cancer staging and treatment. This approach leads to effective resource allocation—patients who are likely to respond a particular treatment receive it and those for whom the treatment would be ineffective or harmful do not receive it.

While genetic and epigenetic information holds great promise for improving cancer detection and treatment, Dr. Nelson indicated that one problem that needs to be solved is how to store the massive amounts of data that are generated from sequencing patients' cancer genomes.

The Future of Genomics: A Pediatric Perspective: Beth Pletcher, M.D.

Dr. Pletcher, an Associate Professor of Pediatrics in the Institute of Genomic Medicine at the University of Medicine and Dentistry of New Jersey, commented that the Human Genome Project identified and mapped genes, but it is also important to understand and characterize those genes such as knowing how genes interact with each other and with the environment. She also noted that that the promise of genetic technologies and testing is demonstrated by preventing disease, improving surveillance, instituting lifestyle changes, and selecting therapeutics based on an individual's genetic makeup.

Looking to the future, Dr. Pletcher discussed barriers to instituting population screening. These barriers include limited knowledge about many genes and gene-gene interactions, selection of conditions for which treatment or intervention is feasible, and cost of treatment and the infrastructure for patient care. She also stated that a knowledgeable workforce will be needed to interpret genetic results and to implement any needed treatments. Physicians who graduated from medical school before 1990 have limited exposure to new genetic technologies. As of 2007, there were only 1,253 board certified clinical geneticists in the United States.

Dr. Pletcher proposed a model that would support a screening paradigm. In this model, pediatricians would be at the center of the medical home, and education of pediatricians, family practitioners, and other primary care physicians would be a key element. Physicians would need a hotline to reach an expert to help interpret test results, manage the patient, and provide direction on follow-up services. Follow-up services should be in place before screening begins. Dr. Pletcher also would like to have a panel of experts that includes laboratorians, clinicians, and consumers to oversee the screening process. Other needs to support this model are cost-effective technologies for population screening, well designed EHRs that are transportable, and educational materials for parents so they can understand test results and their significance.

Dr. Pletcher explained that implementation of a screening process is of little use without ongoing assessment of clinical benefit. She stressed that long-term outcomes must be evaluated and may take many years to demonstrate benefit or no benefit. In addition, screening programs must accommodate a thoughtful introduction of new genetic tests, which requires broad expertise and general consensus. She also noted that the current reimbursement system is not set up to handle single gene sequencing, let alone general population screening.

Dr. Pletcher also stated that screening programs come with moral obligations. Specifically, tests included in screening should be appropriate and likely to promote health benefits. The results should not be used in a way that will disadvantage patients in terms of educational opportunities, insurance coverage, medical care, or employment. Ongoing assessments should be conducted to add tests that show promise for improved health and remove tests that are shown to be of little value. Finally, whatever the cost of screening, there must be equity in access to testing.

Q&A. In light of Dr. Pletcher's observation that the existing workforce of clinical geneticists is too small to consult on every positive newborn genetic screen, Dr. Williams suggested that another approach, apart from Dr. Pletcher's idea of having pediatricians be responsible for discussing results with families, would be to create a new allied health professional called a genetics educator. The role of this professional would include performing risk stratification and referring some patients to a clinical geneticist. In response, Dr. Pletcher asked about the cost of this approach. Dr. Williams answered that it would be cost-saving. Dr. Pletcher agreed that Dr. William's suggestion was sensible but wondered how feasible it would be for small, rural practices to have such a professional on staff. In these settings, virtual or online consultations might be more practical.

Dr. Dale next asked Dr. Nelson whether he thought all oncologists will need to be educated in genomic medicine, and, if so, how it would happen. In response, Dr. Nelson noted that there is significant standardization in cancer care and that teaching these care standards to health care professionals is a way of educating them in genomic medicine.

Changes in Health Care from Patient Advocates' Perspectives: Katie Hood, M.B.A. and Myrl Weinberg, M.A.

Ms. Hood, Chief Executive Officer of the Michael J. Fox Foundation for Parkinson's Research, noted that the focus of her organization is science—as its objective is to drive research on Parkinson disease (PD) towards better therapies and a cure. Founded in 2000, it has funded more than $142 million in PD research with an additional $30-35 million in new commitments planned for 2009. In its first two years, the Foundation determined that its focus should be on the gaps in translational research, particularly gaps in the drug development pipeline.

Among the Foundation's interests are biomarkers, efficiently identifying the complete genetic map for PD, validating genetic findings, and encouraging collaborative efforts. When the Foundation funded the

first genome-wide association study and a large-scale validation, the association could not be validated. Nevertheless, the Foundation is continuing to fund gene discovery and validation studies, focusing on two genes, *LRRK2* and *SNCA*.

Looking to the future of PD research, Ms. Hood sees as assets (1) the potential of the Internet for handling large quantities of data for this type of research and (2) the growing interest of the public, partly as a result of direct-to-consumer marketing. The Foundation is funding 23andMe and the Parkinson Institute, a California patient clinic and research center, to develop web-based surveys of PD patients to collect clinical information. The Parkinson Institute and 23andMe are also creating a database community of 10,000 people, who, besides providing initial data, will be asked to participate in surveys.

Ms Hood finished her presentation by stating that disease heterogeneity—the idea that there may be different subtypes of a disease known by one common name—is an issue that requires greater study.

Ms. Weinberg is President of the National Health Council (NHC), which advocates for people with chronic diseases and disabilities and their caregivers—more than 133 million people in the United States—and she is a member of the Roche Genetic Science and Ethics Advisory Group. NHC has about 50 major advocacy organizations as members (e.g., the American Cancer Society) as well as health and medical organizations and associations. It works on systemic, not condition-specific, issues.

Ms. Weinberg explained that NHC convened nationwide telephone focus groups with patients to gauge their understanding of genetic research and to learn their thoughts on genetic testing. Participants reported that the societal benefits of genetic research outweigh any concerns and risks. In addition, participants indicated that to achieve the benefits of this research strict controls need to be in place and the limits of technology must be understood. All focus groups indicated that they approve of gene manipulation to cure or prevent disease but not to manipulate the characteristics of a child. They also feared how employers might use genetic information, which Ms. Weinberg hoped had been resolved by GINA.

NHC created the Campaign to Put Patients First and believes that meaningful health care reform should be built on five basic principles, based on patient input from this Campaign. These principles are (1) create a health care system that covers everyone, (2) curb costs responsibly, (3) abolish exclusions for preexisting conditions, (4) eliminate lifetime caps on benefits, and (5) ensure access to long-term and end-of-life care. Ms. Weinberg also pointed out that health care delivery systems ought to be focused on the patient, the end user. Clinical research and CER must move beyond population-based models to take into account the life circumstances of individual patients. Ms. Weinberg also stated that CER results must not drive coverage and reimbursement decisions until CER results are evaluated in real-world settings to determine their impact on individuals and subpopulations.

From the patient's perspective, true value incorporates both quality research and the patient's personal circumstances, which include the individual's genetic, ethnic, religious, socioeconomic, and other factors, at the point of care. Ms. Weinberg noted that care coordination would be orchestrated using individual care plans. The care coordinator, working with the patient and their family, might be a physician, nurse, social worker, or some other person. At times, the focus will be on strengthening the patient's body, and other times, the focus would be on preparing the patient's mind for inevitable death. Care plans would need to be value-based and cognizant of the cost both to society and to the person. NHC sees a need to eliminate unwanted and unnecessary care and the perverse incentives that promote the practice of defensive medicine. As much as one-third of the $2.5 trillion spent on health care each year is for duplicated tests and unneeded procedures.

Ms. Weinberg concluded her presentation by emphasizing that the overarching goal is to make health care, first and foremost, patient-focused.

The Impact of Health Care System Changes on the Pharmaceutical and Diagnostics Industries: Murray Aitken, M.B.A., M.Comm.

Mr. Aitken, Senior Vice President for Health Care Insight at IMS Health, noted that IMS Health is the world's largest provider of market intelligence to the pharmaceutical and broader health care industries and works with government agencies as well. He organized his remarks around the following three topics: (1) the current and near-term future states of the pharmaceutical industry, its commercial challenges, the pressures on the ongoing funding of research and development, and opportunities for genomics-based research for both diagnostics and therapeutics; (2) health care system changes that could enhance progress in genomics-based diagnostics and therapeutics; and (3) unintended consequences to patients of health care system changes that represent risks to ongoing private sector programs of investment and research.

Mr. Aitken said the pharmaceutical sector is facing significant commercial challenges in the next five years that place at risk the ongoing funding of genomic-based innovation. During this period a number of profitable drug products will lose their patents and face generic competition. The number of recent innovations is insufficient to make up for the resulting loss of income, and the annual number of prescriptions began to fall this year. These trends will put new pressures and limitations on available pharmaceutical research funds. At the same time, the total resources required to yield one successful product are rising—as are the number of regulations, which results in greater costs to achieve regulatory approval. Consequently, funding for innovation is likely to be limited.

Despite these trends, companies are devoting significant resources to genomics research and health care reforms appear likely to enhance, rather than hinder, progress in genomics-based diagnostics and therapeutics. Health care reform can have the most significant impact on genomic technologies through (1) broad adoption of CER, (2) changes to the drug and diagnostics reimbursement and incentives systems, and (3) adoption of health information technology.

Mr. Aitken elaborated that CER will be most effective if it is conducted in such a way that it enables effectiveness to be assessed at a patient segment level rather than at the total population level. While patients could be defined at the genomic level, Mr. Aitken indicated that it is unclear at this time whether it is the best way to define patients.

A health care system change that could undermine the development of genomic technologies, according to Mr. Aitken, would be a reduction in reimbursement rates or some other type of cost control that would discourage investment needed for research and development. Health care reform elements that help support a major shift toward rewarding wellness, prevention, and efficient management of patients can provide a major impetus for genomics-based therapeutics and diagnostics.

Q&A. Dr. David Dale asked what the future holds for small biotechnology companies. Mr. Aitken responded that these companies have been hurt by the economic crisis and the freezing of venture capital investment. Furthermore, fears about cost controls are dampening investment. Dr. Nussbaum then asked Mr. Aitken if he expects large pharmaceutical companies or merged companies to produce more breakthrough discoveries. In response, Mr. Aitken said there is no evidence that bigger companies are more innovative or productive than smaller companies. He elaborated, however, that the decisions by payers around the world not to cover drugs that represent only incremental advances has discouraged the pursuit of drugs that are evolutionary at best; companies instead are pursuing high-risk, potential-

breakthrough drugs. If health care reforms severely restrict capital for these companies, these pursuits may be abandoned.

Dr. Teutsch asked whether cost-saving genomic technologies will be developed in the near term. Mr. Aitken did not say whether they will be developed in the near future but expressed confidence that genomic technologies will result in costs savings. Technology developers must create ways to measure those savings—and to do so they must first be able to measure the costs in the current system and then identify those costs that are avoided by using their innovations.

Committee Discussion of Next Steps in Genetics and the Future of the Health Care System

Dr. Teutsch asked SACGHS members to consider how the HHS Secretary could help realize a future that includes genomic-based personalized health care and barriers to this type of health care. Dr. Dale mentioned the importance of collecting genetic information longitudinally in EHRs to permit future population analyses—and also of creating tissue databanks. Dr. Mansfield agreed with the importance of tissue banking (and tissue specificities) to genomics.

Dr. Nussbaum suggested looking at current proposed health reform legislation to identify where it references genetics or genomics and then respond to those provisions, Dr. Teutsch reminded everyone that the Committee advises the HHS Secretary, not Congress. Dr. Teutsch agreed, however, that the Committee could in the short term comment on health care reform proposals while pursuing other long-term actions. In response, Ms. Walcoff suggested it would not be feasible to comment on proposed legislation because new bills will soon come out and existing bills will be undergoing modifications; it would be too difficult to anticipate what the ultimate bill would contain. She suggested it might be more productive to focus on recently passed bills and offer direction on how they should be implemented. In particular, the Committee could recommend that the Secretary require research grantees receiving funds under the stimulus bill to store tissue specimens.

Dr. Teutsch responded that it might be better to simply offer guiding principles for legislation rather than commenting on particular provisions of pending bills. Dr. Ferreira-Gonzalez then noted that SACGHS in its previous reports has already made various recommendations relevant to health care reform and could present these to the Secretary.

Dr. Guttmacher agreed that assembling a report on prior positions is timely. He suggested some senior HHS staff may already have an interest in personalized medicine, and Dr. Royal recalled that a genomics and personalized medicine bill had been introduced in 2006 (by then Senator Obama) and later reintroduced; the bill had language about gene-environment interactions, too.

Dr. Williams proposed delving into health information technology, noting that SACGHS had appropriately deferred to the AHIC Clinical Decision Support Group (when AHIC existed) on aspects of health information technology and personalized medicine. He suggested that SACGHS should consider taking ownership of the health information technology aspects of genetics, genomics, personalized medicine, and biobanking so the health information technology infrastructure going forward will have the capacity to support genetic information when it is collected. Ms. Au added that relevant requests for applications (RFAs) have been announced but in an uncoordinated way.

Reflecting on the discussion, Dr. Wise remarked that he had not heard a coherent plan of action and suggested that the Committee come up with specific actions. Agreeing that a focused plan is needed, Dr. Billings added that the Committee's recent progress report does not meet that criterion. He also suggested that what is needed is not a long laundry list but a focus on just a few critical issues.

Dr. Ferreira-Gonzalez mentioned that certain key elements—like tissue banking, information technology, and privacy issues—will certainly be relevant; she proposed that SACGHS could lay out some of the infrastructure needed to move forward. Dr. Nussbaum commented that the most likely next legislative steps on health reform will not cover technical areas that are of interest to the Committee, and SACGHS should focus on these areas for now.

Ms. Walcoff proposed picking three major topics and suggested biobanking as one of them. Dr. Amos added that biobanking is part of a larger measurement infrastructure—while also being part of health information technology. Dr. Dale said that that it is also important to link biobanks with clinical data. Dr. Teutsch added that the Committee would also have to talk about such aspects as the deliberative process that is going to get the American people to agree to biobanking and the related issues of privacy protections. Dr. Amos added that there must be standardization of how tissue collection is performed; otherwise, the different expression levels of tissues are meaningless. Dr. Ferreira-Gonzalez and Dr. Mansfield noted that some groups are already working on standardizing tissue collection.

Dr. Evans then suggested that the Committee should not focus on issues relating to biobanking because it was too complicated. While Dr. Evans agreed that the Committee should limit its focus in this area to roughly three topics, he proposed that whatever topics are chosen must be ones upon which the Committee can come to a conclusion. Dr. Evans suggested EHRs as one of the topics. Dr. Teutsch proposed evidence development as a possible second topic. Dr. Nussbaum mentioned including genetic counseling in the medical home concept as a possible topic.

Dr. Wise proposed that SACGHS establish a subcommittee that would refine the selected topics and frame them in a way that makes their importance to health care reform clear. Dr. Teutsch agreed but wanted to first finalize the selected topics.

Ms. Walcoff suggested (1) biobanking as a research-and-development issue, (2) genomic and family history and the EHR as a clinical issue, and (3) a development/product selection issue—such as patient stratification, whether in post-market clinical comparative effectiveness or adaptive trial design. Dr. Teutsch noted that a fourth possible topic he was hearing was developing a coordinated system of care that included genetics.

Dr. Billings proposed also addressing adequate financing for translation of innovation as health care reform will change the current system, and a new way to fund effective innovation will be needed. Dr. Teutsch said he agreed. Dr. Evans stated that biobanking should be dropped from the list of topics because of contentious issues that the Committee has not had time to debate.

After further discussion, Dr. Teutsch identified the following four key topics: (1) information infrastructure, (2) evidence development/comparative effectiveness, (3) coverage and reimbursement for new technologies, and (4) coordination of care/medical home issues, including genetics. When several other members suggested combining a couple categories or adding other topics, Dr. Teutsch said that he agreed with Dr. Nussbaum about being straightforward and brief and also keeping to topics relevant to health reform.

The following SACGHS members volunteered for a subgroup to prepare a letter to the Secretary on the four topics identified as important to genetics and health care reform: Ms. Walcoff and Drs. Williams, Billings, Dale, Ferreira-Gonzalez, and Wise.

Dr. Williams wondered how to say something timely about health information technology as the Health Information Technology Policy Committee was meeting the following week. Dr. Teutsch suggested that appropriate remarks from the SACGHS meeting could be included in a prompt thank-you letter to Dr.

Blumenthal. The letter would also include a suggestion of a formal liaison between SACGHS and the Health Information Technology Policy Committee.

Gene Patents and Licensing: Overview of Public Comments on the SACGHS Consultation Draft Report: James P. Evans, M.D., Ph.D.

Dr. Evans expressed appreciation to the public for its responsiveness to the request for comments on the gene patents and licensing report. SACGHS received 77 comments, totaling 392 pages. Dr. Evans informed the Committee that public comments were received from professional associations, technology transfer officers, industry organizations, life science companies, academic organizations, health care providers, laboratories and laboratory managers, and private citizens. A wide range of opinions was expressed. Criticisms were leveled from both ends of the spectrum—from those with little desire to see any changes whatsoever in the patent and licensing landscape and those who want to see a whole-scale dismantling of the genetic intellectual property landscape. Dr. Evans remarked that perhaps the range of comments shows that the report has achieved some balance.

Dr. Evans then described what the Task Force's next steps would be. He indicated that the Task Force would review, analyze, and discuss the public comments. He explained that if the Task Force learns from a comment of an inaccuracy in the report, the inaccuracy would be corrected. Dr. Evans continued that after the public comments have been reviewed, the Task Force will revise the report and determine what recommendations it will present to the Committee at its October meeting.

Closing Remarks

Dr. Teutsch thanked everyone for their attention and asked Committee members to review the draft paper on direct-to-consumer genetic testing for tomorrow's meeting.

June 12, 2009

Opening Remarks

After welcoming everyone, Dr. Teutsch noted that the first topic on today's agenda is a follow up to discussions from the March 2009 meeting on direct-to-consumer genetic testing. In addition, SACGHS will review the draft memo that Dr. Williams and others prepared on health information technology for Dr. Blumenthal in preparation for next week's meeting of the Health Information Technology Policy Committee.

Direct-to-Consumer Genetic Testing

Presentation of the Draft Report on Direct-to-Consumer Genetic Testing: Sylvia Au, M.S.

Ms. Au briefly reviewed the March 2009 decision that a short-term task force on direct-to-consumer (DTC) genetic testing would develop a paper that outlined DTC benefits and concerns, highlighted prior SACGHS recommendations that address those concerns, and identified issues that were not adequately addressed by prior recommendations and that the Committee might want to consider for future work. The goal of the session was to reach consensus on these elements of the paper. The DTC Genetic Testing Task Force decided to limit the scope of the paper to DTC testing that provides risk assessments, diagnosis of disease or health conditions, and information about drug response or other phenotypic traits. It excluded forensic analysis, ancestry testing, and paternity testing.

Potential benefits of DTC testing include increased availability and access to genetic testing, support of consumer empowerment and autonomy, adoption of health-promoting behaviors, promotion of health literacy, an alternate route to medical research, and confidential access to genetic testing. However, the unprecedented speed at which genetic technologies are introduced as commercial products and sold directly to consumers has raised some concerns.

The draft paper identified the following concerns: gaps in regulatory oversight; questions about test quality analytical validity; lack of standardized terminology for genetic variants, standards to select and validate variants used in assessing disease risk, and standard criteria in assessing aggregate risk; limited evidence of clinical validity and/or clinical utility of certain tests; false and misleading marketing claims; and incomplete or unbalanced promotional materials. Other concerns are the ability of consumers to evaluate marketing claims and make informed decisions about genetic testing; their ability to understand the test results; unpreparedness of health care providers to help consumers understand DTC test results; limited data on psychosocial impacts; unclear or inadequate privacy protections and protections for the research use of specimens obtained during direct-to-consumer testing and the data derived from the specimens; inequities to access new technologies offered through DTC testing; and insufficient safeguards to prevent nonconsensual or third-party testing.

Eight prior SACGHS recommendations were highlighted in the draft paper. These recommendations addressed concerns related to analytical validity, clinical validity, clinical utility, oversight gaps, false and misleading claims, and consumer and provider education.

The Task Force identified the following concerns that were not adequately addressed by prior SACGHS recommendations: unclear or insufficient privacy protections; limited data on the psychosocial impact of DTC genetic testing; potential exacerbation of health disparities; inadequate protection for research use of specimens and data derived from the specimens; and the lack of standards for genetic variant terminology, selection and validation of variants used in assessing disease risk, and calculating aggregate risk from multiple variants.

Ms. Au asked if the draft paper had correctly identified (1) concerns related to DTC genetic testing, (2) prior SACGHS recommendations that addressed these issues sufficiently, and (3) remaining concerns that may require additional action. She also asked whether the paper should move forward to the HHS Secretary and if any additional action is warranted for issues not adequately addressed by prior SACGHS recommendations.

Committee Discussion

SACGHS members praised the work of the DTC Genetic Testing Task Force. Dr. Williams' only addition to the list of concerns would be the issue of sample and data ownership (e.g., if a company is sold). Ms. Walcoff mentioned possible confusion between DTC advertising and DTC genetic testing and physician-ordered testing. She also suggested that the selected prior recommendations could be reworded to be more directed and specific to DTC advertising and/or testing. Dr. Billings cited as an example making the genetic education recommendation more targeted. Dr. Nussbaum agreed that the recommendations should be more specific to DTC testing; particularly issues related to clinical validity and how DNA samples would be used and consent for that use. Ms. Au pointed out that these proposals would certainly lengthen the process as well as change the focus of the paper.

Dr. Williams noted that recommendations in the SACGHS oversight report are relevant to DTC testing. In the short term, the Committee could make the Secretary aware of these recommendations and how they specifically apply to DTC genetic testing. In the longer term, the Task Force could develop a more tailored document that focuses on issues unique to direct-to-consumer testing.

Dr. Evans proposed that the Task Force develop a preamble or executive summary that highlights a few key concerns for Secretary's attention. As one of the key concerns, he suggested that claims should be reconciled with reality—that is, genetic testing is really medical testing and should have the same kind of oversight as other medical tests. Offering tests for high-penetrance *LRRK2* or *BRCA* variants is incompatible with claims that state that testing is not meant to provide medical advice. Dr. Gutierrez stated that defining genetic testing as a medical device would be helpful and would alert agencies about their regulatory responsibilities. Dr. Billings, however, had concerns about the medical device definition asit had not been previously discussed by the Committee.

Mr. Bowen suggested emphasizing the differences between clinical utility and personal utility. Dr. Billings remarked that DTC testing is distinguished from other kinds of medical testing by the role of the expert in ordering the test, which had not been addressed in the paper. Regarding privacy protections, he thought that DTC tests were protected by the same laws as other kinds of testing. Dr. Ferreira-Gonzalez pointed out that the Health Insurance Portability and Accountability Act (HIPAA) provides privacy protections for medical testing, but Dr. Cathy Fomous noted that DTC genetic testing companies are not considered covered entities under HIPAA.

In summing up the discussion, Dr. Teutsch said the standards for DTC tests that make a health kind of claim or indicate some value in the health sphere need to be at least as high as those tests performed in the clinical arena.

Dr. Wise still wondered whether the Task Force should take a detailed look at legal and other implications, but Dr. Evans noted that there are certain aspects of DTC testing that rise to the level of obviousness, such as BRCA testing as a medical test, and it would be worthwhile highlighting those issues that the Committee agrees rise to importance without spending several additional months on the document. Dr. Wise responded that recommendations made by the Committee have implications for a variety of agencies. Committee members who are not be directly involved day-to-day with DTC issues need to have background information that has been vetted and articulated so we can make sound decisions.

Dr. Teutsch proposed moving forward with a preamble to the paper that highlights the Committee's decision that genetic testing is health-related testing that needs oversight when it deals with clinical issues plus a few other key issues. A consensus was reached that the one- to two-page prepared will be prepared before the next meeting and brought to the Committee for approval at is October meeting. Ms. Walcoff volunteered to help write the preamble.

Clinical Utility and Comparative Effectiveness Research

In introducing the session on clinical utility and CER, Dr. Teutsch noted that the speakers would be discussing federal developments and future directions in this area.

Clinical Effectiveness, Clinical Utility, Comparative Effectiveness—An Evolving Landscape: Gurvaneet Randhawa, M.D., M.P.H.

Dr. Randhawa, a Medical Officer in Center for Outcomes and Evidence at the Agency for Healthcare Research and Quality (AHRQ) first explained that several factors can influence the effectiveness of therapies. The foremost factor is the patient's biology, which includes age, gender, comorbidities, disease severity, and genetic factors. Apart from the biology, other patient factors influence effectiveness such as adherence to the drugs or other therapies, costs of therapies, therapeutic preferences, and drug-drug interactions that do occur but are studied in efficacy trials. In addition, it is important to consider factors related to providers, such as the skills, training, and experience of the provider (e.g., skill and experience

in implanting devices during surgical procedures). He noted that efficacy trials have high internal validity but poor applicability; effectiveness trials have high applicability but require large samples and are expensive. Dr. Randhawa described clinical utility as information that is useful for clinical decisionmaking.

Comparative effectiveness studies can compare interventions (e.g., devices, drugs, dietary supplements, biologics, surgical procedures, counseling, behavioral interventions), protocols, health care programs, and delivery systems. Methods to study comparative effectiveness include randomized controlled trials (RCTs), observational studies, modeling, and systematic reviews. Dr. Randhawa noted that Congress authorized AHRQ in 2005 to conduct CER, and in acting to implement this authorization, AHQR established the Effective Health Care Program (EHC). Two examples of EHC studies are the comparative effectiveness of different treatments to prevent fractures in people who have low bone density or osteoporosis and the comparative effectiveness of different diabetes medications. When the studies are completed, AHRQ issues a report as well as clinician and consumer guides.

Future Directions and the Role of Genomics in Comparative Effectiveness: Harold Sox, M.D.

Dr. Sox, Chair of the Institute of Medicine (IOM) Committee on Comparative Effectiveness Research Prioritization, explained that the IOM Committee was tasked with recommending the particular comparative effectiveness studies the Government should undertake with ARRA funds. He added that the IOM Committee defined CER as "the generation and synthesis of evidence that compares the effectiveness of alternative methods to prevent, diagnose, treat, monitor, and improve delivery of care for a clinical condition." The purpose of CER is to help patients, clinicians, purchasers, and policymakers make better-informed health decisions.

Dr. Sox then provided an example of a past CER study that compared the effectiveness of using traditional diabetes risk factors with using those factors plus genetic information to predict diabetes. The results of the study demonstrated that genetic information did not make a clinically important contribution to discriminating between people who will develop diabetes and those who will not, which would be important for targeting programs to try to reduce the incidence of diabetes through the use of behavioral change as well as drug therapy.

The IOM Committee was given until June 30, 2009, 19 weeks after ARRA was signed, to provide its report. In pursuing its work, the Committee heard from 56 presenters at an open meeting, conducted a web-based survey soliciting condition/intervention recommendations, and developed criteria for balancing the portfolio of study topics that would ultimately be recommended. Dr. Sox indicated that the IOM report was undergoing review by the National Research Council of the National Academies.

Dr. Sox next discussed the possible impact of health care reform legislation on CER. He noted that the U.S. Senate Finance Committee recently issued a white paper that included a proposal for a new private, nonprofit institute for CER that would both recommend areas for inquiry and conduct research. The institute would have both public and private sector representatives on its board and be funded by a modest assessment on private insurers.

Role of Genomics in Comparative Effectiveness Research, NIH Perspective: Michael Lauer, M.D.

Dr. Lauer, Director of the Division of Prevention and Population Science in the National Heart, Lung, and Blood Institute, is a long-time CER researcher. He indicated that his presentation would include the history of CER at NIH, definitions of CER, the impact of ARRA on CER, how NIH activities on CER are organized, and the opportunities and challenges from ARRA's CER funding.

Before beginning these topics, however, Dr. Lauer asserted that CER is needed, and as evidence of this need, he pointed to a study examining guidelines of the American Heart Association and the American College of Cardiology over the last 25 years, which concluded that while the number of recommendations to physicians is increasing, the proportion based on solid evidence has decreased. Furthermore, when classifying currently active recommendations by the level of evidence on which they are based, the researchers found that only 11 percent were based on strong evidence (multiple RCTs) while 50 percent were based only on "expert opinion."

Dr. Lauer then presented examples of CER research studies at and/or funded by NIH. He explained that NIH has multiple resources for accomplishing CER research, including trial networks, cooperative groups, disease registries, electronic medical record data, a consensus development program for evidence syntheses, and a Center on Health Services Research at the National Library of Medicine. Dr. Lauer noted that while institutions and individuals vary in how they define CER, there are some common themes—in particular, most definition recognize that CER involves some kind of valid comparison, a focus on real world effectiveness as opposed to efficacy, and a focus on real outcomes.

Dr. Lauer next explained how NIH will use funds appropriated to it under ARRA. He indicated that a NIH coordinating committee has been formed that is responsible for determining how best to use the ARRA funds. This committee has also been charged with determining how to best collaborate with sister agencies, particularly with AHRQ, on some jointly funded cost-effectiveness research and how to best communicate and disseminate NIH CER findings. The committee is also tasked with accelerating research through existing mechanisms and new programs and considering the agency's long-term charge for CER.

Dr. Lauer stated that NIH plans to use some ARRA funds for supplements to current research, for Challenge and Grand Opportunity grants, and for peer-reviewed meritorious grants it was not able to fund earlier. Some funds will also be used to enhance appropriate trials that are funded by contracts. Since these grants and contracts supported by ARRA are restricted to a two-year timetable, a big question is what happens at the end of that time period.

Future Directions and Developments in Research Methodologies: Steven Goodman, M.D., M.H.S., Ph.D.

Dr. Steven Goodman, Professor at Johns Hopkins Bloomberg School of Public Health and statistical editor of *Annals of Internal Medicine*, observed that considerable data are being generated on genes found to be associated with disease, but ways are needed to determine exactly which genetic factors are genuinely clinically significant. While discovering a gene's function is one to determine whether it may be clinically significant, Dr. Goodman focused on presenting clinical approaches to assessing genetic factors. One approach he described is the use of Bayesian adaptive trial designs, which enable a potentially more efficient study of genetic factors and disease. In such trials, study components can change based on findings made during the course of the trial. Components that can change include the sample size, the randomization scheme, the particular therapies or their doses, and the clinical or surrogate endpoints. In addition, these trials can stop early for success or terminate early for futility and adapt to responding subpopulations. In other words, Bayesian design allows for common-sense learning.

Dr. Goodman described one adaptive clinical trial that is underway. It is an adaptive breast cancer trial design for neoadjuvant chemotherapy in women with large localized tumors before surgery. The goals of the study are to evaluate new therapies in patient subsets based on biomarkers and to test, validate, and qualify new biomarkers as drugs are tested. If a particular therapy and biomarker subgroup look highly promising, they are moved to testing in a phase III setting. Regimens are dropped if they show a low

probability of improved efficacy, and new drugs can be added as those that have undergone testing are graduated or dropped. Experimentation is a continuous process in this trial system.

Bayesian design also allows formal incorporation of prior evidence into the interpretation and design of trials, which can improve the trial's efficiency. The design also minimizes unneeded experimentation as it allows dropping of trial subgroups or arms.

Dr. Goodman noted, however, that certain factors can make this approach inefficient. That is, if no subgroups can be curtailed and no surrogate endpoints can be identified, the trial is extended in length. In addition, adaptive designs require a lot of upfront planning. Currently, flexible, user-friendly software for the statistics, design, and data management has to be built anew for each trial. An unfamiliarity of government regulators with Bayesian designs also slows the process.

Dr. Goodman next described the reproducible research model. In this model, the data, methods, documentation, and distribution are all part of one fused document that has all the code embedded but looks like a paper that one can read. The concept was initiated in technical proposals in the computer programming literature and is now starting to see broader application.

In addition to describing these new methods of clinical research, Dr. Goodman suggested other changes that he believes would improve the ability to conduct clinical research. For example, he called for the development of tissue repositories that link clinical data and long-term follow-up from RCTs. He also indicated that there may be an FDA requirement that has created a disincentive for conducting clinical trials of combination therapeutics that work synergistically. If this FDA requirement in fact exists, it needs to be reexamined, according to Dr. Goodman.

Impact of Comparative Effectiveness Findings on Clinical Practice: Marc Williams, M.D.

Dr. Williams, in his professional capacity, presented on how InterMountain Healthcare develops and optimizes processes for medical care as a means of improving the quality of care.

Dr. Williams explained that one determines quality in terms of the medical and patient outcomes and the level of service, including whether access to the right service was available. Costs are also considered in determining whether a medical process resulted in a quality outcome.

Dr. Williams provided several examples of how InterMountain Healthcare has sought to improve quality through creating defined processes. For example, a study of extubation practices in the post-cardiac intensive care unit (ICU) found considerable variability in when physicians extubated patients. After studying how physicians went about making the extubation decision, a protocol to guide the decision was established. After this process was put into place, extubation time became less variable, and patients' overall hospital stay was reduced.

Using the same basic approach, InterMountain Healthcare established a specified process for discharging patients with acute myocardial infarctions who did not have a contraindication. As a result of this change, the InterMountain system went from correctly discharging these patients with a beta blocker only 57 percent of the time to 98 percent of the time.

Dr. Williams noted, however, that after a process is initiated and gains are made in compliance with recommended care, one often sees a backslide in the percentage of clinicians following the recommended care. As a result, procedures have to be adjusted to maintain a high percentage of compliance.

Although getting physicians to follow an established procedure is useful, compliance with the procedure is only a surrogate outcome, Dr. Williams explained. The outcome that really matters is the patient's health. As such, InterMountain Healthcare set out to study whether compliance with a procedure by physicians in fact resulted in better health outcomes for patients. For the discharge program, InterMountain found that health outcomes did improve, as evidenced by significant drops in mortality and readmission.

Dr. Williams noted that the cost-savings of establishing defined processes has also been tracked, albeit with some difficulty. To track costs to identify cost-savings from 30 or more clinical quality improvements at InterMountain Healthcare required radical changes in accounting. Once the accounting was done, InterMountain found that every continuous quality improvement (CQI) project has produced savings. For example, the extubation protocol has saved $5.5 million to date.

Dr. Williams added that InterMountain Healthcare has also tried using defined processes in genomics. In particular, InterMountain established a process of using genotype information to set an initial dose of warfarin. InterMountain found that when this process was adopted initial doses tend to be fairly close to stable maintenance doses, resulting in fewer adjustments and fewer tests conducted. Cost savings, however, did not result from adopting the procedure. Dr. Williams suggested that the lack of savings may have been because there were already established, quality procedures for these patients that made additional gains from genotyping hard to achieve. Dr. Williams wondered, though, if genotyping might have greater cost-saving value in a rural setting or small medical practice, where the physicians do not have the resources to establish an anticoagulation clinic with defined processes.

Dr. Williams next described how InterMountain Healthcare develops processes for improving the quality of care. He explained that a multidisciplinary team selects high-priority care processes and does evidence-based reviews to identify best practices before putting the proposed guidelines out to the full range of practitioners who would be exposed to the guideline to get their comments and suggestions. The guidelines (called shared baselines) generate a clinical work process. While clinicians are free to vary particular steps within the process based on each individual patient (no protocol fits every patient) and their own individual judgments, the institution captures the outcomes from each of those decisions in order to learn. The team expects that the measuring and learning process will lead to changes in the initial guidelines.

Dr. Williams noted that while the work he has described is comparative and looks at effectiveness, not everyone is willing to call it research. Perhaps it fits among the newer research methodologies. He also believes that these processes will work well in personalized medicine.

Committee Discussion

Dr. Teutsch encouraged the Committee to consider how CER fits within the scope and responsibilities of SACGHS. Dr. Evans began the discussion by asking if anyone might suggest what should be done once CER shows particular options to be better. In response, Dr. Williams said that before something new can have rapid translation into practice, the following steps have to come together: recognition that a problem exists, demonstration that there is a better way, and development of established processes that provide the needed information to the clinician just before he or she has to make a clinical decision. For example, at InterMountain when a physician orders a test electronically, an information button is available for access to guidelines for that test. Also, in an electronic ordering environment, one can constrain certain decisions or request that certain additional information be presented.

Dr. Goodman added that doctors would be better able to take advantage of CER if their education included statistics and economics. He then went on to answer a question Dr. Dale had posed concerning

whether a Bayesian adaptive trial could be used to improve care processes, such as those used at InterMountain Healthcare. Dr. Goodman answered that traditional methods could be used to study care processes and that one would not be required to use an adaptive trial.

Regarding the value of tissue banks—another issue raised by Dr. Dale—Dr. Goodman said that NIH funding for trials should be extended to permit follow-up on study subjects and tissue storage. He added that tissue banks should be centralized.

The discussion turned toward the subject of increasing patient participation in CER. Dr. Sox asked Ms. Darien how CER could be made more appealing to patients. Ms. Darien answered that CER studies can be made more appealing by asking questions that matter to patients and by allowing patients to participate in the study design.

Dr. Ferreira-Gonzalez stated that it might be appropriate to require CER studies that involve diagnostic laboratory tests to use only those laboratories that are certified under the Clinical Laboratory Improvement Amendments. She also proposed a clearinghouse of funded CER projects so that areas that have not been studied can be identified.

Ms. Walcoff asked everyone what HHS could do to promote CER. Dr. Randhawa replied that his priority would be the creation of an infrastructure that can identify and learn from what is happening in health care. Dr. Goodman added that HHS should create databases from past experimentation for quick testing of current hypotheses, reserving prospective studies only for those questions for which there is inadequate existing data. He also suggested that it will be important to identify ways to increase the number of patients available for CER. He explained that HHS must identify ways to make patients who receive care outside of academic medical centers part of CER studies. Dr. Sox indicated that HHS should focus on CER coordination and collaboration across the federal government. He noted in particular that outcome measures should be standardized.

Dr. Teutsch suggested formation of a task force to consider the various ideas presented during the discussion and further refine exactly what SACGHS should do in the area of clinical utility and CER. Dr. Williams added an idea the group could consider—identifying initial CER funds that focused on genomics and whether those funding decisions overlooked needed studies. Dr. Goodman also suggested determining what the standards could be in the domain of genetic testing that would enable both the sharing of information and the establishment of quality standards. Dr. Teutsch asked Dr. Williams to lead the new task force; other members include Ms. Darien and Drs. Ferreira-Gonzalez, Gutierrez, Mansfield, and Randhawa.

Federal Activities Related to Genetics/Genomics

Report from CMS on Evidentiary Standards for Coverage Decisions on Genetic Tests: Jeffrey Roche, M.D.

Dr. Roche, a Medical Officer in the CMS Division of Items and Devices, explained that the Medicare Evidence Development and Coverage Advisory Committee (MedCAC) is a way in which CMS asks for input from a variety of stakeholders. He said that two 2009 MEDCAC meetings—in February and May—have specifically dealt with genetic testing. The February meeting focused on diagnostic uses of genetic testing and qualities or characteristics of evidence would be desirable for Medicare to use in determining whether genetic testing as a laboratory diagnostic service improves health outcomes. MEDCAC panel members were asked to consider diagnostic and prognostic uses and tests that help physicians assess response to therapy.

The MEDCAC panel members were briefed on a technology assessment for genetic testing and criteria used by the Evaluation of Genomic Applications in Practice and Prevention (EGAPP) Working Group and a model that considers analytic validity; clinical validity; clinical utility; and ethical, legal, and social implications (ACCE). They decided that these criteria provide a useful framework for looking at the evidence of the value of genetic testing in diagnostic situations. The panel also liked EGAPP's working methods and noted that EGAPP has addressed and continues to address important decisions about using genetic testing in diagnostic situations.

The MedCAC panel considered several questions. The first question asked whether the desirable characteristics of evidence for diagnostic genetic testing were different from the desirable characteristics of diagnostic testing in general. The panel responded that genetic diagnostic testing should be as rigorous as any other kind of diagnostic testing and EGAPP and ACCE criteria were considered a desirable evidence framework. The panel also considered the desirable characteristics of evidence for determining analytical validity of diagnostic genetic tests and also found that the EGAP and ACCE criteria provided the necessary framework. Another question concerned outcomes—are there meaningful differences in the desirable and/or necessary characteristics of evidence about the effect of diagnostic genetic testing on outcomes for diagnostic, prognostic, and pharmacogenomic assessments? The panel found no differences in characteristics of evidence about outcomes for these types of genetic testing.

MEDCAC panelists were also asked how confident they were that methodologically rigorous evidence was sufficient to infer whether diagnostic genetic testing improves three types of patient-centered health outcomes namely (1) a change in patient management by the physician, (2) indirect health care outcomes, and (3) direct health care outcome (e.g., mortality, adverse events). The panelists placed the highest confidence in studies in which the outcome reflected a direct health care outcome such as mortality and lower confidence in indirect health outcomes and physician management decisions. Another question asked the panelist to consider ethical issues particular to genetic testing that may alter the methodologic rigor of studies of genetic testing. They noted that methodologic rigor contributes to ethical rigor, and a lower methodologic standard would detract from ethical generation of evidence for genetic testing. The last question asked if the age of the Medicare beneficiary population presents particular challenges that may compromise the generation and/or interpretation of evidence regarding genetic testing. No consensus was reached, and panel members noted the rarity of Mendelian single-gene disorders in the Medicare beneficiary population and challenges to studies in this population due to prevalence of polypharmacy, multiple comorbidities, and competing causes of death.

The May MEDCAC meeting focused on the desirable characteristics of evidence that are needed to evaluate screening genetic test(s) for Medicare coverage and whether genetic testing as a laboratory screening service improves health outcomes for the Medicare population. Screening tests were defined as tests to detect a disease in a person without signs or symptoms of that disease. Dr. Roche explained that under Medicare Part B, coverage has been approved for a limited number of preventive services, but effective January 1, 2009, section 101 of the Medicare Improvements for Patients and Providers Act of 2008 (MIPPA) allows CMS to cover additional preventive services that fulfill certain statutory requirements.

Dr. Teutsch made a presentation at this MEDCAC meeting about the EGAPP method to assess screening tests. He noted that assessment need to consider not only potential benefits for those who are affected but also potential harms to those who do not carry a particular genetic marker but, because of testing uncertainty or testing mistakes, could be exposed to harms of additional testing.

Considering questions similar to those for diagnostic testing, the panel made the following recommendations: (1) expectations for characteristics of evidence should be at least as high as for other screening technologies; (2) there is an ethical imperative to drive rigorous evidence; (3) it is essential to

consider evidence of harms from screening, not only benefits; and (4) quality-adjusted life years or decreased evidence of disease were preferred study outcomes.

Family History State-of-the-Science Conference and Family History Tools: William (Greg) Feero, M.D., Ph.D.

Dr. Feero, Senior Advisor to the Director for Genomic Medicine at the National Human Genome Research Institute (NHGRI), explained that family history is a relatively cheap and accessible tool for focusing on preventive efforts and enhanced screening and is becoming important for risk assessment. The U.S. Preventive Services Task Force (USPSTF) has come out with guidelines that involve family history. For example, USPSTF recommends that women whose family history is associated with an increased risk for deleterious mutations in *BRCA1* or *BRCA2* genes be referred for genetic counseling and evaluation for *BRCA* testing. Dr. Feero also noted that determining which USPSTF guidelines to use may vary with family history. For example, different colorectal cancer screening guidelines are used depending on whether or not there is a strong family history of colorectal cancer.

This past year the HHS Office for Civil Rights (OCR) issued some guidance regarding HIPAA and family history (see www.hhs.gov/ocr/privacy/familyhealthhistoryfaqs.pdf). It suggests treating family history like other health information in a patient's medical record. Dr. Feero added that MIPPA gives authority to the HHS Secretary to consider additional preventive services benefits (e.g., those with an "A" or "B" rating from USPSTF), which could provide a mechanism for reimbursing clinicians for the collection of family history.

CDC conducted a major trial of a family history tool called Family Healthware. The trial used a web-based, consumer-focused tool that not only helped collect family history information, but also provided patients with risk assessment information for six common conditions (heart disease, stroke, diabetes, colorectal cancer, breast cancer, and ovarian cancer). Of the six high-mortality diseases, 82percent of the trial participants had a strong or moderate familial risk for at least one of the six. In a subgroup analysis, in which paper records were compared to EHRs, 23percent of the paper records had enough family history information to assess disease risk.

Recently, a number of RFAs issued by CDC, NCI, and the National Institute of Diabetes and Digestive and Kidney Diseases for translational genomics research have included family history projects. Some of the challenge grants also involved family history and point-of-care tool development. In the area of evidence synthesis, AHRQ has had two major reports published from its Evidence-based Practice Centers on the use of family history in the cancer arena; one looked at collection and use of cancer family history in primary care—for which the evidence base is quite limited—and the other examined the issue of clinical utility of cancer family history.

On the community level, the Health Resources and Services Administration has created tools for helping communities and individuals gather family history information and effectively share it with their health care providers. NHGRI has also funded demonstration projects with diverse communities, including Appalachian and Hispanic communities.

Dr. Feero also mentioned that the new version of the Surgeon General's family history tool has the capability to connect to EHR and personal health record systems.

In concluding, Dr. Feero invited everyone to attend the August 24-26, 2009, State-of-the-Science Conference on family history that aims to identify knowledge gaps and propose research to fill those gaps (see http://consensus.nih.gov/2009/familyhistory.htm).

Health Information Technology and Standards to Support Clinical Research—Combining Clinical and Genomics Data: Rebecca Kush, Ph.D. and Jennifer Nadler, Ph.D.

Dr. Kush, Chair and CEO of the Clinical Data Interchange Standards Consortium (CDISC), indicated that she and Dr. Nadler would discuss the ability of health information technology to support clinical research, a use case on a core set of clinical research elements, and combining clinical data and genomics data. CDISC is involved in clinical research standards development, working with Health Level 7 (HL7) since 2001 to ensure these standards are harmonized. Integrating clinical research and health care for multiple purposes requires standardization. Standardization can also ease paper burdens (e.g., paper-based clinical trials records). Standards are needed for transporting data, and content standards are necessary for true semantic interoperability. Dr. Kush reviewed a number of CDISC projects that use core data sets and standards to produce a better work flow, support research, and assist data exchange.

CDISC and other stakeholders are preparing a use case for the Healthcare Information Technology Panel (HITSP). The case, which was selected by a group that the American National Standards Institute convened in November 2008, demonstrates taking a core data set and exchanging it from an electronic health record system to research systems. The group decided this use case could provide a foundation upon which to build other elements. For example, clinical genomics could be added to the core data set, or eligibility criteria and safety reporting could be added. The idea was to create an infrastructure through which health care advances clinical research and then in turn informs clinical care. Existing standards are being leveraged, and completion of the use case is planned for September 2009.

Dr. Nadler, a Science and Technology Policy Fellow with the HHS Personalized Health Care Initiative, noted the importance of linking clinical data with genomic data. Consequently, data standards are needed for clinical genomics, and a new federal government workgroup was initiated, spearheaded by Elizabeth Mansfield at FDA and Ken Butow at NCI. Dr. Nadler explained that standardized terminology is needed to record and report all phases of the production of genomic data, such as the collection and handling of biospecimens, sample processing, data generation, data analysis, data storage, and data transmission. Some HL7 standards already exist (e.g., for genetic variation and family history); ongoing work is addressing gene expression data, and a proposal has been approved for developing standard reporting for genetic testing.

Genomic information has use in health care for tailoring screening based on familial risk factors and customizing treatment based on genetic profiling. It has use in genetic research for stratification of patients, use in drug metabolism, and use for biomarker discovery.

Barriers to research and health care include the lack of clear regulatory mandate for genomics data in studies, a clearly defined process for biomarker validation, and global standards to facilitate data exchange. Additionally, a common standard is needed to enable use of medical data in research; maintenance of multiple standards not sustainable; and many standards requires creation of cross-references. Also cost-effective data management requires global standards that enable data use for multiple purposes (e.g., healthcare, research, epidemiology/public health, health-access policy). Another barrier is the slow adoption of EHRs.

Dr. Nadler stressed that harmonization of the standards between research and health care really is critical. It is essential to be able to aggregate information across different stakeholders, so that research findings lead to informed health care decisions. Harmonization also enables timely global safety surveillance for drugs and devices, and it allows linkage of biomarkers to population characteristics and outcomes. In addition, harmonization facilitates research for clinicians concurrent with their clinical care. For example, data collected in the EHRs will be accessible for comparative effectiveness research.

Public Comment Session

Jeffrey D. Voigt, representing Medical Device Consultants of Ridgewood, LLC, stated that he wants to ensure that the companies he works with can compete in the marketplace and that the medical industry continues to improve upon affordable and quality care. He discussed how diagnostic genetic tests are being evaluated for coverage determinations by payers, including Medicare. He noted that payers have established an excessive number of criteria and definitions for clinical utility. Mr. Voigt recommended that: (1) the Secretary of HHS form the task force recommended in the 2006 SACGHS report on coverage and reimbursement of genetic testing to develop a set of principles to guide coverage decisionmaking for genetic tests and services; and (2) clinical utility should be defined, keeping in mind the effects of confounding variables in establishing any relationship between diagnostic genetic testing and health outcomes.

Concluding Remarks

Dr. Teutsch briefly reviewed the topics covered at the meeting and decisions made by the Committee. He thanked everyone for their valuable input.

Adjournment

The meeting was adjourned at 2:55 p.m.

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We certify that, to the best of our knowledge, the foregoing meeting minutes of the Secretary's Advisory Committee on Genetics, Health, and Society are accurate and correct.

Steven Teutsch, M.D., M.P.H.

Sarah Carr