DEPARTMENT OF HEALTH AND HUMAN SERVICES

Nineteenth Meeting
of the

SECRETARY'S ADVISORY COMMITTEE
ON
GENETICS, HEALTH, AND SOCIETY
(SACGHS)

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– VOLUME I –

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P R O C E E D I N G S

[8:33 a.m.]

Opening Remarks

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

DR. TEUTSCH: Good morning. Thanks, everyone, for joining us. Welcome to the nineteenth meeting of the Secretary's Advisory Committee on Genetics, Health, and Society. We will go through some of the usual formalities that many of you have heard before.

The public was made aware of this meeting through notices in the Federal Register, as well as announcements on our website and on the listserv. We certainly welcome all the members in attendance, as well as our Committee members and liaisons.

There are, undoubtedly, other members of the public who are listening on our website, and we welcome them, as well. Thank you for your interest in our work. We will have public comments this morning at 9:45, and then again tomorrow at 2:55.

Before we begin, I want to extend a welcome to Charmaine Royal. Charmaine is a new SACGHS member. She is associate research professor at Duke University's

Institute for Genome Sciences and Policy. Her scholarship has the goal of enhancing the integration of genetic and genomic research with behavioral, social science, and humanities research to facilitate a more holistic approach to understanding and improving human health and well-being. As you know, those are important parts of what we are here to do, so welcome, Charmaine.

We also have new ex officio members. From the Department of Defense, Col. Adam Kanis, who is sitting in the Hawaiian corner down with Sylvia. Col. Kanis is chief of medical genetics in the Department of Pediatrics at Tripler Army Medical Center in Honolulu. In 2008, he returned, as I understand it, from a 16-month deployment as medical director at the Riva Ridge Group Medical Clinical Camp at Camp Liberty in Baghdad.

We welcome you home. Thanks for your service to the country, and welcome to the Committee.

I also want to make you aware of some additions to our staff. Brian Haugen and Alex Lynch have joined the staff for the summer. Brian has a Ph.D. in microbiology from the University of Wisconsin. He is currently in the NIH Presidential Management Fellowship

program and is doing a rotation with us for a few months. We will be using his statistical skills to help us analyze the data from the survey for the Education and Training Taskforce. We will be hearing a little bit more about that from Barbara in a minute.

Alex has an internship with us this summer. He is in his senior year at UVA, where he is majoring in philosophy and minoring in bioethics. He also is going to be working with the Education and Training Committee, and will be helping to develop the review of the literature.

Welcome to you both. We are going to put you to hard labor, I'm sure.

We also have a second summer intern, Suzanne Luther, who is not here yet. She is going to be starting next week. She is pursuing her master's degree in public health with a focus on public health genetics at the University of Washington.

Let me go over the agenda with you a little bit. We are moving ahead with a number of our priority topics at this meeting. We will begin the day by hearing an update on the work of the Genetics Education and

Training Taskforce, which, as you know, is in the middle of its investigations.

After that, we will be hearing about HHS's work in developing the Health Information Infrastructure. We are particularly pleased that we will have the head federal official for that work, David Blumenthal, who I think many of you know. He is the national coordinator for health information technology. He will be talking about the development of the infrastructure. As many of you know, it is going to significantly affect how we deliver health care and will be very important to the future of how we deliver genetics care in the health care system.

We will follow up for the bulk of the day with a discussion of genetics and the future of the health care system. This is a continuation of what we began at our last meeting, where we heard primarily from payers. Through this topic we are going to be exploring how genetics may shape the future of the health care system and how system changes may also shape the development of genetic technologies.

As with all of our priority topics, we will be

looking at some of the important issues in health disparities, in this case the future of genetics and how implementing it in the health care system can serve to reduce those disparities.

In today's session we will be hearing primarily from payers, patients, advocates, providers, an expert on the pharmaceutical and diagnostics industry, and the health disparities folks. It should be a rich and interesting discussion.

After we have a chance to talk with our guests, we will have a chance to discuss where we want to go and see where we can add some value to this discussion.

The last item on the agenda for today will be a quick update from the Gene Patents and Licensing Practices Taskforce.

Tomorrow we have a full agenda, as well. We will hear from the Direct-to-Consumer Genetics Testing Taskforce. As you will undoubtedly recall, it began its work at our last meeting and has labored to produce a draft report before this meeting. For those of you who have not had a chance to look at it, it is in your binders. We will be looking to see if we can't move that

forward tomorrow and come to consensus on some next steps.

Following that, we will have an informational session on clinical utility and comparative effectiveness research, which was another of our priority topics. They will discuss the evolving landscape of comparative research and genomics' potential role in that research.

In the afternoon we will be hearing an update of a variety of federal activities relating to genetics, including presentations from CMS on evidentiary standards for coverage decisions and other updates on the Family History Project and on genomics and health information technology.

A couple of other items of note. On Tuesday and Wednesday of this week, Andrea Ferreira-Gonzalez represented us at a workshop sponsored by IOM's National Cancer Policy Corps. This must have been a week of genomics meetings. There have been a lot of them this week. Thank you for doing that.

At that meeting, the discussion of policy issues related to the development of personalized medicine for cancer therapy, including technological

hurdles, regulatory hurdles, and reimbursement hurdles. I trust you got to resolve all those things. You presented our findings, as I understand it, on the oversight of genetic testing. So, thank you for that.

In May, CMS proposed not to cover genetic testing used for guiding Warfarin dosing. They found that the evidence did not demonstrate that such testing led to improved outcomes among Medicare beneficiaries.

CMS is proposing, through its coverage with evidence development procedure, that patients who are enrolled in certain types of trials will be covered. I think many of you were part of the discussions when we talked about coverage with evidence development within our Oversight group, and this is one of the ways we hope to get some of that information.

CDC is publishing this week in the MMWR good laboratory practices for molecular genetic testing. It should be available on the Web today. The report's recommendations serve as guidelines for improving various areas of lab practice, including the laboratory's genetic testing process and the procedures for preserving patient confidentiality. It also highlights factors laboratories

should consider before introducing new tests.

A short description of the report and how to access it is online. We have it in our folders, so you should have it in front of you. As you know, all of that will be available publicly, as well.

FDA's Office of In-Vitro Diagnostic Device Evaluation and Safety is forming a Personalized Medicine Management staff to address testing issues in pre- and post-market product review. The staff of this will have the needed scientific expertise to review the complex data and regulatory submissions, and familiarity with the regulatory issues pertaining to diagnostic devices and therapeutics, which we have gotten engaged in before.

Before we get into the main part of the agenda, I think it is apparent to everyone here that we have an incredibly diverse committee. That is one of the great strengths of the Committee. Our mandate is extremely broad, and we are composed of experts in a wide variety of disciplines. Many of us aren't genetics experts.

Because the issues we address are so multi-faceted, our discussions and deliberations are really enriched by all of the different disciplines, ideas, and

perspectives that all of us bring to the table, even though we may not be expert in the specific topic under discussion. So, we really appreciate everyone's attendance at these meetings and participants asking some of the hard questions and helping us move forward to address the important issues.

Sarah, this is your moment to talk to us about ethics rules.

MS. CARR: I am going to remind you, because you all know them very, very well, I know. What I'm going to do is just highlight two of the rules that govern special government employees when you are serving on the Committee.

The first one is conflicts of interest. Before every meeting you provide us with information about your personal, professional, and financial interests, information that we use to determine whether you have any real, potential, or apparent conflicts of interest that could compromise your ability to be objective in giving advice during committee meetings.

While we waive conflicts of interest for general matters because we believe your ability to be

objective will not be affected by your interest in such matters, we also rely to a great degree on you to be attentive during our meetings to the possibility that an issue will arise that could affect or appear to affect your interest in a specific way.

We have provided each of you with a list of your financial interests as a reminder that these would pose a conflict for you if they became a focal point of committee deliberations. If this happens, we would ask you to recuse yourself from the discussion and leave the room.

Lobbying by government employees is also prohibited. We ask you not to lobby while you are here as part of the Committee. If you lobby in your professional capacity or as an individual, private citizen, it is important that you keep that activity separate from our work. Just keep in mind that we advise the Secretary of Health and Human Services, not the Congress.

As always, I thank you for being so attentive to these rules. We appreciate how conscientious you are about them.

DR. TEUTSCH: Let's get on with the meat of our discussion. The first agenda item for today is a report from the Genetics Education and Training Taskforce. Barbara Burns McGrath has been busy leading this group and is now going to update the Committee on where they are in the information-gathering phase of their work.

She is going to be joined by several other colleagues: Vence Bonham, chair of the Consumer and Patient Workgroup; Greg Feero and David Dale, who are leading the Health Care Providers Workgroup; and Kate Reed, who is a member of the Public Health Providers Workgroup.

Greg, we will hear from you in a minute. I understand you are going back to private practice in Maine and are stepping down as chair of the workgroup. We want to thank you, on behalf of the Committee, for the energy and acumen you have brought to not only this taskforce's work but also for all your support of SACGHS over the past few years.

DR. FEERO: I would point out that I'm not quite dead.

[Laughter.]

DR. TEUTSCH: We have a few more weeks to tap you. Thanks, Greg, for all your contributions. We wish you well up there in Maine.

Let me also thank Dr. Dale, who has stepped in here and agreed to take up the cause here with the Providers Workgroup. Thanks to you, as well. Barbara, take it away.

- GENETICS EDUCATION AND TRAINING -

Genetics Education and Training Taskforce Progress

Barbara Burns McGrath, R.N., Ph.D.

[PowerPoint presentation.]

DR. McGRATH: Thank you. As Steve said, our level of activity has been steadily increasing, so you will be seeing more of us over the next couple meetings. I will just launch into this one today. Today is one of the more brief ones, I think.

We have a couple goals. I will give a report about where we are in the progress. The bulk of the time we will be spending this morning on the update on the data-gathering activities. Each of the leads of the workgroups will be talking about their specific activities.

Then, we have saved about 20 or so minutes at the end to discuss workgroup policy directions. Let me explain that a little bit. We have not completed all of our data-gathering activities. You will hear where we are in that process. Clearly, we are not at a point to have any final policy directions or recommendations, but we have some thoughts on these things and we will be presenting those to you today. What we are asking from you is to give us some feedback and perhaps guidance on a conceptual level.

Our next step is to draft these guidelines to draft form. However, we are not looking to fine-tune our recommendations at this point. There will be a chance for that in future meetings. I'm asking us to think big picture still with us on this, to make sure we are covering all of our bases.

Having said that, on the other hand, we are past the point of really wanting to brainstorm and bring in all ideas and all comers. We are at that middle point of looking for feedback and guidance from you, not fine-tuning but not brainstorming. I think that will be clear as we go further.

Here is our roster. Each group will describe who is on their committee. As you can see, it is pretty big. I think we are in pretty good competition with the Oversight Committee. I'm not sure. I'm not counting one for one, but I think we have a pretty robust group.

The other people that need to be added on this, of course, are the staff. Kathy Camp has been leading our efforts. You have met Brian Haugen and Alex Lynch, the two people who have been with us this summer. They have been helping a ton on this.

As you know, we have organized ourselves around core concepts. One is the Consumer group that Vence Bonham is the lead on. The Health Care Provider group Greg has been leading, and David Dale now is taking over as the incoming chair. Joseph Telfair continues to be the chair of the Public Health Provider group. Although he has rotated off the Committee he has been very involved, and I appreciate the fact that he is staying involved. Today Kate Reed, who has also been very involved in the committee, will be presenting their report.

I'm not going to go over all of our charges

again. All of that is in your book. At the last meeting, we went through how we came to be formed as a committee and each workgroup gave a bit of an overview of their activities.

As we have been developing our plan for how to proceed over the last year or so, we have been guided by three things. I wanted to point those out to you. When possible in this report, we have been looking for comparative data so that we could look at trends across time. We have tried to find data sets that we could replicate. So, think of that.

Another big goal or principle of ours is that we would like to shed light on the needs of vulnerable and underserved populations. We have tried to hone in on those issues as much as we could.

Finally, we would like our recommendations to end up ones that are measurable, so that the next taskforce that comes along in five years has an easier time looking at this than we have been having.

As you are listening to the reports from the three groups, perhaps you could think of those things and give us advice so we can perhaps achieve these goals that

we have.

In today's meeting we will be talking about these policy directions, conceptual recommendations, and looking for feedback, if you have any, and specific questions about methodology. Our data collection isn't complete. We are nearly finished, and we will try to tie it up by June 30th, which gives us a little more time to take some new directions or make corrections, if we come up with suggestions today.

The data analysis has been ongoing, and we expect to complete it by the end of the summer. At that point, the final draft should be finalized. That is also being written as we are collecting data, so we are fairly along the way with that.

On September 15th, or around mid September, you all will receive a draft report of the task force. We would like you to read it in preparation for the October 8th and 9th meeting. That is the meeting where we will really roll up our sleeves and look at the report and recommendations. At the end of that we will be asking for approval from you.

Around November it will be released for the 60-

day public comment period. We anticipate getting all those comments back, analyzed, and integrated into the final report sometime in the spring. So, around the March meeting we should have the final report. Then, in June it gets transmitted to the Secretary.

That is our timeline. We are actually, I think, pretty much on it. I think we have stayed on it all the way because we have such great people pushing this forward.

The next thing is, each task group will talk about what they have been doing in their research activities, and present some data. I love it when we can present data at these meetings. Each group has some very interesting things. We will have a discussion at the end. You may have specific questions about methodology or ideas for different groups that you think should be surveyed or ideas about recommendations. I will ask you to hold all of that. We will have one big discussion at the end and you can direct it to each person, so we can move through the whole report. Some of your questions may be answered by other people speaking.

I'm going to step aside. The first person is

Vence, talking about Consumer and Patients.

Consumer and Patient Workgroup

Vence Bonham, Jr., J.D.

[PowerPoint presentation.]

MR. BONHAM: Good morning. What I would like to do is to start by thanking the workgroup. They have been working very hard over the last few months.

Many of the members of the workgroup are here today. I encourage you to talk to them individually with regard to any suggestions, guidance, directions, or concerns that you may have as to how we have approached our job with regards to helping to identify recommendations for the Committee with regard to the needs of consumers and patients. Again, I appreciate their work and their commitment to provide the best advice to the Committee.

I want to take a second and think about this question of the public, patients, and consumers. When you think about the diversity of this country and the types of individuals that may need and seek genetic information, how do you make a decision of how you describe patients and consumers.

We have made a decision as a workgroup that our focus has really been on those individuals that are seeking information. When you think about those consumers that are seeking information through direct-to-consumer genetic testing or other approaches, and patients that are seeking information through their providers and through various websites, we are focusing on those individuals. We are not thinking about the general public that may not be thinking about the questions of what their needs are with regard to genetics education and genetic needs, but those that are seeking out information. I think that is important as we think about the context of the work that the workgroup has been doing.

The specific charge that we have is to provide recommendations that address the genetics education needs of consumers and patients. Again, this is focused on those that are seeking out information.

What I want to do is really talk about the design of our collection of data process. I'm the only workgroup that doesn't have data to present today. We decided not to present any data but really wanted to

focus with you on our design to collect information to help us analyze and make the recommendations that we will ultimately make.

We have really focused our work with regards to looking at a variety of things. First is the reports on federal agencies' and organizations' activities regarding genetics education for consumers and patients. We will be collecting information across the different agencies on what activities are going on so that we have a sense of the activities. There is a lot going on at this point in time focused on the needs of consumers and patients.

We want to provide recommendations as to how, what, where, and when to communicate genetics information to public and patients, and to review best approaches to consumer- and patient-level genetics education. We will come back to that as we talk about one of the methods that we are using to collect data.

We want to provide an appendix of consumer and patient education resources so that this can be of guidance and assistance to the agency and to the Secretary.

I would like to focus on our specific data-

gathering methods and the four ideas that we have identified. The first is basically an environmental scan that we have done of a broad array of topic areas to gather information. We have actually conducted some qualitative work here. We have done 11 interviews, that I would describe as semi-structured interviews, with experts in these specific topic areas. Each of these were telephone interviews, but they were transcribed.

They were set up so that there was either one or two individuals that were being interviewed at a time. We found some real advantage to actually having two individuals from the same expertise area on the phone answering the questions because they were able to bounce off of each other and to add information and really make the data quite rich for what we received. The majority of the interviews were done with two individuals at a time.

I want to identify specifically the individuals that we had an opportunity to talk to. They all provided a great wealth of information. You see they are coming from different expertise areas and backgrounds. We had individuals who are actually experts around health

communication and genetics education. They provided us a perspective on both their own research and work of others related to education of the public. We had those that really are experts in genetics and science education. We focused on having a better understanding of what are some of the needs from that perception. We also talked to clinicians, individuals who are caring for patients at different levels, about their experiences and the guidance that they provide.

We also had national advocates from several organizations that have not typically been involved in the genetics organizations or communities, the traditional group of advocates that we reach out to, but clearly were of importance. These were recommended by the Advisory Committee, and so we had the opportunity to hear their voices and perspectives, which you will see in our recommendations ultimately.

We did reach out to the industry to try to get a perspective from those individuals who are reaching out directly and working with consumers and seeking to provide them services and information. We wanted to get their perspectives with regard to the needs of the

public, particularly consumers of genetic testing.

Finally, we focused on the policy perspectives and some of the things that are being learned here. Dr. Hudson, who I know has been in front of this committee many times, had an opportunity to share her perspective related to the needs of the public and patients.

The second area is an area where we have collected quantitative data. This process is going on. Some of you may even have actually received this through the various ways we have sought to distribute the Web-based survey. This is a survey that the workgroup developed with input from others. It was sent out through the Genetic Alliance to their 1,000 affiliates, as well as to 71 organizations which are primarily health care advocacy organizations that are not focused on genetics but that are dealing with specific disease areas or broader health concerns and issues.

I want to highlight one thing because of the importance of really thinking about the questions of underserved communities and issues of disparities related to the work of this taskforce. We oversampled for organizations representing minority and underserved

communities. We really sought to make sure that the voices of those organizations are part of what we are learning with regard to the needs of education for patients and consumers.

We really used this process to get additional information from the experts. As of June 9th, we had 301 responses to the survey and 29 partially completed. So there was a drop-off, but we will be able to use their data. So, at this point we have 330 responses to the survey that we will be analyzing.

The second area of data collection that we are going to use is with regard to a national survey that was done by COGENT, which is a marketing survey company. They provided us permission to use their 2008 report. They did a national random sample of 1,000 individuals across the country. So, from a perspective of having a national view, we do have national data around issues of genetics and the perceptions of the public.

Clearly, many of their questions are very important and relevant to the work of thinking about education. We have access to that data, and that data will be incorporated into our analysis and our

recommendations.

The third area is some work that is also going on at the National Institutes of Health. I think at the last meeting Larry Thompson presented to the Committee some of the work that was going on at NIH. This is related to that work. NIH has commissioned the Academy of Education Development, AED, to prepare a very thorough literature review report with regard to the scientific literature as well as what is in the public, such as newspapers and magazines, with regard to issues of genetics and the public.

It will provide us greatly detailed information about what studies have been done around genetics education for the public, the perceptions, commentaries, and various viewpoints. We have the opportunity to actually use the literature from work that has been done by others to help to inform the work of our workgroup.

This work has been completed by AED. We will now be using that as one of our strategies in coming up with our recommendations.

The work that we have done has been to really try to reach out in various ways to collect information.

We are actually collecting new information through the qualitative interviews and the empirical survey method that we have used with the workgroup, but are also gathering information from other groups, like the COGENT survey and the literature review that is being done by NIH. We are using various strategies to collect information so that we can really move forward to provide you the best information with regards to the needs of the public.

Next steps and policy directions. As Barbara stated, we are early with regard to making recommendations, so these are just directions to give you some sense with regard to what are some of the themes that we are seeing across the data that we think are extremely important.

One area, is providing patients and consumers with tools to identify knowledgeable health care providers. This goes to the question of seeking out credible experts when they are trying to make decisions with regards to genetic testing or understanding genetic information.

Another, is to develop models to enhance

genetic health literacy for the public. This is the question of can we develop different kinds of models, recognizing that different communities may need different strategies with regard to the dissemination of information.

How do we enhance K-12 science education and content on the role of genetics and health and the issue of probabilities and risk; how do we provide that information; how do we educate the public in understanding risk, which is a major issue. It was a common theme in our qualitative interviews that we had.

Then there is the issue of understanding the role of genetics and environment so that people do not perceive that genetics plays more of a role than it really does. The public needs to understand how the interactions of both environment and genetics play a role in health and disease.

Our next steps are to complete the data analysis, to identify gaps and barriers to successful genetics education efforts, and refine proposed recommendations for the draft. Thank you.

Health Care Providers Workgroup

Greg Feero, M.D., Ph.D.

[PowerPoint presentation.]

DR. FEERO: Thanks, Vence. That was beautifully done. I think, with the Health Care Providers Workgroup, you may see a somewhat more pragmatic and less elegant approach to data gathering, but I think you will find it valuable, as well.

I would also like to thank the Health Care Provider Workgroup members. They played an integral role in developing the initial surveys for health professionals. The federal survey that I will talk about in a minute here was already largely developed, although they helped in the process of paring it down, and then again in reviewing the data for presentation today.

You can see up there that there are a diverse number of groups represented and types of health care providers, including nursing, genetics specialists, as well as practicing clinicians like myself and Ph.D. researchers. Marc also is a practicing clinician.

Today I will be presenting only a portion of the information-gathering process that our group is undergoing. There is a literature review that is ongoing

that I will not talk about. Also, Judith has been working particularly on genetics health work force issues for the report, which is separate from what I will be speaking about.

Just briefly, what were the goals of our workgroup activities. As you will see in a minute, we are duplicating a federal survey that was done in 2004 to inform this group around federal activities for health professions education in the hopes that we can compare and contrast those results to gain some insights on what the trends have been over the last five years, particularly given the explosion of potential clinical applications in genetics and genomics.

We would also, with the activities that I'm going to be talking about today, like to get a snapshot in time of what the health professional groups are thinking about genetics and genomics education. There is, admittedly, in our ascertainment a slight bias to physician primary care because I think, in general, the workgroup felt that that is one of the areas where the need potentially is the greatest, given the volume of care that is delivered in the United States through that

particular set of provider types.

From querying those groups, we would like to gain a sense of what their future plans are in this area in order to help enable, hopefully through multiple pathways, their goals.

I won't spend a lot of time on the federal survey. I put a lot of information into your slides. I think you have already heard this. It essentially duplicated the survey that was done in 2004, and targeted groups that have SACGHS ex officios. It had a combination of open-ended questions and some more closed-ended questions about budgets, et cetera.

We attempted to make it less onerous than the last survey. I heard multiple folks say that the last survey was just incredibly difficult for the agencies to complete, so we cut out some of the materials that made things more challenging, e.g. an accounting over the last five years of what you spent on various projects, which was very hard to complete.

We distributed it in early 2009, and sent out Email reminders. We had about an 85 percent response rate, however only a 45 percent completed survey rate.

So, a number of these agencies responded back saying that they really didn't have much to report.

We had six agencies in common between 2004 and 2009. They are some of the more prominent agencies that you would expect to be invested in this area, which is good. We should be able to do some comparisons back and forth.

Three agencies had no reply in 2009, despite Email reminders. One reported activities but was unable to complete the survey.

So, what did we get back. We got about 295 pages of PDF documents. We are in the process of looking this over from a qualitative standpoint. Brian is working on a database to compile this information to make it somewhat more accessible for the Committee.

I think that at the end a meaningful, quantitative analysis is probably unlikely, e.g. a comparison of what was being spent overall in 2004 to 2005 is going to be very challenging. We will get to a couple of comments that point this out. There are some selected excerpts.

The first comment up there essentially says

that the CDC is not able to fully develop this area, e.g. education for health professionals, due to a lack of resources, et cetera. HRSA, on the other hand, felt that they were able to fulfill their role in health professions education adequately at this time.

NIH's response was quite interesting. The individual institutes responded separately. There was also an overall response. Actually, I am not speaking at all for the NIH or the NHGRI today. I'm speaking for the workgroup. I think one of the challenges in looking at this is extracting what we perceive to be core health professions education activity from other activities.

For example, included in the accounting from the NIH was a very large award for the National Center for Integrated Biomedical Informatics to basically train informaticians to use health-related data. The Committee, I guess, and the workgroup will have to make a determination whether that really represents the kind of education that we are talking about.

Likewise, there was a neurodevelopmental toxicology grant included in there. Again, I think it is really a qualitative decision as to whether that counts

or doesn't count towards health professions education.

So again, these are tentative, possible policy directions. This is, I think, quite vanilla, but I think it is one we could start a discussion from. The Secretary of HHS should establish, empower, and fund health professional genomics education activities within HHS.

It is interesting to note that there is such a diversity of perceptions of what health professions education activities are across the various agencies. I think that that is an interesting challenge moving forward when trying to decide is there coordinated movement in one direction in terms of bolstering this area.

A little about the health professions survey. We elected to target a diversity of health professions organizations. We, again, had a bent towards primary care. In what way do I mean that. For example, we surveyed the AMA, the American Academy of Family Physicians, and the American College of Physicians, but we didn't go to the American College of Cardiology and a lot of the more specialty-oriented organizations in the

physician world. That just gives you an idea of the kind of honing down that we did. The committee played an active role in that process.

We created the survey within the committee and piloted it with the board of NCHPEG. That is a group of individuals that represents a diversity of different types of health professionals. We got their results back. The survey was reviewed by a survey methodologist in the fall of 2008 for reasonableness, although I would argue that this survey is not as elegantly put together as Vence's.

In early 2009, the survey was distributed. Email and phone call follow-up occurred, and the survey targeted eight genetics organizations, eight health profession education organizations, those that particularly focus on the educational aspects of health professions, and then 28 overall organizations that provide advocacy, et cetera, for health professionals, and then three of the federal advisory committees.

The response rate was 58 percent. All the genetics organizations responded, 39 percent of the education organizations responded, 57 percent of the

overarching organizations responded, and 67 percent of the advisory committees responded. I think there is actually interesting information right there in terms of the level of interest in the survey amongst the different types of groups.

We acquired about 329 pages of PDF documents from this group. Qualitative and quantitative analyses are planned and underway. There is also a database being created of this information. I think we will be able to do some meaningful quantitative analysis.

I would like to just walk you through the results of some of the questions that were asked and what we found. This first question looks at, overall, what level of importance does the organization put on educational activities in general. I will draw your attention over here. This is a Likert Scale, where a one is not much importance at all, five is a lot of importance. Whether they were a general professional organization, a genetic-specific organization, or an education organization for health professionals, essentially, all of them ranked education as a very high priority.

If you then move to the question, "What importance do you place on education specifically related to genetics and genomics?" you see immediately a spread in the priorities. The overall scores are still quite high, but suddenly, in the general professional organizations, there is this trend down, with some folks responding one. Again, here you can see in the education organizations several responses of two and three, so it is a relatively low priority to teach or to focus on genetics education for their groups.

The next question -- and I cut out some of the actual raw data here -- was, "What overall priority does genetics have in the other priorities facing your organization?" You can see for the general professional organizations -- and this is essentially what you would predict -- that it is just on the horizon. It is there but it is certainly not a high priority for them to deal with, whereas the genetics folks felt it was a high priority. I think this starts to point at what we might be able to do to change this.

The question was, "How proficient and comfortable would you say your organization's leadership

is with genetics and genomics education?" What you can see here is the median scores. The general professional organizations and the professional education organizations gave relatively low scores about how proficient they thought their leadership was in this topic area. That might point out a direction of targeting leadership for some education to get them thinking more about the topic area, rather than immediately going out to the rank and file.

Likewise, this question, I think, is pretty telling. "To what extent is your organization's membership satisfied with the organization's current emphasis on genetics and genomics education?" What you can see is, among the professional organizations, they would say in general that they are moderately satisfied. I think there may be a little ray of hope here that there may be some dissatisfaction, that there is not enough going on in the education organizations, and that we could ramp up the activities and not meet with blank stares.

What are the barriers they identified. I thought this was actually quite interesting because I

expected the health professions education organizations and the professional education organizations to really harp on this issue. It is one that comes up a lot, the evidence for effectiveness. As you will see in the next slide, neither organization type really ranked this highly. It really had a lot to do for both of them with competing priorities in their minds and, in some cases, lack of educational resources.

This popped up here, but again, competing priorities is clearly the task at hand as to how to get this up in the queue for things that need to be done.

Possible workgroup direction from this. The Secretary of HHS should facilitate the development of public-private partnerships with health professional organizations to develop and implement a core data strategy for genomics education in the United States. I think that would be a fairly reasonable starting point for discussion.

The last thing I would like to report on is a meeting that just happened on Monday and Tuesday of this week. This was something that NHGRI had in the works and very nicely folded into, I think, this evidence-gathering

process.

We brought together, with some other federal co-sponsors and one of the other advisory committees to the Secretary, a group of leaders from a diversity of primary care organizations, including both the overarching organizations that provide advocacy for the communities as well as those that are directly related to education of the rank-and-file primary care doctors. The goal of bringing them together was really to engage them in a discussion of genomics education for the next five years, to really draw out what they thought should happen rather than impressing upon them from the genetics perspective what should be happening in the next five years.

I think overall the meeting went quite well. No one stormed out of the room. They all got along nicely. I would point out to you that I don't really believe that this type of meeting with this diversity of physician groups for genomics has happened. There may have been something around the Genetics and Primary Care Initiative similar to this, but I'm not entirely sure that there has been a similar meeting. Others may be

able to comment on that.

Again, this is very preliminary. We had the meeting captured by a transcriptionist. There was a meeting writing there from the other advisory committee. They will be producing a report on the maternal and child health issues that were covered. I put down some of the general themes that came out this that I think you might find interesting.

There was substantial accord on several topics. It was pretty plain from everyone there that they did not think that genetics and genomics education for health professionals would fly as a separate, distinct add-on to the education process as it stands. Really, genetics and genomics need to be integrated throughout existing infrastructure, e.g. if you are teaching about cardiovascular disease, you make sure that when you talk about cardiovascular disease you talk about the genetic components of risk, pharmacology, pharmacogenomics that might be relevant to the topic, et cetera.

They felt that there was a great need for better coordination between the physician groups and, in fact, allied health. We had some folks from the nursing

communities present on their educational activities, as well as some folks from the physician assistant community present to these physician groups. I think there was a recognition that the similarities of lack of knowledge might overcome the differences between the groups in some respects in terms of their educational needs.

There was broad consensus that family history should be a major focal point for both care and education around genetics and genomics, but a number of folks expressed dismay that it was very difficult to capture family history in the tools that they use on a day-to-day basis to provide care, the electronic health records.

There was a general agreement that the pipeline for genetic specialists needs to be expanded. There was a lot of discussion about who do we turn to in our environments when we begin to tackle a genetic or genomic issue and then run into something that is extremely complex. Many of them expressed concern that in the more far-flung areas of the United States there may not be well-trained genetics professionals readily available.

They particularly thought the transitions in care were important to genomic medicine, particularly in

the preconceptional, prenatal, post-natal, and newborn screening periods, and also around the transition from pediatric to adult care. They thought a team-based approach using the patient's medical home, a topic which came up a number of times, really would help to alleviate that. Again, it is going to require that coordinated activity between the different team members of the medical home to make it happen.

There was a clear discussion around the clinical utility issue and how important that is to getting folks to adopt genetics and genomics education. If they don't think that there is a clear benefit to their patients from doing so, they are not likely to pay much attention to the educational activity.

It was indicated that everyone felt that the RRCs, the residency review committees, and the CME approval processes are really key points of influence that could be approached in the near term to improve genomics integration -- I think the term that was used yesterday was "insinuation" -- throughout the primary care education infrastructure.

There was a consensus that they would like to

get back together again in six months to a year to review progress in their organizations and do some additional planning for future activities. I think that is the end of my presentation.

Public Health Providers Workgroup

Kate Reed, M.P.H., Sc.M., C.G.C.

[PowerPoint presentation.]

MS. REED: Last but not least, I am going to present where we are with the Public Health Providers Workgroup. I think we lie somewhere in between the other two groups. I have some preliminary data to present, but it is very preliminary. We are still collecting a lot of data. One of the things that we are going to ask for from the Committee is ideas of other groups that we may be able to survey or include in the survey to collect the real data that we need here.

First, as with the others, this group has come together quite well and is quite representative of different areas in public health. Joseph has really been a great force to keep us moving.

I will talk about this in more detail, but one of the major challenges with this group is to define our

population. If you look at the IOM reports, to paraphrase the definition of what a public health professional is, it is anyone interested in health at the population level. That gives us a very broad audience that we are trying to capture and get information from, and that has been one of our challenges. Joseph has really been great in helping focus our efforts here.

I will say that I came into this midway through, so any mistakes that I make in this presentation are mine alone. Thank you to both Barbara and Kathy for helping me get up to speed on where we are right now.

What we have done at this point is, there has been an online survey developed. The group focused on looking at competencies. Specifically, we are looking at competencies because competencies are applied skills and knowledge that enable members of the public health work force to effectively practice public health.

These have been developed by a number of groups. As you can see, we were looking at five overall to see what competencies have already been developed, and then trying to use an iterative process to figure out what is common between those various competencies that

have been produced. So, what is the core set of competencies that different groups have come together and said this is what public health professionals need, as opposed to starting from the beginning and coming up with our own new list of competencies.

The purpose of competencies in the public health field, as it is with health professionals and other fields that use competencies, is really to structure educational programs and to define what public health professionals should be doing in terms of knowledge and skills.

The other thing that I just want to comment on is that we have had significant discussions about genetics versus genomics competencies. Really, for most of the 12 competencies that we came up with we used this combined term, the reason being we didn't want the terminology to be a barrier for people to be able to answer the questions appropriately. There are some of the competencies that deal specifically with genetic health services that we only used the term "genetics." So, we have had that full discussion, and I just wanted to let the group know.

I also want to mention here that there have been other efforts to survey the public health professionals to determine what activities are ongoing, how important genetics is in public health, how it has been integrated, what some of the challenges are. The latest ones that we have been able to find were really completed in 2001 and 2002. They have been done with numerous groups. Again, one of the requests for input from you will be, what is the appropriate group for us to be serving here and have we captured them in the groups that we have already done.

The groups that we have already sent out our survey to are, as you can see, the state genetics coordinators. These are individuals in state departments of health who are responsible for whatever the state defines as genomic activities. It is not necessarily a 100 percent job. Actually, Sylvia was in charge of that survey in 2002. I think it was the publication looking at who is doing what and to what level. We do have some data on that.

The APHA state affiliates are independently established, and they are responsible for participating,

implementing, and advocating on behalf of various public health issues related to the priorities of APHA.

We also sampled 366 members of the Genomics Forum from APHA. This is a recently formed group. It is a group of individuals who are generally involved in public health. They are not necessarily APHA members. They are involved in public health, they are interested in genomics, and that is what we know about them.

Those are the main groups that we have preliminary data from. Recently, on June 9th, as you can see, we sent the survey to the Association of State and Territorial Health Officers list as well, with the instructions that we would like the health officers to answer the survey and then distribute it to other individuals within their organizations who are not specifically involved with genetics or genomics. We gave them examples of state genetics coordinators or maternal and child health because we do want to get a broad audience.

As you can see, we have received 133 full responses. This comes up to a response rate of about 26 percent. Again, looking at past surveys of public health

professionals, it is within the range.

Our survey has three main parts: one, your role in public health; second, the importance of public health within your setting; and then the competencies. We will talk through, again, the very preliminary results for each of these.

One of the first things we are trying to get our head around is at what level of public health do you work. As you can see here, something to note is that 31 percent of the sample that we have currently collected is academic, as opposed to 49 percent federal or state. This is something that is going to be important to keep in mind as we analyze the data further because those two groups in particular, as well as some of the others, are going to have different priorities and resources that we need to take into account as we look at things like importance, competencies, and things like that. Again, this doesn't include the recent mailings.

We asked an open-ended question, "What is your job title?" For those of you that have not seen these word clouds before, the larger the font, the more responses were given with those words involved. So this

is just a very quick visual to exemplify the diversity of individuals who are involved in public health and who are answering the survey.

It is also very important to keep in mind that the groups that we have surveyed so far are more likely to be involved in genetics. The fact that genetics got nine occurrences out of our group is probably higher than we would see in a general public health sample because most people are not going to have "genetics" in their job title. So, the idea and the scope will likely change as we continue to broaden the population that we are sampling.

Part two of the survey was to look at the importance of genetics and genomics in your institution's leadership. The first question was, "Does your senior administrator think that genetics/genomics is important to, first, your job responsibilities, and then their job responsibilities?" Looking at the responders' job responsibilities, if you add it all up, 75 percent think genetics and genomics is important to the responders' job responsibilities. To their own responsibilities, it is 61 percent.

This also will be very important to look at based on what role they have within public health, not only if they are working at a state or federal level but also if they are working in academics or other settings.

A 2001 survey that was done looked at a very similar question but sent it to six distinct groups within public health. They sent slightly different surveys to maternal and child health individuals, lab directors, health officers, and chronic disease. That doesn't come up to six but those are the four I have written down, so we will go with that.

What they found is, in terms of job responsibilities and what we would expect, is that there are different senses of how important genetics and genomics is to each of those depending on what your responsibility is. So, again, as we would expect, responders in maternal and child are going to see genetics and genomics as a higher level of importance because that is where newborn screening lies. Lab directors is the next down, health officers next down, with chronic disease at the end. As we move forward with this analysis we won't be able to directly compare the

data, but it will be interesting to see generally, given job title, whether this falls out in a similar distribution of importance.

We also asked, "How adequate are your resources for implementing genetic and genomic competencies into your work or role?" As you can see, 74 percent responded that the results were at some level of adequacy. Again, it is interesting when we go back to other data available. Earlier data said one of the major concerns was the lack of funding.

So, the fact that people are perceiving that resources are available and are at somewhat of an adequate level is a positive thing. Maybe awareness is growing. We need to note this, and then we may need to figure out exactly, again, as we add more people to this survey, if this still falls out to be true.

The third part was to look at the competencies specifically and ask individually how important each competency is, how confident are you in demonstrating this competency, and how frequently do you apply this competency, all answered on a Likert Scale. We don't have any analysis yet available, but the point of this is

to do a couple of things. One, we wanted to get a sense of, are these competencies things that we should be asking about, are these truly the core competencies, and where do they fall. How is genetics and genomics being incorporated currently into public health on a day-to-day level.

Given that very preliminary data, what we have tried to do is come up with some very general ideas about the policy direction. Again, these are based on what we know from the literature as well as this preliminary data. It is not hard to fall out that likely the policy directions are going to be in two areas. One is, who is being trained right now and how do we increase or improve the education and the integration in current trainees, and then, how do we begin to educate the current work force.

There are a couple of things that I think will be important to keep in mind that I have already mentioned. One is the diverse nature of this group. Doing general education programs for public health professionals may or may not be useful given the different uses of genetics and genomics in each of the

roles within public health. We need to look at targeted programs that help us to do that.

We had a conversation with Muin Khoury, who also emphasized the idea of translation. How do we educate not just about the knowledge base of genetics and genomics but the actual translation aspects of genetics research, and how do we use that to almost bolster the need for education within this group.

There are some current activities going on. Dr. Khoury is working with people at the NCI to look at what current educational activities are ongoing and how those map to this translational highway from basic research to clinical integration. They are looking at what activities are currently ongoing. That is something that may be informative in creating policy directions, as well. Thank you.

Committee Discussion

DR. McGRATH: Thank you. I think it is obvious that this is a really many-headed beast that we are dealing with. One of the challenges is that we could go all over the landscape and talk about education and training needs. The danger of that is that we would

cover everybody but it would be on such a superficial level it would be meaningless.

The other direction would be to narrow in and lose track of some of the important players in this, and that is a challenge we have been dealing with since we started. I think the three presentations show where we have decided to focus, but you may have some suggestions about groups that you think are particularly important to pull back in. We have some capability to do that. That would be good feedback to hear.

I think we will put up some of the recommendations. We have about 15 minutes to open it up to discussions. Our next task is to sit and put pen to paper and start writing recommendations and finalize the data collection activities. I would just very much welcome, as we all would, any suggestions from anyone on any of the three taskforces about either methodology or helping us as we craft these recommendations. Marc.

DR. WILLIAMS: I'm going to represent my parochial interest as a member of the group. Perhaps it has been missed from the surveys or we need to think about it a little bit more, but what is missing is the

idea of the movement towards point-of-care, just-in-time education within the electronic health record environment, at least from the provider perspective.

I didn't necessarily identify individuals or groups within the survey that were asked about genetics relating to that. Now, that may just be because this is an amorphous group and there is not a real go-to place, but I just want to make sure that we don't lose that. I think there are many of us who believe that is going to be critical in terms of the ongoing post-graduate education for health care providers and particularly is going to be essential relating to actual on-the-ground translation.

DR. FEERO: It was not specifically in the surveys. It did come up in the physician meeting the past several days. It was thought to be most relevant to the practicing clinician and how to reach the practicing clinician, as opposed to relevant in the medical school and resident training processes. It was definitely a point that will come out in our summary from that.

DR. TEUTSCH: My sense of all of this is there is obviously a large differential set of needs from all

of these different groups, as you have alluded to. I wonder if they reflected anything about the timing of their needs, particularly the primary care practitioners or some of the people who have less direct involvement at the moment and who don't see a lot of immediate applications that are germane to them.

In terms of our recommendations and how we would roll these things out over a period of time, and I know that you will get to a different level of detail, specificity, and actionability, I wonder if people talked at all about when they think they are going to be ready for this across these different constituencies.

MR. BONHAM: That is something we need to try to address from the data that we have gathered with regard to time, because I do think that there is different timing. We made some conscious decisions from the perspective of the patients and consumers to focus on those that are already seeking information. So, we have a level where timing has already been recognized from that perspective, but I think that there may be some things in the data that may be of value.

DR. FEERO: I think implicit in the issues that

were reflected in the health professions survey around barriers and their priorities of genetics relative to their overall education priorities, you see some of what you are getting at. Right now it is not really on the horizon in the primary care groups.

However, there was also that question about how facile do you feel your leadership is with this area. It is a little hard to decide, given how rapidly this field is evolving, if the issue is that they understand it and it is not a priority, or at this point in time they don't have enough knowledge to fully appreciate whether they should be making it a priority or not.

I think what you saw in the two-day meeting was that a number of the folks that came were people who weren't already thinking about this quite a bit. They came in, listened to some of what was said, and realized in pharmacogenomics there are a lot of labels out there that we need to be thinking about. People have been prescribing drugs like Carbamazepine for 30 years and are not aware that the FDA has changed the labeling and there is a potential liability issue. Maybe there is a bit more urgency, particularly in pharmacogenomics and cancer

genetics topic areas, than they would think otherwise.

MS. ASPINALL: That was my question. It is a little hard on the phone. Is it okay to interrupt?

DR. TEUTSCH: Go ahead, Mara.

MS. ASPINALL: Maybe you answered it with that, but maybe systematically as we go forward, are there any areas of critical need, regardless of our process and the Secretary's process, for which there is the potential or actuality of harm without some additional information and that in some way we need to accelerate knowledge of that critical need?

DR. FEERO: I would say, coming out of the physician meeting, PGX was definitely an area. Another was the direct-to-consumer movement and concerns about how to and should they deal with that information.

Also, cancer genetics, and one that I guess I have a personal conflict of interest with is family history. I don't have a financial conflict of interest, but I'm just so immersed in it. That really did come out as being an area that they felt is vastly under-utilized. The systems that are getting put into place now for delivering care, the electronic health record systems,

are not well built to capture it.

There needs to be some thought given to, are we going to lose a whole bunch of our ability to provide genetic risk assessment if we can't capture family history information, and the role of health IT.

MS. ASPINALL: It doesn't sound like there is one type of physician group or one particular test that is so egregious that emergency action needs to be happening but it is more broadly getting this information to folks.

DR. DALE: I was just going to comment that, as I listened to the consumer side, I was thinking about Consumer Reports, the magazine. If you are buying a car or a refrigerator, you look for it in there, and if you are not, you don't, but you are glad it is there because it is a relatively unbiased review of almost all the common things you might ever want. We need something like that, and I think the public does but not every day. That is, in a sense, at least a way of conceptualizing what might be a target.

MR. BONHAM: I think a representative from Consumer Reports presented here, correct? Maybe I'm

mixing meetings up.

MS. ASPINALL: Yes, two meetings ago.

MR. BONHAM: I don't know; maybe at some point we need to reach out to them and find out exactly where they are going. One of the questions that came up in our discussion with the industry was to get some sense of the kinds of information that they are providing that is more general education and not targeted toward their marketing of their services. Clearly, many of the companies are now thinking about issues of what general information needs to be provided to the public to help them as they make decisions with regards to genetic services.

DR. McGRATH: Just from looking at the public health competencies and the rest of the data, one area that is a really thorny one is, how do we move toward looking at complex diseases and the role of the environment. That is a more difficult concept, I think, to grapple with. I think it is going to show up in public health. Those folks could be the ones to help us move forward to a greater understanding and a greater communication about the role of the environment. So, I would put that on the hot list.

DR. BILLINGS: I have two responses. One is, I don't think, as a committee, it is a wise idea for us to get too deeply involved in the tension between the specialists and the primary care doctors and who manages what. It is pretty clear historically that most of the genetic information that we want to see education improved upon is probably best embedded in specialty care. While many patients are treated in primary care settings, most of the hard information and the best evidence is probably in specialty care. So, it would seem to me that we don't want to lose sight of that.

The other thing I was struck by in all these presentations is that we obviously want to see improvements in education about genetics. There is ample evidence, and there continues to be ample evidence in all groups, that we could do better. On the other hand, we don't want to get ahead of ourselves at some level. I was struck by that tension between the down side of being too aggressive about educational efforts and under-emphasizing the environment and the causation of disease, and so forth and so on.

MS. WALCOFF: In terms of recommendations to

the Secretary, I would be really interested to know in terms of your discussions with clinicians and physicians that were aware of some of this labeling and were thinking about this, is the labeling that is being provided by FDA useful to them? Is it something that they find that is actually helping them understand, particularly with pharmacogenomics, what they need to do with that product and how it should be incorporated into their practice?

DR. FEERO: I would say that I probably don't have the depth of survey, survey not in the sense of a survey on a piece of paper, but the depth of enough discussions with enough different clinicians to really comment on that except superficially. People are concerned about it. They feel like the information is there but they don't really have a good handle on what the next steps are and what the implications are for following or not following.

There has been label information about pharmacogenomics for a number of drugs for a long time, but it seems like in the last year or two the profile of the labeling has been raised. So there is some confusion

as to what does that mean, what do I do, am I at liability if I don't do something, et cetera.

MS. WALCOFF: Exactly. I think, as we go forward, that would be something very useful for the Secretary to actually work on in terms of working with FDA.

DR. EVANS: I just wanted to amplify on what Paul said. I think we do have to be very careful that we don't inappropriately push genetics education. As somebody who does do some degree of general medicine, those competing interests that these providers have are extraordinarily valid. Oftentimes, they should outcompete genetics education.

I think that the way to deal with that is by getting to prioritization, to really prioritize our educational effort. Those priorities should be contingent upon evidence of how it affects health outcomes. Where those aren't present and where those are lacking, we really shouldn't try to argue too strongly for education.

I agree with Paul. I'm not sure if we should just assume that the place of focus is the specialist.

When I think about where the most bang for the buck is with genetics, I think that Greg's focus on family history is most appropriately in who people see for the most part, which is, at least at first, generalists. We don't want to neglect the generalists, who are the wide end of that funnel that eventually funnels people into areas where genetic knowledge is necessary.

DR. WILLIAMS: I would like to just follow up on what Jim said there. I think the other point that I would make relating to that is, while I do agree that we need to focus on the things that we have evidence around, one of the things that I was struck by as I was going through the materials in preparation for the meeting relates to at least the current way that we train health care providers and physicians, particularly the modified apprentice model of internship and residency.

We clearly have a huge gap in terms of mentoring how genetics and genomics can be integrated into care at the bedside. I think it is an extremely thorny problem, and the solutions are not obvious in terms of how to address that. It is also clear that attitudes about whether or not this is really critically

important in day-to-day practice are really developed in that venue.

If we don't somehow step up to the plate and say, how can we actually get this mentoring to take place within that post-medical school but pre-graduate setting, I think we are going to have a much greater problem down the road.

MS. DARIEN: Just to build on some of the comments before and also to put on my consumer and educator hats, I think one of the most important things to do when you are talking about education is to figure out how to put it into context. Genetics has to be put in a context of how it relates to the environment and how it relates to all the other decision-making.

I think that one of the things that is missing, particularly with consumers, is that you look at all the genetics testing and you look at what is going on in the education but you don't necessarily know how that relates to other things. I think of it from the consumer viewpoint, but I also think that there is a provider viewpoint about where this relates and where it doesn't relate, and where the genetic information has some value

because you can make decisions based on it and where it has no evidence or no value.

DR. FEERO: Just going along with Marc's comment, I think one of the other issues that is related to this mentorship approach to education is the confluence of that and the fact that this field changes so rapidly. How do you balance this issue of an evidence base, which takes years and years to generate, and the fact that there are things that are coming out that occasionally have such amazing face value that it is hard to not say that you probably ought to be thinking about them. I think that is something in the report that really needs to be emphasized.

DR. EVANS: I completely agree. It is not an easy matter to prioritize. I think that some of the things are pretty obvious, like pharmacogenomics relabeling of drugs. I think other things may rise to the level where we would want to emphasize education based precisely on a looming impact. I think, for example, of multiplex analysis in the direct-to-consumer arena, et cetera.

Those are going to take some judgment around

the table to figure out. I just want to get my bid in for taking a nuanced approach to what we emphasize so that we aren't perceived as just evangelists.

DR. WILLIAMS: The very specific thing that I want to add related to providers is, have we had engagement with the pharmacy R&D community relating to that? I think it is going to be absolutely critical to get engagement with that group. As I envision how pharmacogenomics is going to evolve, I think that much of that is going to fall within their bailiwick because they are really best prepared to deal with a lot of the information. They already have the content expertise in terms of pharmacogenetics and that type of thing.

DR. FEERO: Actually, I could relatively easily, with your approval, reach out more to that community. I was in a meeting about two months ago where pharmacist leaders were talking about this. They actually are chomping at the bit to really become more involved. They say, metabolism of drugs is our business. Genes define metabolism, to a large degree, so we would really like to get more involved in this. I think we could relatively easily bring that perspective into the

report.

DR. McGRATH: In response to a lot of the tone here, I think the report will give the landscape of where, since this is a committee about the needs of society, society gets a lot of its genetics information.

We all know the statistics. A lot of people would like confirmation by their physicians, clinicians, or health care providers at point of care, but a lot of steps happen before they ever make that step. I think one thing we will be able to contribute is to talk about those multiple steps in the community and the role of public health officials, and broaden it a little bit so it doesn't look like point of care in the clinic is the first place that people start hearing about things.

DR. AMOS: Have you talked to the MEDCO people? Andrea and I were at a personalized medicine conference a couple months ago in Baltimore. The MEDCO pharmacy people have implemented pharmacogenomic testing for their prescribing practice. They are the largest provider of those pharmaceutical services to the insurance companies. I just wondered if you had talked to those folks.

DR. BILLINGS: Russell T. Garden is the guy who

runs it.

DR. FEERO: In believe, I believe he presented, or one of his near folks in the hierarchy presented, at believe it was a meeting hosted by APHA several months ago here in D.C. MEDCO was definitely there and presented. They are playing a huge role in this process. In fact, I think just in the past week a study that MEDCO is doing on Tamoxifen closed. We should be getting some interesting results from their work.

DR. TEUTSCH: Rob Epstein, of course, presented to us last time.

DR. NUSSBAUM: What is very impressive is not only your work but the stunning gaps that exist in all arenas. I just wonder if the taskforce stepped back and said, let's look at what has happened with preventive services, with chronic illness, and even with those educational programs where we still have 50 percent translational gaps in knowledge, and whether there is a way of leapfrogging. The leapfrogging could be in personal health records and other types of information services.

I just wondered, given the tempo, the rapid

advances that we expect in the years ahead, whether we could use this information to give us a new model or paradigm for how consumers, doctors, and other health professionals can be guided to new evidence and optimal care.

What you have shared with us is wonderful, but it is very, very traditional, isn't it? I just wonder if there is a breakthrough way of thinking. We have so many new electronic information tools available to consumers, and we also know that health professionals need lifelong learning. This is just an area that will even be accelerated.

DR. McGRATH: That is a great charge. Thank you.

DR. NUSSBAUM: One suggestion is the concept of all of us having personal health records. Those health records would contain a tremendous amount of demographic information, preventive services, and preventive needs. We could then embed decision support for the physician, be it specialist or primary care physician, be it other health professional. As we gain new information, whether it be pharmacogenomic information, that could be fed into

that process.

Looking at preventive services or common chronic illness today, if we miss the mark half the time, just think, with the gaps that we have that you have so well identified and the opportunities, where we will be in the genetic arena.

DR. EVANS: That really gets to something that Marc has brought up time and time again about just-in-time education, et cetera. It really fits with the rest of our session today about health care reform because it is all part and parcel of trying to motivate people.

DR. RANDHAWA: I have a couple of suggestions. If we will be reaching out to the pharmacology and the pharmacy communities, there is a fairly rich history of drug-drug interactions. There is a lot that can be learned from the entire field in terms of FDA labeling, the information on how that is used, how the evidence base was created to come up with these clinical decision support tools, and the alerts that are often turned off at the point of care because they are not very useful. I think there are many things there that can be helpful as we think about making it more actionable information.

The second point is, it might be useful to separate out general information from actionable information. If we don't do that, then I think we are conflating issues that are hard to tease apart.

DR. FERREIRA-GONZALEZ: I was wondering if you have also reached out to the laboratory community.

DR. FEERO: Herein lies the issue of expanding the net. As soon as the pharmacists and the laboratorians are involved, then you end up with this wider and wider net. We grappled with this in the workgroup on health professions education. Where is going to be the most likely bang for our buck.

Just speaking to the specialty communities, the feeling was that there are a lot of applications. ASCO has guidelines. There is already a fair amount of effort directed towards them and getting them up to speed, whereas for primary care folks there may not be. There was also a feeling that the laboratorian community is probably better off, at least right now, than primary care.

I think you have to think carefully -- and, actually, you probably should be talking to him because

he is taking over as chair of the workgroup -- about how wide you want to cast this net and how much time you want to take in trying to cast it.

DR. FERREIRA-GONZALEZ: Yes, but I think in talking about the pharmacists or the laboratorians, these are individuals that are interacting with all the different specialties all the time and have been educated and are continuously educated. I cannot tell you how many times they call me to see what results mean. Then you go over some education at that point.

The laboratories have a very active role in educating primary care physicians and even specialists in genetic information. We need to make sure that the laboratory community is also on board with genetics. We have certain communities that are really on board, but we have to have the whole laboratorian community. That, I think, is a critical component that could play a very active role in the education of the health care providers.

MS. REED: One of the things that I'm hearing is that there is a lot of overlap between these groups. Is there any utility in thinking about educational

efforts on multiple levels.

The health providers are also consumers. If there is general education that everybody needs, can it be left to the consumer group. Can we assume that that will help get health providers up to a certain level and that we then need to add on whatever extra level that they need. Laboratorians are a combination of health providers and public health. Is there any utility in thinking of it in a step-wise fashion, if that is not what we are already doing.

DR. TEUTSCH: Barbara, thank you to you and all of you on the panel for all the work that you have done and are going to do. I know that directionally you have already indicated where you are headed. Obviously, next time we are going to be looking at things at a lot more specific level and the kind of things that are likely to be actionable that we can, as you said, measure and monitor going forward.

We look forward to that discussion. We appreciate everybody's comments, thoughts, and input. Hopefully that will be helpful.

At our next meeting we will have this report,

which, as Barbara said, you will have seen in advance. We will be marching through it, systematically looking at each of those recommendations and getting everybody's input, so it will be ready for seeking public input. Thank you very much.

We will move to our period for public comment. That is one of the important things that we do. We provide a forum for deliberation to hear the concerns of individuals and organizations. We really value that opportunity. We set aside time each day to allow us to do that. We ask our presenters to keep within a five-minute time limit.

We have one of those individuals here today, and that is Jennifer Leib, who is a partner in HealthFutures. She is here today representing the Association for Molecular Pathology.

Please come on up. I believe we have a copy of her statement in your table folders, so you should have that in front of you. Jennifer, please. We look forward to what you have to say.

- PUBLIC COMMENTS -

Comments by Jennifer Leib

The Association for Molecular Pathology

MS. LEIB: Good morning. I'm Jennifer Leib. I'm a partner in HealthFutures, but today I'm here giving comments on behalf of the Association for Molecular Pathology, which I will refer to as AMP.

AMP recently submitted extensive comments to the Federal Coordinating Council for Comparative Effectiveness Research. In those comments, AMP identified a number of priority issues that I would like to briefly share with you today.

We, first, encourage the development of a comprehensive infrastructure for CER in laboratory tests. Specifically, recommendations included creating a panel of expert stakeholders with molecular diagnostics expertise, a transparent and widely available electronic clearinghouse for information on CER projects, standards for the collection and storage of data from genetic testing laboratories to permit the interoperability between those databases, and last, requirements that data from technologies and tests under evaluation be generated from CLIA-, CAP-, ISO-, or FDA-certified institutions.

AMP's comments also discuss 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, AMP urges that funding for large, carefully designed comparative effectiveness trials for molecular tests be coupled with funding for comparative effectiveness studies that complement randomized control trials by including those patients who would not necessarily meet the inclusion criteria for prospective trials.

A third area of concern involves evaluating the effectiveness of genomic tests and the labs in which they are performed. 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 that extent, AMP recommends funding for a program to develop reference materials, the development of new proficiency testing methods as alternatives to distributing surrogate test specimens, and the development of appropriate quality assurance guidelines

for new technologies such as whole genome sequencing.

On the closely related issue of reimbursement, in February AMP made public comments to the CMS MEDCAC meeting, as the committee was considering the expansion of Medicare coverage to include molecular testing. In those comments, AMP maintained that the evidence required for coverage of most genetic and genomic tests should not differ from the requirements for other diagnostic tests. AMP also spoke about the critical linkage of genetic testing and the evolving field of personalized medicine, and commented that CLIA and other accreditation programs help ensure the analytic and clinical validity of molecular tests.

Finally today, I wanted to mention that AMP has recently submitted to your advisory committee comments on its draft report on gene patents and licensing practices as they may impact access to genetic tests. As many of you are aware, AMP is a lead plaintiff in the recent lawsuit brought by the American Civil Liberties Union challenging the validity of the BRCA 1 and 2 patents.

AMP believes that, while the draft report raises many key questions, it misses an opportunity to

more definitively explore the negative impact on public health that derives from exclusive and restrictive licensing practices, such as in cases like the genes associated with SMA and the Connexin 26 and 30 genes. We encourage the Secretary's Advisory Committee to consider additional cases similar to those that demonstrate those points.

Our complete comments and materials submitted to your committee, as well as to the coordinating council, can be found on the AMP website. Thank you very much.

DR. TEUTSCH: Thank you, Jennifer. We always benefit from your input. You have obviously covered a lot of topics. Let me just open it up briefly to the Committee to see if anybody has any comments or questions for Jennifer.

[No response.]

DR. TEUTSCH: Hopefully you can be here tomorrow. We will be talking extensively about the issue of comparative effectiveness, which is clearly a high priority for us going forward. You have obviously touched on a lot of the things that are of interest to

us.

MS. LEIB: I look forward to that session.

DR. TEUTSCH: Thank you very much.

MS. LEIB: Thank you.

DR. TEUTSCH: We have come to the break. Why don't we plan to be back at 10:30. We will be having David Blumenthal here to share with us some of his thoughts on directions in the health information infrastructure.

[Break.]

DR. TEUTSCH: We want to turn now to a topic that we have touched on many times and obviously heard some about again this morning, the importance of health information technology. As many of you, I think, are aware, Dr. David Blumenthal was recently appointed to lead the HHS efforts to speed the adoption of interoperable health information technology. I think you are going to have all that done by 2014; is that right?

DR. BLUMENTHAL: Sooner.

DR. TEUTSCH: As the new national coordinator for health information technology, David will be administering the $20 billion in federal funding from the

American Recovery and Reinvestment Act, the ARRA.

Health information technology is only the latest of the many things that David has done in the health policy arena. Prior to joining HHS, he was the director of the Institute for Health Policy at Massachusetts General Hospital, where he designed and led some of the most important and influential policy studies of our time on issues ranging from academic and industrial relationships, determinants of physician behavior, quality management in health care, access to health services dissemination, and many others.

Earlier in his career, he worked for the Senate Subcommittee on Health and Scientific Research and was also a national correspondent for the New England Journal.

He and I actually go way back. We were actually classmates back in college, but I didn't spend enough time so I continue to learn.

[Laughter.]

DR. TEUTSCH: David's commitment to HIT is also more than academic. He was an early adopter and has been using the HRs in his own primary care practice for over a

decade. We know your schedule must be overflowing, so we are really particularly delighted that you can be here.

As I mentioned, we have talked about the importance of managing the information flow that is going to be flowing out of genomics and then using it as a tool for clinical decision-making. We are delighted to have you here, knowing that you are in this position. People may ask you some questions beyond health information infrastructure.

Let me turn it over to you. Thank you for being here.

- DEVELOPMENTS IN HEALTH INFORMATION TECHNOLOGY -

Activities of the Office of the National Coordinator for Health Information Technology

David Blumenthal, M.D., M.P.P.

DR. BLUMENTHAL: Thank you, Steve. It is a pleasure to be here. I am grateful to have this opportunity to talk with you all about genetics and health information technology.

I want to start by saying that I am now finishing my seventh week here. I think, by some standards in this current administration, that makes me a

veteran. There are still many empty offices in this building. Those of us who are here anxiously await our colleagues.

I want to admit right away that I am sure that I have a lot to learn from you all about how health information technology can advance our understanding of genetic influences on health and disease and how a more advanced information infrastructure can promote human health through better understanding of genetics.

What I would like to do very briefly is just tell you a little bit about the work that we have ahead of us. Some of you may know this already, and I apologize if I repeat things you already know, but some of you may not be familiar with the mandate that the Office of the National Coordinator and the Secretary of Health and Human Services have been handed by the ARRA HITECH legislation which was signed by the President in February.

It is a very substantial undertaking. If you play out its full implications, it could have revolutionary effects on the delivery of health services and on the performance of our health system. I think of

that in my optimistic days. There are also, of course, risks that we are paying a lot of attention to and trying to manage.

Just very briefly, as Steve mentioned, there is a $20 billion price tag often associated with this HITECH legislation. Actually, the price tag wanders depending on who is doing the calculation. That is an estimate that incorporates assumptions about how many physicians, hospitals, and other providers of care will adopt electronic health records, at what pace they will do it, how well they will use it, and how well we will measure whether they use it the way we hope they will. It also incorporates, by the way, some Congressional Budget Office assumptions about savings resulting from that uncertain level of adoption and use. The actual numbers associated with this legislation vary from maybe $30 billion to $45 billion.

Having said that, I should also point out that the Office of the National Coordinator is responsible for policy development and for spending about $2 billion in discretionary funds that are intended to help providers of care adopt and meaningfully use electronic health

records.

The expenditures for incentive payments, which account for the great bulk of the money, will actually be paid by the Center for Medicare and Medicaid Services, and will be the subject of the Center for Medicare and Medicaid Services' rulemaking process. They will be administering it and deciding actually who receives incentives and what amount those incentives will be.

We are focusing on policy development and providing technical support. Both of those are substantial and very interesting challenges. Policy development involves helping to understand what it is that we would like physicians, hospitals, and other providers actually to do with their electronic health records once they have acquired them, set them up, and have them operating.

This gets to the question of how you define the concept of meaningful use, which is, I think, an inspired concept, one that will be the object of a great deal of discussion over the next several months as we begin to think about what meaningful use should be at each of the phases in the deployment of an electronic health record

over time. We have to have some preliminary definitions in time for the 2011 time frame when incentive payments become available under Medicare and Medicaid, but the Congress clearly intended meaningful use to be a definition that evolves over time.

I think of it as trying to get on an escalator and moving up that escalator toward a more powerful definition of use, one that is more transformative of the health care system and contributes increasingly to better personal and population health and to a progressively more efficient health care system that uses the capability of information technology.

That is one of our big policy challenges. We have another big challenge in the form of providing support to hundreds of thousands of physicians and thousands of hospitals. Even if they have all the best intentions about adopting these electronic systems, they will need help, the same way all of us who work in institutions depend on information systems support to keep our electronic capabilities up and running, maintain them, update them, increase their capabilities, and deal with breakdowns and the inevitable system failures that

occur.

Especially for small practices and small hospitals who don't have any current information technology support, who don't have any help with transitioning into this new world of electronic records, for that average solo practitioner or member of a three- or five-person group, for the average 100- or 200-bed hospital, these are very challenging technical tasks to undertake. We are not talking here about getting computers onto physicians' desks or into nursing stations. The intent of the legislation, as I previously indicated, is to not just get them there but have them be used in a meaningful way.

I can't think, in my own policy experience, of a time when the federal government has tried so intimately to affect the daily work of physicians and hospitals, in effect to take this $2.6 trillion health system and change the way it moves information and the way it uses information, and to do it with the goal of making population health better, individual health better, and eliminating waste and inefficiency.

We, of course, have changed payment systems.

We have trained people. We do lots of things in the health and medical sector, but getting people to use a different recordkeeping system and, more than a recordkeeping system, a different way of moving and managing information in their practices, between practices and their hospitals, and between hospitals, connecting all of those, that is a very, very different kind of work process that we are going to ask people to engage in.

It is very challenging and also, of course, creates enormous opportunities for care improvement but also for research. We hope that we will, as we roll this out, use whatever influence we have to lay the groundwork for successively more sophisticated uses of our electronic health information systems. We can't promise that everyone's needs and every conceivable use will be possible in year one or year two or year three, but we do understand that we have a great opportunity to lay a foundation for many, many purposes and functions over time. Part of what we have to think creatively about is how to leave open those possibilities, even if we don't realize them in the first go-round in our support of

health information technology.

One of the things, of course, that we want to be able to do is to support the understanding of relationships between fundamental physiologic and other biological characteristics of humans, their evolving health over time, their development of disease and recovery from disease, and their maintenance of health. That, of course, gets us to the question of how to collect information on genetics and link it to information on human experience to the extent that that can be captured in the electronic health record.

We also want to be able to support what has until recently been called comparative effectiveness research but, more generically, is research about the efficacy of treatment and alternative treatments. We want to be able to support things like post-marketing surveillance of drug and devices, and look at their impact on human health and the occurrence of adverse events.

We want to be able to support surveillance of the adverse and positive effects associated with immunization. We may be in the midst of a pandemic flu

outbreak, for which the administration is busily helping to prepare a new vaccine. They will want to know what the impact of that vaccine is on human health. That is an opportunity of the type that we hope the systems we are preparing will enable us to take advantage of.

That is an overview of what we are trying to accomplish. We will be, next Tuesday, holding the second meeting of our Health Information Technology Policy Committee, which is a federal advisory committee created by the HITECH legislation. We will be having a first discussion of the work that that committee has been doing on meaningful use, what it should consist of initially and over time. We will also be discussing a number of other aspects of our mandate.

Let me stop there. I would be happy to answer any questions, but mostly, I hope I can learn from you about what you see as the agenda and the opportunities related to genetics and human health and the charge that we have to promote adoption and meaningful use of electronic health records.

Question-and-Answer Session

DR. TEUTSCH: Thanks, Steve. Julio.

DR. LICINIO: I have a question. You raised a very, very important point that I don't see discussed very often in any discussion that comes up about electronic medical records, which is the issue of maintenance and adjusting. You hear about the potential of the Stimulus money helping to set it up in different places and making some budgets to create it, but the maintenance, continuous upgrading, compatibility, and continuous management of it is not very trivial. A lot of institutions that don't have it are being very pressured to develop it.

I actually wonder what the ability of especially smaller or mid-size institutions is to actually do a very good job over time in terms of confidentiality, genetic information, and adjusting to new things that come up.

DR. BLUMENTHAL: I think I hear two questions there. One is about the ability to maintain and upgrade records over time, and the other is about confidentiality of genetic information. On the former, we are very much aware that that is a challenge. I think it has been a major barrier to adoption because of the understanding

that both physicians and hospitals have about the demands that are associated with having a system and getting value out of that system.

Part of the reason I think that Congress gave us the discretionary funds that we have was to try to begin to address that. We have plans to do that we will be discussing more over the summer.

Ultimately, though, this is a problem that has to be solved by the market, by demands from the purchasers of these systems that vendors produce systems that are intuitive and easy to use and that they maintain those systems and upgrade them as it becomes possible to do that.

In terms of confidentiality of information, of course, right now there isn't a lot of genetic information in these records. That is part of a generic issue of privacy and security of many types of sensitive personal information.

We are working hard on that. We will be looking at technologies related to security of information and related to the identification of information to try to assure the public that we have

minimized the chances for breach and violation of safety of information and also that we have control over the uses of that information.

DR. EVANS: I just wanted to mention two things that are, I think, somewhat peculiarly germane to genetics and the electronic record. One is the mundane issue of presentation of data to the provider who is looking at the medical record. There are a lot of things in medicine where text is the best way to do that. I think, though, if you talk to almost any geneticist, one of the frustrations with most electronic medical records is the inability to represent pedigrees in most of these things. I think it has been probably fairly neglected in the general electronic record type of environment.

In our division, we probably are not supposed to, but we continue to keep shadow charts for exactly that reason. Text representations of family histories are exceedingly cumbersome.

I would just put a plea in to keep that in mind. It is not a real hard technical problem, but it is one that often gets overlooked.

The other thing I would just mention about

privacy is that, whether they should or shouldn't, people seem to accord their genetic information a privileged status. They privilege it in ways that they don't some of their other health care. I would just put in a bid to keep that in mind. I think that in some ways, especially as we get into more robust analysis of the genome in people, some of that information may need to be treated in the way we privilege psychiatric information in the overall medical record.

I really agree with the idea that you put safeguards to keep the medical record confidential, but there may be some layering and there may be some sentiment out there that genetics necessitates another layer.

DR. WILLIAMS: I wanted to circle back to a point that Julio made and then continue on from there. I think one of the issues relating to the maintenance issue relates to standards in interoperability. If we don't have a national venue by which we can publish acceptable standards that everybody can adopt and then can have interoperability, we will have lost an opportunity.

Of course, that was a large focus of the last

couple of years particularly related to the American Health Information Community, an advisory committee to the HHS that has sunsetted and I know is transitioning into a public-private partnership. At least, those are the rumors.

Having had the opportunity to not only sit on this advisory committee but also to sit on a couple of workgroups of the AHIC, it seems that there are several issues relating to standards in interoperability that would also facilitate looking at meaningful use in a deployed environment. The one that has come up repeatedly here and that Jim has just mentioned is family history, which is something that we have been collecting for millennia, actually, but have really lagged behind on in terms of representing in records.

While he and I, I think, have a bit of a different idea about what actually needs to be represented from the perspective of a geneticist versus a primary care physician, the reality is that the representation of that is text-based. It is extraordinarily unuseful if you want to drive decision support.

One of the things that I would certainly think would be a reasonable target to look at is to take the standards that were developed from the AHIC Personalized Medicine Workgroup around family history and to look to see how those can be incorporated into products that are emerging in the marketplace and then to look at meaningful use around family history where we know that that can provide benefit to care.

The second national issue that seems to lend itself to this would be in the area of newborn screening. Again, there was a specific workgroup under the Personalized Medicine Taskforce around newborn screening. Every state has a program.

These are relatively rare disorders, so any given physician is not going to see them very often. The opportunity to be able to have embedded within a report from the newborn screening program education and direction in terms of what to do would also seem to be a reasonable target for looking at meaningful use since, again, we have that deployed across the country.

The third thing, which is probably a little bit behind the other two but certainly is going to be

emerging fairly rapidly, relates to the whole idea of genetics and genomics and specifically pharmacogenomics. We do have some specific examples where pharmacogenomic testing is going to be essential for safety and optimal management of certain medications.

I think it has been fairly well concluded that without the ability to represent these types of tests in an electronic health record environment that we are going to have a lot of problems in terms of really being able to use these optimally.

In my view, from the perspective of this group and the clinical decision support and personalized medicine groups of the former AHIC, it seems like those would be reasonable targets that are relevant to our content that could translate fairly straightforwardly into cases of meaningful use that could be incorporated at some point along the roadmap.

I guess my question, if there is one, is, given that you are really just starting this process, is this something that you see as being represented as this discussion goes forward? Maybe a more generic question is, the things that have emerged from the roadmap of the

AHIC, is there an intentionality about translating those into the meaningful use roadmap?

DR. BLUMENTHAL: The meaningful use discussion is just about to go public. We are just at the beginning of it. There is going to be ample opportunity for you and many other groups to make the case for what they see as the optimal definition.

Since we are going to be the recipients of all this excellent advice, we are going to always be saying, where does this fit into the roadmap, how demanding is it, how far is it away from current capabilities, how much lead time do the vendors need in order to incorporate this, and how much training do physicians need in order to manage it.

Ultimately we want to get, as I said, people on the escalator. We don't want them to jump off at the third step because the records that we are demanding that they use are simply beyond human comprehension if you haven't been at it for 10 years. We will have a very open conversation about this. We would welcome these and other suggestions.

The AHIC formulated its request for standards

in terms of something called use cases, which were very specific instances of a clinical situation or an administrative requirement. The Health Information Technology Standards Panel, and I don't want to overwhelm people in this audience who aren't part of this world of information technology, but we have asked a group that generated a lot of those use case standards to reconfigure them in terms of meaningful use and think about where we have standards that we need and where we are lacking them. Of course, you start with a definition of meaningful use and work back to standards.

DR. TEUTSCH: We have time for just a couple more. Let me get Sam, Paul, and Charmaine.

DR. NUSSBAUM: David, first of all, the nation is fortunate to have someone who not only understands health IT but really understands health services and health policy. We really not only wish you well but want to support you in this vital role.

The comment I want to make, though, relates to affordability and what you were talking about in terms of using health IT to take it to the next level in terms of patient-centered health research or comparative

effectiveness research, and linking that to the emerging field that this group is spending time in, and that is the clinical validity and the clinical value of genetic tests.

The question is, as you look at meaningful use, it strikes me that it is not only about a lot of the connectivity elements that need to be built into medical records interoperability but the ability to collect information for observational studies.

We will never have sufficient dollars to look at all types of comparative effectiveness research. We will generally, probably, start with big items like the use of CT angiography in cardiac disease or approaches to surgical procedures that are very common. To take on the genetic issues that affect smaller numbers of people, we are going to need to gather data very differently.

So the question is, could the meaningful use elements of electronic health records really be pivotal in enabling us to collect that observation so we know down the road how these genetic tests will be applied and how the outcomes of cancer therapies can be guided by pharmacogenomics and other ideas.

DR. BLUMENTHAL: Those are excellent points. Thank you for your voice of support. The longer I'm here, the more I value such sentiments.

[Laughter.]

DR. BLUMENTHAL: The fact is that we want to build in the capability to do genomic-related research over time. That means building in critical data elements so that they will be there when they are needed. Exactly what those are we welcome suggestions about, and what the minimum is, what the ideal is, and where we might settle in between the minimum and the idea.

Having that vision of where we want to get to is going to be very important for us. We can work back to what we can insist upon or request of providers in the short term and then over time.

DR. BILLINGS: I just wanted to echo my colleague's comments about family history, only to say that this agency has spent a lot of time, effort, and money to develop information on public programs and tools to improve the aggregation of family history. The integration of that into a health record and then the identification of families from that who would benefit

from further testing, for instance, is a measurable outcome which could show immediate benefit of the effectiveness of having an electronic health record.

So, I want to just say, to a large extent, that I think family history would be a good early target for improvement that could be measured in terms of the impact of the electronic health record.

I also wanted to raise another issue which has been around this committee for a while, which is just the general integration of laboratory data into the electronic health record. There are enormous issues embedded in that, and problems with the recording of laboratory data and the way laboratory data is generated currently into a standard health record.

Obviously, this committee, as representing one kind of set of laboratory results, is interested in that and has looked for ways to improve reporting standardization. We need, maybe, a new coding system or a descriptor system so that the information is more useful, and so forth and so on.

I would just say, some attention to that general area would certainly be consistent with the

mission of this committee as well.

DR. ROYAL: I would like to just follow up, again, on Jim's comments about what we call the genetic exceptionalism of genetic information and how people privilege information, both patients as well as probably health care providers and others.

There is also the need to link with folks involved with GINA, the Genetic Information Nondiscrimination Act, which provides some protection in terms of access to genetic information. Where the loopholes might be in GINA, there might be the need to link with them in terms of just monitoring who has access and how the information is being used.

DR. TEUTSCH: David, thanks so much for being here. As you can see, between the protections issues, the need for research and taking advantage of all this information, and the knowledge management in what we see as a burgeoning area, so much gets funneled through the work that you are doing. We are delighted that you are there. We are delighted that you came, and really appreciate your willingness to engage with us. Thank you.

DR. BLUMENTHAL: Thank you, and all the best.

[Applause.]

DR. TEUTSCH: It is great to have someone like David there to help us move all of those important agendas forward.

We are now going to turn to the topic that we began at our last meeting, which is genetics and the future of the health care system as it relates to health reform. I won't go into much detail now because I know our next speaker is up against a close timeline.

At our last meeting, of course, we heard primarily from payers and how they view some of the issues surrounding genomics and potential changes in the health care system. Today's speakers are going to cover some different topics, including disparities, issues of equity, something about what this might mean for providers and for different professional groups, patients, advocacy groups, and so forth.

At the end of this, we will want to come back to a discussion about what we can do and how what we see as the future of genomics can be fulfilled in the health care system, what kinds of changes we should anticipate,

and particularly, what the Secretary might be able to do to fulfill that future.

That will be our agenda at the end. What we will be doing is having a series of speakers and discussions with them. Hopefully, many of them can stay to the end and actually participate in our discussion later this afternoon.

Our first speaker today on the topic is Sarah Gehlert. She is the director of the University of Chicago's Center for Interdisciplinary Health Disparities Research and a professor of the university's Institute of Mind and Biology. Her research has looked at the influence of social factors on gene expression in cancer, so she is covering everything from the sociophysical environment down to the gene.

Hopefully, she will be able to provide us some insights into how we can reduce disparities in this country, which I think we all know remain an inordinate problem, and how we promote health equity.

We are delighted to have you here and look forward to what you have to say.

- GENETICS AND THE FUTURE OF THE HEALTH CARE SYSTEM -

Health Disparities and Changes Needed

to Promote Health Equity

Sarah Gehlert, Ph.D.

[PowerPoint presentation.]

DR. GEHLERT: Thank you. I'm sorry I have to run out, but I have to be on the NIH campus.

I'm going to talk about the marriage of genomics and social and behavioral sciences for ameliorating health disparities. I will be talking about the work at my center, which is one of the eight centers for population health and health disparities that were funded by the National Cancer Institute, the National Institute of Environmental Health Sciences, the Office of Social and Behavioral Research, and the National Institute of Aging in 2003, to address health disparities.

This is important because the initiative mandated that social, behavioral, biological, and genetics scientists work together transdisciplinarily, which is a word that I didn't really espouse at the beginning but have grown to love. It meant that they would work on projects that were completely

interdependent, answering one question instead of a group of questions, coming up with shared research designs using the best of their shared disciplinary theories, and coming up with new methods of analysis.

Our center is called the Center for Interdisciplinary Health Disparities Research, which we call CIHDR because otherwise it is difficult to say. We are located at the Cancer Risk Clinic at the University of Chicago, on the left. The Center for Mind and Biology is important because it was a neutral space on campus. It wasn't in the Biological Sciences Division or the Social Sciences Division, so it was a place where one way of knowing wasn't privileged over others.

We are also at the University of Ibadan in Nigeria. For lack of time, I'm not going to talk about the work in Nigeria today.

We are five scientists. I'm from the School of Social Service Administration, also a biological anthropologist. Martha McClintock is a biopsychologist. Suzanne Conzen is a hem/onc clinician who is also a molecular biologist. Funmi Glopade is a hem/onc clinician who runs a high-risk breast cancer clinic and

is also a geneticist. Thomas Krausz is the chair of Surgical Pathology. We are from two divisions and one school at the University of Chicago. Most of us had never worked together in the past.

What brought us together was the question, how do factors in women's social environments contribute to the African American and white disparity in breast cancer mortality in the United States. We knew that access to care was certainly an issue in health disparities, but we also knew that even when access to care is controlled for, as in the U.S. military or in clinical trials, that there is still a black-white disparity in mortality from breast cancer.

Looking at SEER data from NCI from 1973 to present, it has always been the case that white women were more likely to get breast cancer. If you look on the right, black women are much more likely to die from it. The issue is that white women's odds have improved through time but there hasn't been a concomitant improvement for black women. Things started changing in the early 1980s so that now black women in the United States are 37 percent more likely to die from breast

cancer than white women.

This is an overview of our mutually informative, multi-level, multi-modal approach. I'm going to introduce the term "upstream." We talk about the factors on the right as upstream factors. These include community neighborhood factors, including things like crime; collective efficacy; the social ecology of neighborhoods or the nature of neighborhoods. For example, are there vacant buildings. Are there sidewalks. Upstream factors also include housing, environmental exposures, social circumstances such as social isolation and social support, psychological states and behavior patterns, and hormones and genes. Obviously, it goes in both directions.

We have four projects. Two use animal models. Suzanne Conzen works with SV40 TAG transgenic mice in which blocking apoptosis increases the growth of TAG memory gland tumors. Martha McClintock works with Sprague-Dawley rats in open caging. She manipulates them socially only. The animal models really give us a way of trying to understand how the social environment gets under the skin to produce mammary tumors.

Giving you the quick and dirty here, we concentrated on social isolation because of a large body of data that social integrations associated with better health outcomes and social isolation with poorer health outcomes, from work by Jim Haus [ph] and others which I don't have time to mention.

Martha took individual female rats at various points in the life span and took them out of the social group, which is where they prefer to be. They were in cages by themselves in the same room with the same food and same everything, other than the lack of social grouping. She found that in time -- this is 17 months, which is about 510 days in a 1,000-day life span -- the isolated females developed spontaneous mammary tumors. Their tumor burden was much higher than that of the group-housed animals.

These are two sisters, one of whom was left to her own devices with the group and the other socially isolated. You can see the big, whopping mammary tumors in this animal. About 100 days earlier, she quit even attempting to grooming herself. They tend to die about 100 days earlier, too.

In trying to understand how just isolating some of the animals at different points in the life span caused the tumors, Suzanne began looking at stress response. She found that just moving the cage of the animals, literally moving it from one counter to the other, which is a fairly mild stressor, caused differential rises in recoveries in corticosterone in the group-housed versus the isolated animals. For the group-housed animals, the cort levels went up and came down just as you would expect from baseline rise and recovery. In the isolated animals, the levels of cort went up and stayed up, so that the animals were bathed in cort for a longer period of time.

One of Martha's fellows found that he was able to predict from the rise tumorigenesis, when tumors developed, and from the recovery how long the animal died. So we thought we might be on to something in terms of how the social environment got under the skin.

This is work from Suzanne Conzen with the SV40 TAG transgenic mice. Suzanne found that glucocorticoid receptors, stress hormone receptors, increase as tumors become more invasive. That suggests that mice are

susceptible to GR-mediated cell growth.

She found at the same time in the mice that, as tumors became more invasive, estrogen receptors and progesterone receptors decreased. This is important for humans because ER- and PR-negative tumors, which are two-thirds of the negatives in triple-negative tumors, have poorer outcomes. They tend also to be more common in African American women than white women.

This is a little bit about Suzanne Conzen's work. She found that isolation increased up-regulated mammary gland fatty acid synthesis and glycolytic pathway gene expression, both of which contribute to breast cancer growth. The isolated mice also developed a heightened corticosterone stress response compared to group-housed mice, which suggests potential interventions using molecular biomarkers and/or targets such as fatty acid synthesis, which we are exploring for breast cancer prevention.

The lessons learned from the animal work are that endocrine stress response should be considered in understanding the biology of health disparities and that hormone response is a conduit from social environmental

stressors to gene expression.

As we move into the human work, we saw that, at the population level, we are talking about social isolation and its psychological component, which is felt loneliness, which is my part of the picture. Moving to the individual level to acquired vigilance, Martha's animals, when they are socially isolated, become vigilant. I will show you a picture later, but instead of exploring a novel situation, they literally stand in a corner of the cage and are hyper-attuned to threats. They look around. Even when they are put back in the social group, they don't interact with other animals.

We can also look at neuroendocrine response, which is my work, Martha's, and Suzanne's, to the level of more aggressive tumors, which is the work of Martha, Suzanne, and Funmi Glopade. So we need a transdisciplinary team to put all this together. Had we been looking at just one part of it, we truly would have missed the bigger picture.

Moving to what Funmi and I are doing, this is a schema of how we approach working with women. We began interviewing women whom we enroll at Stroger Hospital;

Cook County Hospital in Chicago, which is women who aren't insured; Mount Sinai Hospital, which is women on Medicaid; and the University of Chicago Hospital, which is basically women with insurance.

We are following women on the south side of Chicago who are all African American, all urban, but have a range of socioeconomic statuses. Some are quite affluent, some are homeless. We recruit them at the point of diagnosis in surgery clinic, and Funmi follows them into the surgery suite and gets tumors so that she can characterize the tumors.

My team interviews women in their homes four to six weeks after surgery. We see them for two-day visits every six months for a year and a half, so it is 10 visits per women for over 18 hours of face-to-face interviews. All our interviewers are African American clinical social workers who live in the neighborhoods, so they are geographically and racially similar to the women.

We, in the home, look at psychosocial functioning. We do a very thorough social network analysis. We try to get out what women want from their

social networks and what the network affords.

We look at health behaviors. We look, importantly, at perceived discrimination, which has been linked to health outcomes. We measure salivary cortisol, the cort level, four times a day for three days in a row at regular intervals.

We planned just to look at community-level variables from the City of Chicago and other sources geocoded to women's addresses. From the City of Chicago we can get wonderful data on crime. We then build a quarter-mile buffer zone around each woman's house so that we can count the crimes there, count the threat, and compare across women.

We also have data on collective efficacy from Robert Sampson's Chicago area study. That is the feeling that you belong to something. Dilapidation of housing; the City of Chicago tells us how safe every house is. We are looking at, for women, acquired vigilance as being around a lot of crime and in unsafe housing. You have to be vigilant to stay alive.

In looking at this level and this level, we left something out. We couldn't get fine enough tuned

data here, so we put together a built environment team to measure the immediate environment around each woman's house, comparable to the quarter-mile buffer zone for crime.

We looked at features that either impeded or enhanced social interaction. So, enhancing social interaction might be a vacant lot that is an attractive park or lots of small shops. Impeding social interaction would be vacant buildings that were dangerous. We actually measured the danger of vacant buildings in the four blocks. Do the vacant lots have syringes and condoms on them or are they ball fields. Also, the amount of traffic. Could a woman even get outside her house.

If you look here, we do satellite mapping of each four-block area, and then we go out and we measure the vacant lots, as I told you.

I had this on my desk one day, as I also had this slide from Martha's students' work. This is what I was telling you about the measure of acquired vigilance. This is looking down into the open cage of the Sprague-Dawley rat. This dark spot is an overturned food dish,

which should make the rats very curious. The turquoise is the measured footprints, with a software program we have. So this is one rat who is isolated and one who is group-housed, and just how much they have explored their environment in a short period of time.

The group-housed animals explore their environment. The isolated animals, especially those that are taken out during the period of puberty, become hyper-vigilant. They literally don't interact. They only look around, attuned to threats.

It occurred to me that we were seeing the same thing. In the same way that we created vigilance in the lab animals, neighborhoods create vigilance among some women by their danger, so that women have to be literally hyper-attuned to threats, as did the animals.

I'm not talking very much about the results of our work, but when we looked at the stress hormone, the diurnal salivary cort patterns, I decided to try to factor-analyze them to look for variation within the group. What is interesting is, we found a group of women who looked like the isolated rats. During the day, their stress hormone levels went up and they came down.

What was frightening, and I think this is the first time anybody has seen it in neighborhoods, is that 67 percent of the women in the sample didn't respond to stress anymore. I knew from the poverty literature, my end of transdisciplinary, that that is called the weathering hypothesis. Through time we just lose the ability to react. I had to go to my friends in endocrinology to understand endocrine burnout and to try to bring these two groups together to cross-talk.

What is interesting is, we asked the women, what is the worst thing going on in your lives. This group of women said, my breast cancer. My breast cancer is awful. My whole life revolves around it. But this group of women put breast cancer as the third or fourth thing that was a problem for them. Most of the time it was looking for safe and affordable housing for them and their children. These are also the women we noticed who we couldn't find for follow-up, who we had a hard time following up with.

One lesson is that cortisol rhythms are affected by neighborhood factors and psychological responses and there is within-group variability. In

health disparities, people don't look within a group. They take black, they take white, they take Hispanic. When you look within a group, you see variability.

I said, within-group variability and cortisol response must be considered in designing interventions. We know from Rebecca Voelker's article in JAMA in the end of 2008 and Marshall Chin's work that, for all the money we put into health disparities, very few interventions actually impact. It is probably because we are getting at these women but we are not getting at these women, so the gap remains. I think this is an important lesson.

Just to show you, this is logistic regression. We can, about half the time, from the social variables, the upstream variables, the robberies and the homicides in that quarter-mile buffer zone and women's response to them, if it is depression, predict which of those two groups women are in.

So, the lesson learned from both the animal and the human work is that biological factors with clinical implications can be predicted from neighborhood factors. Targeting neighborhood factors with interventions conserves resources. We can figure out who needs

resources and we can target to prevent the clinical and biological outcomes.

This is a messy slide, but it gives you an idea that from the upstream factors, which for us are degraded infrastructure and neighborhoods, crime, and unsafe housing, through sexual assaults, we can find other significant pathways. We get to the psychosocial functioning through this three-factor suite of social isolation, depression, and vigilance. When we factor-analyzed that, we found two groups of women: those that were depressed and lonely and those that had what we could only describe as anomie, just feeling they had no place in the universe and they were entirely alone. We talked about disenfranchised groups, but this is the first talking about disenfranchised individuals within disenfranchised groups.

We then had a significant pathway to the stress response through nighttime rise in cort. We also have a pathway here. Through the animal work, we have identified glucocorticoid receptors in the cancers and up-regulation of metabolic and inflammatory genes. Interestingly, 38 percent of the women in the sample --

you can guess into which group they fall -- have triple-negative tumors. Significantly more of them are under 50 years of age, which you would expect.

The number of sexual assaults that they have experienced in childhood and adolescence and their age is associated with those triple-negative tumors so that, as the number of sexual assaults goes up, they are more likely to have triple-negative tumors, ER-negative, PR-negative, and HER2-new negative, and their tumors are more likely to be of higher histological grade.

We are now going to test an intervention. This is our model, put in an easier-to-view form. From the upstream factors of degraded infrastructure and unsafe housing, we equate those social circumstances with race, not biology with race, to isolation, acquired vigilance, and depression, to metabolic gene regulation, inflammatory gene function, and failure of apoptosis and tumorigenesis.

We think that if we intervene here at the neighborhood level we can prevent some of the downstream changes. Basically, our neighborhood-level intervention, which I won't go into, is designed to decrease social

isolation, to increase social support and safety in neighborhoods, and to increase skills for negotiating complex systems. We then will measure at the clinical level whether or not it leads to increased adherence to treatment in women undergoing chemotherapy, which we believe to be the case.

At the biological level, we expect increased salivary cort regulation. We expect increased inflammatory response, for example Epstein-Barr, increased regulation of fat distribution, which is suggested by Suzanne's work, and a decreased allostatic load. We also think it might affect changes in fat metabolism that favor insulin resistance, which in turn leads to type 2 diabetes, which are increasingly public health problems.

In fact, we think that social factors may lead to metabolic changes and a redistribution of fat that affects both breast cancer susceptibility and susceptibility to the elements of metabolic syndrome.

We are moving our model to a rural, impoverished area where both black and white women are very poor so we can tease apart the effects of race,

socioeconomic status, and geography, and test these hypotheses. We will look at food insufficiency and food intake.

That is a quick and dirty view of what we are doing. I think my message is that health disparities is really best addressed transdisciplinarily. We know that the genome is shaped by environment. We don't think that genomic medicine alone is adequate for addressing health disparities. We also don't think that attention should solely be to social determinants of health. The proof is in the interactions.

You really need to, I think, foster cross-talk between social and behavioral scientists and geneticists, such as the NHGRI has already begun to do. We found in a couple of meetings earlier that Vence put together that it was as if we were two different cultures. One thought the other's measures were soft and mushy, and the other felt the same way. I think that anything you can do to bring scientists together and to approach these very complex problems through a shared lens, the better chance we have of diminishing health disparities. Thank you.

Question-and-Answer Session

DR. TEUTSCH: I assume there will be a few questions for you. I think one of the things, of course, that we are looking for here is how this all fits into health reform. As we talk about health reform, we are looking at some of the downstream clinical care and how do we deal with those issues, particularly in genomics. Then we talk about the importance of dealing with these upstream issues, as well. I wonder if you could reflect a little bit on this.

DR. GEHLERT: Certainly, if you improve access to care you will probably decrease black-white disparity in breast cancer about 40 percent, but there will still be 60 percent. If you aim upstream, it can seem daunting but there are very specific, simple ways that you can improve neighborhoods. It really is taking a multi-level approach because the upstream changes really do produce downstream changes. So I think that you need to pay attention to both.

When you were talking about information earlier, including social information in trying to understand how to make clinical decisions about patients is important. Knowing from what neighborhoods they come

and what their socioeconomic status is really does make a difference. So that is where we are. Thank you very much.

DR. TEUTSCH: Do you have time for another one or two questions?

DR. GEHLERT: Yes, I certainly do.

DR. WILLIAMS: One of the things we heard earlier from our Education Taskforce was a focus on the medical home and how education might take place within a medical home. I kept having flashbacks to my intro psych course at the University of Wisconsin, but it seems that a medical home has the potential at least to address both sides of that. If that is a model that you think is also reasonable, then how might we use that type of a model in the genomic realm to accomplish that?

DR. GEHLERT: I think a medical home makes a great deal of sense. Unfortunately, there is a great deal of variation in the quality of health care facilities, especially in impoverished neighborhoods. I think working through federally qualified health centers might be the way to go, and trying to make sure that someone is assigned a clinician, and perhaps not only

assigned a physician but assigned others, such as a social worker or a nurse, who really can follow them.

We have talked about patient navigators at at-large teaching hospitals or other large hospitals but not so much at federally qualified health centers. That certainly would help. Part of our neighborhood-level intervention into which I went into no detail is really to hook women in a neighborhood of a certain size with providers and with information that they can go back to often. It is finding safe places in neighborhoods, which certainly could be the federally qualified health center. I think it makes a great deal of sense.

I think that, in my experience, women very much appreciate having the information about genomics and genetics. We have taken Rick Kittles through many, many neighborhoods to talk to women. I have been incredibly impressed by the fact that women with master's degrees are on the edge of their seats but women with fourth- and fifth-grade educations are also on the edge of their seats. Their health is important to them and they just too seldom are talked to directly. I think that would be a big change.

DR. ROYAL: Great work, Sarah. I really believe that this is where we need to go in terms of thinking about health and even health disparities. The point you made about us just looking at black-white differences and not looking within groups is an excellent point.

I think, though, our terminology is important. When you say "upstream" and "downstream," even looking at your model, it is still a linear approach to how these interact. When we think about interactions, we are thinking about a web. We are thinking about a nonlinear approach where there is really no up and down. They are interacting, which makes it so complex, which is why we don't have more of this research going on. I just think that in communicating the message about the complexity, "upstream" and "downstream" minimize that complexity and really hold us to this linear approach, which we need to get away from.

DR. GEHLERT: Point well taken. I think in our Health Affairs article we did have a paragraph of caveats, but you are completely right. You are completely right. Thank you.

DR. TEUTSCH: Thank you so much. We really appreciate it. I think it is an important reminder to the interaction of all of these things and the need to deal with these complex disparities issues at all these different levels. So, thank you for taking the time to be with us.

[Applause.]

DR. TEUTSCH: We are going to now turn to the providers. Our first speaker today is going to explain some of the ideas for reform of health care delivery and provider payment. Dr. Michael Barr has been working on provider payment and delivery reform in his role as the vice president of practice advocacy and improvement for the American College of Physicians, and has been deeply involved in this topic. It has come up multiple times here.

Michael, we look forward to your comments. Thanks for being here.

Proposed Reforms in Health Care Delivery and Provider Payment Systems

Michael Barr, M.D., M.B.A.

[PowerPoint presentation.]

DR. BARR: Thank you very much. I appreciate the invitation to speak today. I know I'm standing between you and lunch, so I'm just curious about what time you would like me to wrap up so I know how fast to talk.

DR. TEUTSCH: We are aiming for noon.

DR. BARR: Very good. I think for this audience I don't need to spend a lot of time talking about the case for health care reform. We have poor access to health care, especially for the uninsured, and escalating cost and volume of services without any link between the cost and quality. High cost doesn't necessarily mean better quality. Our system is laden with administrative costs. We have a payment system that incentivizes volume and not necessarily quality and coordination. If you compare us to international data, we are lagging. Work force issues abound, especially for primary care. The ACP has said we face the impending collapse of primary care.

Now, it has not been for lack of trying. We have a lot of different ideas about what can happen with the health care system and what we can design. This is a

simplified way of showing all the different factors we need to address within the health care system. For example, if we create universal health coverage but don't address the work force issues, we will have nobody to deliver the care. You will have people with insurance and no access.

If we try and put forward an HIT infrastructure but we don't reform payment policy to incent people to use it, as Dr. Blumenthal was saying, with meaningful use, then we are going to spend a lot of money and not really get the kind of returns that we need.

I'm not going to pretend to say that the patient-centered medical home is the answer to all of this, but I hope at the end of the presentation you will see that we believe, and will agree with us, that it is part of the solution.

So, what is the patient-centered medical home. We talk about it as a vision of health care as it should be and a framework for organizing the health care delivery system both at the micro level, at the practice level, and at the societal level, the macro level.

Most importantly, we don't think we have

everything all figured out. This is a model to test, improve, and validate. As I mentioned earlier, it is part of the health care reform agenda. By itself it won't solve anything, so bear with me on that.

We also use it to describe a pathway to excellent health care as physicians and other clinicians who represent all of the folks who are involved in this effort reclaim a role as advocates for our patients, with their families when that is appropriate.

It is very much a team sport. This is a cultural change we need to work on with our own members and others. We are working together with others because alone none of us can solve the issues or help our patients.

It also needs to be an educational opportunity. I have been here all morning and I have heard a lot of discussion about how we need to educate the primary care work force and others. Here is a good example of where, again, a system-based orientation for providing health care and providing the tools, resources, and education at the point of care, which I will bring up a little bit later, is critical if we are going to get to the ends

that we seek.

Most importantly, if we want to address the work force issues, we have to articulate a model that is going to be attractive to medical students and residents for making the decisions right now and in the future so they choose primary care specialties.

To put it in a graphic context, we think the medical home is, again, not the sole answer but really could be the central thesis around which we can reorganize health care to address quality, cost, satisfaction, and access, with all the different components that I have outlined above.

Unfortunately, the very strength of the model that we have been pushing forward, which is primary care, is also its greatest weakness. Just to cite a few statistics, only 2 percent of fourth-year medical students, in a recent study, decided to go into general internal medicine. About four times as many general internists leave practice as their colleagues in specialty medicine, about 21 percent after 10 years, versus 5 percent. So we have our challenges ahead of us.

That is to emphasize the point. Without

primary care, we don't think this can exist.

So, what are we talking about. The medical home model is not new. This has been talked about by the pediatricians for 40 years or so. What we have brought forward is now reinvigorating it, with our colleagues at AAP, the American Academy of Family Physicians, the American Osteopathic Association. This is heavily based on Ed Wagner's chronic care model. We have a prepared, proactive team and an informed, activated patient. All the systems and the terminologies in the big balloon up top are how you organize the health care system. Because of time I won't go into these. Hopefully, many of you are familiar with it.

The critical part is that you don't get to the improved outcomes unless you have a team-based environment and an engaged, activated patient. ACP put forth our paper in January 2006, called The Advanced Medical Home. It is a terrible term. When you talk to patients, they think it is one step away from hospice care or the funeral home. On the other hand, what we are trying to do is link it to the literature in pediatrics so there is a genealogy for it.

When we started talking about it, we started talking to employers. We were actually approached by two gentlemen from IBM, Martin Sepulveda and Paul Grundy. Martin and Paul made the rounds to the American Academy of Family Physicians.

They met with us at ACP and said, we really like what you are talking about, this medical home concept, or the advanced medical home, or the future of family medicine, or the medical home that pediatricians talk about. In fact, we like it so much that, as a global company, we buy this kind of health care in other countries. We have a hard time finding it here. If you can put your ideas together on one or two pieces of paper, we will go around and bring in the largest employers in the country and the payers. We will start working together to try to reform the health care system based upon these ideas.

That led to the joint principles, which were released, actually, in March of 2007. They formed part of the basis for the Tax Relief and Health Care Act at the end of 2006, which authorized a demonstration project under Medicare for the medical home.

You can see it is a personal physician in a physician-directed medical practice of nurse practitioners, PAs, and other colleagues. This is a team-based practice. This came from physician organizations, but we want to emphasize it is a team-based model.

We talk about taking care of the whole person at the point of care, either coordinating the care when we don't provide it directly, or providing it directly, where appropriate. If we don't take care of quality and safety while we are doing it, it is for naught.

Enhanced access to care probably should be at the top of this list because, if you look at any of the data from the Commonwealth Fund, if you improve access to health care, health disparities start to disappear. I think access is critical, which becomes more important now when you look at work force data.

When we started talking to all the employers and the payers and others about this, pretty much they started telling us it sounds like mom and apple pie. This is the kind of care we thought we were purchasing. This is the kind of care we would like to purchase. We

said, that is great, but unless you change the payment system this will never be sustainable because right now the payment system doesn't create this kind of health care system. I'm going to talk a little bit towards the end about payment models.

Another way to look at this is the patient-centered, physician-guided care through the levels of the physician, patient, family, community, especially with the previous speaker talking about the impact of community on health.

On the other side, you have the practice team, the integrated delivery system, or, again, since the vast majority of ambulatory care visits are provided in physician offices of one, two, or less than five physicians, you have to talk about virtual teams. That whole list of folks I had a couple of slides ago, they are not going to fit in the four walls of most practices, so you need to figure out how to create a system whereby, when a patient needs those services, they are readily accessible and coordinated across all the different domains where we receive care.

This is another way to look at it. Again, here

is that list on the left. I want to emphasize that this also includes care givers, both formal and informal, the immediate family, extended family, and the community.

I worked for a community health center as chief medical officer and saw patients, and of course, trying to educate them about self-management and exercise was a challenge because many of them lived in neighborhoods where they couldn't exercise outside after certain hours, especially in the winter. Trying to figure out all the impacts of society on them was important, and remains so.

We started talking about the model. Those who would pay for it said, that is great but we are not going to put another dime into anything unless we know what it looks like and can point to it so I know one when I see one, and so forth. The National Committee for Quality Assurance had a model out there called the Physician Practice Connections. We worked with NCQA over several months and refined their model to develop the Physician Practice Connections for the Patient-Centered Medical Home.

There are nine domains. This is now a recognition process. It doesn't define the medical home.

It is a way for us to tell whether a practice has the ability, the capacity, and is doing some of these things right now with the idea that, in the context of a medical home demonstration project, we will be able to see how they are doing on quality, cost, efficiency, patient experience, and satisfaction.

I'm going to describe to you a level one medical home, but I want to remind you that this is not the definition of a medical home. The joint principles are the definition of a medical home. People get locked into this check box NCQA recognition process.

There are three levels of the medical home, based upon a point score with increasing complexity. Just tying this back to the payment model for a second, the idea is that the payment model will help practices move along the trajectory from a level one to level two to level three. As they increase their level of services, the payment will actually support that. The incremental cost to the practice will exceed the incremental costs.

I will talk about a level one practice. This is one way you could achieve it. This practice has to

develop timely access and communication processes. That means they have to have policies that say, we are going to see a patient when they request to be seen within a certain amount of time. When they call us and they want a lab result, a referral, or a prescription renewal, this is what our policies are.

The NCQA recognition process says, show us your policies and that you are following your own policies. It doesn't dictate to the practice. Of course, we all have general ideas of what those policies should look like, so anything way out of bounds will probably get picked on.

Whether you are an electronic or a paper-based practice, you need to organize your charts. I don't know how many of you clinicians have worked with electronic health records. I have worked with paper and electronic and have gone to lots of different practices. I can tell you I have seen very well organized paper-based practices and very disorganized electronic health records at "enabled" practices. That speaks to the challenge that Dr. Blumenthal has in the ONC with this roll-out of meaningful use.

The idea is that the charts reflect the kind of care you are going to provide. We track age-appropriate conditions and have evidence-based guidelines built into our tracking and the documentation processes.

Among the population we identify the three most important conditions for which we want to make sure we are doing the best care possible. It is not that those are the only three conditions, but as a proxy for better processes throughout the whole practice, show that you are following three conditions within your practice. If you are a geriatrician, those are going to be very different than if you are an HIV specialist or a pediatrician, but pick for your practice.

The right side of this diagram is encouraging and providing support for patients and families, addressing health literacy, and tracking tests and referrals so that what goes out comes back. That would sound like a good practice anyway, but you probably would be surprised at how poorly that typically gets done.

If you do all this and you are not looking at the data to make sure you are doing better, then it is not really quality improvement. The idea here is, a

practice is going to reflect upon itself, look at the data they generate, look at each of the practitioners within their practice, and determine if they are actually improving.

This is a level one. When I have talked to lots of different audiences, I typically ask the groups of physicians how many of them feel like they are practicing to a level one. Usually, very few raise their hands. When you ask, can you actually achieve this, most of them feel with some help and support they can get there. Then I ask, and I will ask this crowd, how many of you as patients go to a practice that is organized in this manner, to your knowledge?

[No response.]

DR. BARR: The challenge here was to define the level of a practice that was distinctly different than what we typically experience but not make it so challenging that we would disenfranchise all those practices out there. I think there are some challenges here, but for the most part we are talking about things that are achievable even by small practices.

Key points. It does not require an electronic

health record at this first level. Obviously, as you add more and more functions, needs, and attributes, it becomes much easier to have an electronic health record than it does to do this on paper with stand-alone databases.

It will require registry and tracking functions. We need to look at those patients within our practice that have specific needs, like diabetics, patients with congestive heart failure, and chronic obstructive lung disease, and follow those appropriately.

The emphasis in level one is looking at access, organization of the office, structure, processes, and so on. The idea is to form the base or the platform upon which you can build more and more features of a medical home.

Moving from level two to level three, advanced access options for patients. Now you start doing Email, personalized health records patients can access through a patient portal, more and more complex care coordination, population management, advanced reporting, technology solutions, and clinical decision support and guidance.

I just picked one definition. Clinical

decision support systems link health observations with health knowledge to influence health choices by clinicians for improved health care. In the context of providing information around genetics, genetic screening, counseling, and all the issues that this group is working on, this is an opportunity that I don't think currently exists to really put that information in the hands of clinicians, especially primary care clinicians at the point of care.

We are talking about point of care and evidence-based guidelines with the newest, most important information they need so they can use it when it is appropriate.

In the interest of time, not that I haven't been going slowly, but I'm going to go even faster through more features of the medical home. We use everybody to the highest capability. One of the challenges is that people aren't practicing to the level of their license, skill, and ability. We try and train practices to let everyone practice to that level and no lower, so that you are taking advantage of everybody on the team. It is a good way to practice. It is also good

in terms of personnel management so people are satisfied with what they are doing.

We also talk about cultural competency training and health literacy and broader and more vigorous connections to community and available resources. Many practices are blind to what is happening around them and don't make those kinds of connections. Frankly, in the busy day of a volume-incented practice, it is hard to do that.

There is also self-management support and getting feedback from the patient's families in an advisory group; providing written care plans, assessing barriers to adherence to those care plans, and trying to help patients and their families overcome them; and managing transitions of care seamlessly.

A couple key points, though. It is not a gatekeeper system. Many of our physicians and clinicians, when they hear this and then I talk about the payment model, which is the next couple of slides, start thinking that this is a managed care redo. Basically, this is to facilitate care. This is to help patients find the appropriate care on an appropriate timeline with

the appropriate information and engage in their own care.

We have been talking to ACP. About 45 percent of our members are subspecialists of internal medicine, so we talk with ourselves. What is it like to be a subspecialist and engage with the medical home. We are working on different models. One model is, some subspecialty practices may very well be great as a medical home. Think about an infectious disease specialist taking care of patients with HIV. If they are providing all the primary care and all the care coordination, why not.

Think about a nephrologist who is taking care of patients with end stage renal disease. He or she sees them three times a week on dialysis, if they are on dialysis. They are taking care of all their acute illnesses. If they were able to provide all the appropriate care, why not.

The other idea is, if we create really robust primary care but our subspecialists and other specialties aren't really as well organized, we have missed half the battle. I don't particularly care for this, but people are starting to talk about the medical home neighbor or

neighborhood.

So, strengths and weaknesses. You have this graph in the slides, if you picked them up, so I'm not going to spend a lot of time here, but I want to look at the threats in particular. There is a perception that this is a zero sum gain because to support this we need to pay more and we need to pay differently. The idea is, where is all that money coming from.

Obviously, there is a lot of excess and waste in the system. Just look at avoidable hospitalizations, readmissions, emergency department usage, imaging, and all those kinds of things. If we are able to cut some of that out and reinvest it, then it may not be completely a zero sum gain.

We talked about the work force. Many of our colleagues feel overwhelmed already. Layering on new requirements and a new recognition process turns them off immediately. Our challenge is to help make the systems available to them so they can go through this process.

Then, we have a consumer challenge. People don't like, as I mentioned earlier, the medical home concept, but when you start talking about what it really

means and what we are trying to create, it actually does get their interest. So, we have a communication and education issue. Just like anything, we can predict our intended consequences, but we always know there will be unintended ones.

Payment models. We have three different buckets to start with. There are many different models to consider, but let me go over these three. On the left side, you see the traditional fee-for-service. You enhance the resource-based relative value scale so that those codes that doctors use when they see patients have better value. Some things are under-valued and some things are over-valued, so we are talking about revaluing them appropriately.

Then there is potentially an add-on code. If I'm a recognized medical home and I have gone through that NCQA process, every time I see a patient, let me check another box. The problem with that is it just continues the incentive to see the patients. You only get paid when you see them.

To your far right is global payment. Let's take a look at a primary care practice given set amounts

of money to take care of these patients and then pay them additional for certain procedures. The challenge with that is getting to the right number and having some risk associated with it.

The middle bucket, which is the one that ACP has been advocating is a blended or hybrid model. You preserve fee-for-service and revalue it as I described earlier. You add a prospective payment that takes into account the medical homeness, where they are on the scoring of the NCQA, and risk-adjust it for the patient population they are seeing. If they are seeing a highly complex, elderly patient population, they get a different payment than they would if they are seeing a worried well population.

That becomes a prospective payment they get that offsets the cost of the investment in the technology, the non-face-to-face care, the care coordination, the Email visits, all the things that we would like to see done but are not reimbursed in the current system for the majority of clinicians.

All of these have an element of performance-based compensation. We think some of the best models of

that would be a shared incentive. If we all do better, we share in the savings and it gets reinvested in the system.

This is the model that many experts we have surveyed like, the blended modified fee-for-service and bundled per-patient payment system.

For our colleagues who are not medical homes or subspecialists but do some of these services, if we really, truly value care coordination and the exchange of information, we should pay for that wherever it occurs. The concept is here on an ala carte basis.

Think about an oncologist who is not really a medical home. They haven't gone through the recognition, but for that episode of care they are doing all the care coordination for somebody with a malignancy. They are taking care of the radiation therapy and the surgical oncologist. They are doing the chemotherapy. They do the home care. All those things we should be paying for because that is good care. The idea is that those ala carte codes, which would be rolled up into a prospective payment for the medical home, get paid on an as-necessary basis.

This payment model moves away from the volume-driven, episodic fee-for-service system and supports the valuable yet currently non-reimbursed activities as I have described. We hope it would align incentives, so we have built these systems of care for the benefit of the patients.

The last two slides show, as you look at other payment models, the criteria which we, ACP, feel we should be looking at. It should support specific policy objectives to ensure accuracy, predictability, and the appropriate evaluation of physician services. It should have increasing value. It should be supporting patient-centered care and patient engagement in shared decision-making.

One of the challenges is that clinicians in the current environment don't have the time and space to engage in these conversations with their patients. They don't have the tools or the resources. The idea is to make the space and the time and pay for that time, because when they are doing that they are not doing the visits, which is the only way they currently get paid.

I will let you scan the others. Align

incentives, encourage optimal number and distribution of physicians in the work force. I would broaden that to say all care givers, all clinicians. Talking about physicians alone can't satisfy this. We need the nurse practitioners, physician assistants, midwives, the whole range of clinicians who can provide services. We need to have a smart work force policy.

Technology is going to be critical. It is necessary but not sufficient. You can spend a lot of money paying for ones and zeros and electrons and not get good health care, so it is important that we do this in a smart way. I think we are on the right trajectory, but there is a lot of money that is going to be spent, so we need to make sure it is spent wisely.

Practices differ. What we do needs to be customized for the practices, even though we have an ideal we want to aspire to over time. We think that one of the big challenges in practice and one of the disincentives for people who go into primary care in particular, are the administrative hassles.

As we are building recognition programs and looking to make sure these practices are built to do this

kind of care, we need to start thinking about relaxing the administrative burdens that they manage because that is actually one of the reasons why many of them don't go into primary care in the first place. They see the harried, hassled internist in an office with no gadgets or gizmos just thinking and seeing patients, and that is not ideal for most of them.

Performance measurement is critical in whatever you are looking at. These are just some of the principles from the AQA Alliance that I just took. Measures should be reliable, valid, and based on sound scientific evidence. They should be selected from where there has been strong consensus. They should be appropriately risk-adjusted and stratified, and they should reflect a spectrum rather than a single dimension of care. If you are looking at performance measurement, that is the ideal.

As we put in health information technology and reformat performance measures that now cannot be collected from an electronic health record, we need to think about how we would roll these up and actually use these. We need to reflect them back to the clinicians

who are treating the patients when they are seeing the patients so they have a dashboard. Right now, this is an impossibility, based upon the current level of technology and the current design of performance measurements. This is ongoing and people are working on it, but I think that is the future.

So, in short, we are talking about a commitment to excellence. We are talking about patient-centered communication and care, involving them in their own care, providing the access to care, which, as I have already said a couple of times, helps remove health disparities.

Talking about implementing electronic health records or health information technology in general in its broadest description, I think we need comparative effectiveness research and evidence-based guidelines at the point of care, getting people the information they need, both the patients and the clinicians, so they can make decisions together.

If we don't measure, improve, and then measure again, we are not going to continue this cycle of improvement. There has to be broad transparency and accountability. That is part of this. At the very end,

of course, if we don't create a safe health care system, we haven't done anything.

So, in 20 minutes or so, I gave you the broadest perspective I could on the medical home, health care reform, payment models, performance measurement, and health information technology. I will stop right here and invite your questions. Thank you very much.

DR. TEUTSCH: Thanks, Michael.

[Applause.]

Question-and-Answer Session

DR. TEUTSCH: I'm sure the Committee has some questions about how genetics and genomics fit into all of this.

DR. WILLIAMS: Very impressive presentation, and very welcome. The thing that I was particularly interested in seeing was the thoughtfulness around the idea of the specialty medical home. This specifically relates to genetics because we have a very unusual position in the medical organizations in the sense that we are a primary medical specialty but we are looked upon as being super-subspecialists.

A lot of us in clinical practice are taking

care of very complex patients with very rare genetic diseases. We struggle with this issue all the time of how do we have an interaction with primary care physicians. There are some that say, I just want to be the consultant. I want to make the diagnosis and then send them back. There are others that would want to adopt much more of a medical home.

So, I guess the point is that if you are looking to talk with someone outside of your specialty organization, i.e. subspecialists within internal medicine, I think the American College of Medical Genetics and the American Board of Medical Genetics would be excellent partners to address some of the issues of the specialty-based medical home.

DR. BARR: That would be excellent. I would welcome the discussion.

DR. FEERO: This is not necessarily a genetics question but one I have been dying to ask people about the medical home, so I'm just going to ask it. The bottom line is that the AMA came out with a statement that said that primary care clinicians and other thought-based service providers should be being compensated more

but that they would not endorse it if it was a zero sum gain.

I wonder, in the current environment, if it isn't actually worse than a zero sum gain. The issue is not really reduction in what we are going to be getting in order to keep things from becoming completely derailed.

I'm just curious how the ACP envisions the bottom line coming out correctly with this type of model.

DR. BARR: That is the big question. What we have called for clearly are demonstration projects to look at where the savings are in the model. We can hypothesize. We can look at data from other countries or look at demonstrations here in the United States, some single-payer demonstrations or health system demonstrations like Geisinger or Group Health. You see where they are saving some money. They are saving on readmissions and hospitalizations, unnecessary procedures, and imaging.

The question is, is that going to be sufficient to fund this model. Some of the things I have talked about are going to cost more. It is not just that we

will give them more at no additional cost. It is going to shift some payment and actually cost more to do some of the appropriate screening and all those kinds of things.

I think there are some unknowns in this model, and that is why we have been calling for a demonstration project in assessing it. That is why it has been difficult to score it when we do the legislation.

No doubt, though, there will be some shifts, unfortunately. There are a lot of overvalued codes. For example, the whole relative value update situation, where you have things that come in, get appropriately valued early in their life cycle, and as certain procedures get easier, they never lose their value. They just stay, and they are adding more and more procedures. So, overall, there has been a devaluation of certain cognitive codes.

I don't think the solution is just around the medical home. It is going to take multiple different ways of looking at how we pay for health care to get to the point where it is equitable and patients are getting the care they need. Frankly, some of the payments that some specialists get, both internal medicine

subspecialists and others, probably are going to need to be looked at across the board. That is not a very specific answer, but general.

DR. RANDHAWA: Continuing the line of thought here, when we think about paying for performance, one of the challenges you have, especially in the primary care setting, is paying for counseling that is effective, be it for tobacco smoking cessation or diet and exercise. I can imagine the same issue would exist for genetic counseling, owing to the time it takes to actually understand the risks and talk about the future steps.

Has there been discussion about how to orient that and make that more a part of the pay-for-performance?

DR. BARR: I am not aware of any specific discussion around genetics and counseling and pay-for-performance. I think the broader question is, again, what I said earlier, how do we make the time and space in the practice to do any kind of counseling right now, or any kind of screening, for that matter.

If you think about where we fall short, we are doing a lot better on tobacco, but think about depression

screening. Think about any kind of real common guideline now that we are supposed to be doing. Frankly, look at the data in terms of mental health. Take it out of the current context. If I'm a physician in a busy practice, when I screen for depression, if I find it, now I have to do something about it. We know the data, that it is very hard to find a mental health professional.

I would love to talk to Marc, for example, and say, if we start encouraging and engaging primary care physicians on doing the genetic screening and the kind of things that you would recommend, we need to figure out how do we get them to the right people at the right time so that we both get paid for the services that we are rendering, because that is in the patient's best interest.

MS. DARIEN: I want to take one step back from genomics and genetics. Your headline there is "Patient-Centered Care." Some of it may be that I am a cancer survivor and work with the cancer survivor community, which is a slightly different patient population, but you said earlier that patients didn't necessarily accept the model and didn't accept the name. I would think that

they would accept the concept and the model but the naming might be the issue, not the concept. It is how the concept is described.

Have you talked to patients about the model and the concept?

DR. BARR: Yes. When we describe the model to folks, they like the model, they don't like the name. It is exactly as you said. Folks at the Stroger Center have done some research with consumers on the names, ideas, and brochures that are being developed. So, yes, absolutely, we understand the challenge. I would expect that if it is a proven model that some of the names will change as others pick it up.

The concern we have, though, on that particular point is, as other folks "test" the medical home, it becomes something different to different people. Within the last month or so, the same four professional societies, the American Academy of Family Physicians, Pediatricians, Osteopathics, and ACP, released guidelines for medical home demonstration projects. It is not that we want to enforce anything, but at the end of the day when we look at demonstration project results, we want to

make sure we are comparing as best as possible apples to apples.

Active engagement with consumers has been occurring. ACP is not the leader, the consumers are. For those of you who are not familiar with the Patient-Centered Primary Care Collaborative, that is an organization of about 500 organizations that have committed to the concept of redesigning primary care payment reform, and consumers are very vigorous participants. So it is an opportunity, Gwen.

DR. TEUTSCH: Last one, Sam.

DR. NUSSBAUM: Michael, first of all, we are pleased to work with many other health plans and support your initiative in the patient-centered medical home and the demonstration projects to show outcomes value and what we hope will be better care and affordability.

I was struck, as you so comprehensively reviewed the NCQA levels, that there wasn't more discussion about wellness, specifically health, counseling, and areas that are going to be very important in optimizing wellness, health, and care for the future, including genetics. I know there has been a focus on

chronic illness in the Wagner model and there has been a focus on communication and the infrastructure, but I wonder, as you go back and look at that, is that something that we could modify going forward?

It just strikes me that that big element is absent, and it is a very key element, I think, in what the informed primary care professional can do.

DR. BARR: Great question. The answer to your question about NCQA and the recognition process is that we always understood that it was something that is going to evolve over time. As I said earlier, we know we haven't gotten everything right. In fact, the four professional societies only endorse the NCQA tool for testing purposes, without understanding.

Some of the criticism, in addition to what you just raised, is that there is nothing about patient-centeredness in the original model. In fact, if you think of where it came from, it came from Physician Practice Connections, which is really mostly about health information technology.

The professional societies added and emphasized certain things within that model with the idea, again,

forming the base of the pyramid, understanding that other things need to be layered on. As you get deeper into the model -- and I didn't put all the bullets in -- there are some issues about care transitions, coordination, communication, and counseling with others, but I think you have hit on what we need to build into it.

The other part is that we always envisioned this being in the context of demonstration projects which would measure some of those elements. So, clinical process and outcome measures, the patient experience measures, those things can't be built in a priori in the NCQA recognition tool. They really have to be measured in a retrospective look. Did this practice really perform like a medical home.

Having said that, there is probably somewhere in between where we can revise the NCQA tool, perhaps collect data at the beginning so we have some idea that this practice really is performing that way, and then continue to collect data to make sure they are, because the payment needs to be appropriate to what they are doing.

I'm not sure it is public, but the NCQA has a

process now where they are taking recommendations from many stakeholders to revise the NCQA tool for the medical home with a one- or two-year time horizon. It takes that long to get it through the approval process. So, thank you. Great comment.

DR. TEUTSCH: Thank you very much, Michael.

DR. BARR: My pleasure.

DR. TEUTSCH: This is important work. Obviously, you can tell by the general questions that you are getting that there are a lot of basic things here that people relate to. We look forward to having some interaction and seeing how, as this model emerges, the world of genetics, genomics, information management, and clinical decision support fits into it. Thank you very much.

DR. BARR: Great. I welcome any questions by Email. Otherwise, thank you very much.

DR. TEUTSCH: Thanks for coming.

[Applause.]

DR. TEUTSCH: We are going to go ahead and take our lunch break. Those of you who ordered boxed lunches, they are just outside. If not, the cafeteria is just

down the hall. We will regroup at 10 of.

[Lunch recess taken at 12:10 p.m.]

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A F T E R N O O N S E S S I O N

[Reconvened at 12:55 p.m.]

DR. TEUTSCH: Good afternoon. Let me introduce Dr. Nelson, who is the director of the Johns Hopkins Sidney Kimmel Comprehensive Cancer Care Center. He directs a research lab focusing on discovering new strategies for prostate cancer treatment and prevention.

He is also chair of the National Cancer Institute Translational Research Working Group, which reported its findings on how to reengineer cancer therapy development to the advisory board in June of 2007.

We know this has been an area where genetics has been put to great use and where there is a lot more to come, and we are very interested in how you think all this can fit in with the future of health care and health reform. Welcome.

The Impact of Genomics on the Future of Oncology

William G. Nelson, M.D., Ph.D.

[PowerPoint presentation.]

DR. NELSON: Thank you for having me here this afternoon. What I would like to do is talk indirectly about genetics and epigenetics to give you a sense for

its already growing impact on cancer medicine at the practice level.

I will say a few words about cancer medicine research in 2009, talk about how rapidly we are moving towards personalization of cancer care, and give you a flavor for how it is really genetics and epigenetics driving that movement.

What is the scorecard for cancer care right now. If you look at age-adjusted mortality rates, what is quite exciting in many ways in my business is that, over the last decade and a half, we are starting to see slow but steady progress in the large scorecard, which means we are finally making progress against the very common cancers that people get as they get older: lung cancer, breast cancer, colorectal cancer, and prostate cancer.

Of course, many of you recognize that a lot of this is driven by declines in lung cancer. That is fairly attributed to declines in smoking, most of us believe, but the improvements in prostate cancer, breast cancer, and colorectal cancer are in fact improvements in cancer treatment.

Of course, what is difficult for us is that the treatment benefits to individual patients are very uneven. Some people with breast cancer, colorectal cancer, and prostate cancer enjoy spectacular improvements in morbidity and mortality as a result of treatment. Others just plain do not. Some of this has a genetic basis, both in the germline and others, in terms of acquired genomic defects.

So, where are we. One in two men and one in three women develop cancer in their lifetimes, 1.5 million cases, 500,000 deaths, and most importantly, we are going to be treating a lot more cancer as we move forward. The baby boomers hit 60 years of age a couple of years ago. Most cancer in this country is diagnosed after the age of 55. This is a chronic set of diseases among people as they get older. We are going to need to be delivering more and more cancer care in the future.

The cost is spiralling, like the rest of our health care system, but if it is going to be the number one disease we are going to treat, it is going to drive the spiraling over the years. I think quite a reasonable point that people have made in the last few years is that

many of our cancer drugs, particularly the ones discovered in the last decade or so, are exorbitantly priced. We are going to have to figure out a better way to develop these drugs, distribute them, approve them, and allocate them than we currently do.

Let's think about genomics, genetics, and cancer. Obviously, the sequencing of the human genome had a great impact on genetics, which most of you are quite familiar with, but a spectacular impact on cancer biology and cancer research as well because cancers are, at their fundamental essence, diseases of acquired genetic, genomic, and epigenetic defects.

Of course, that has generated lots of new technologies particularly used for profiling in cancer cells and, we believe, unprecedented opportunities for the discovery of molecular targets that we can use to design treatments and biomarkers for detection, screening, and diagnosis.

Of course, in our business this has greatly augmented public expectations, I can tell you, and even with these gains and improvement in survival, we still see essays that we are not winning the war on cancer and

the like. It has, as I mentioned, seemingly increased cancer care costs.

Now, many of you are familiar with this formalism for medicine that I first heard from Lee Hood when it had only three Ps. As a result of mission creep, more Ps are appearing all the time.

I trained at a time when the great internal medicine doctors made differential diagnoses based on a physical examination and a history and had a morphologic understanding of disease, and medical students still took gross anatomy. Of course, by the time we recognized the disease present with that strategy, it was because of major organ dysfunction. We found, particularly for the chronic diseases, that we could arrest or attenuate disease progression but we couldn't restore normal organ function, so we had high financial and disability costs associated with this.

The fantasy, of course, is that we are going to develop a medical system that intervenes before symptoms appear, preserving health, if you will; have a cellular-molecular understanding of how disease works; and it will give us this great opportunity for improved efficacy and

efficiency, giving us all these Ps.

I can tell you this is already happening. I'm a prostate cancer physician, as you heard. More than three-quarters of the men diagnosed with prostate cancer these days never, ever have a symptom or physical finding of their disease. They never do. The 15 or so percent of men with prostate cancer who die of the disease spend 10 to 15 years before ever having a symptom or physical finding of the disease. So this has already happened. This isn't the future. In fact, it is rapidly becoming the past.

The largest single challenge, I believe -- this is a personal view -- to our field is in new treatment discovery and development. Here is a reasonable sense of the discovery, if you will, and development of all drugs, particularly anti-cancer drugs. What is alarming in the anti-cancer business is, as we are using genetic and genomic technologies to look at the defects in cancer cells leading to the nomination and credentialing of molecular targets, what we have is a process that is horrendously inefficient.

If you go to the PhRMA website, they list 861

new chemical entities in clinical development for cancer in 2009. These aren't repurposed drugs. These are brand new drugs. We approve one or two a year, in a good year. It leads to an incredibly high development cost, more than $1 billion per approved drug, mostly because you are paying for the ones that didn't work out and a very long development time.

The problem with the anti-cancer drugs is that we tend to get all the way into clinical development before we decide that they work or do not work. Half to three-quarters of anti-cancer drugs in clinical development fail at phase three. It is a very expensive proposition to take an anti-cancer drug into clinical trials.

This was the purpose of the Translational Research Working Group that Steve mentioned. If you look at this process flow, these were the work products that the working group generated in the report. You can summarize it if you target pathway discovery, credentialing, this drug discovery business, which has become quite rapid and efficient, and preclinical drug development.

What is new is that there is increasingly use of biomarkers that will aid and speed up the process, and many of these are in fact genetic or genomic-type biomarkers, particularly the risk stratification ones. We are moving from what was a very inefficient drug discovery and development process.

Remember, for many years most of our anti-cancer drugs were cytotoxic drugs discovered by screens of the Amazon Rain Forest and the like. These drugs, I can tell you, the more you put into a cancer cell culture dish, the more cancer cells you are going to kill. So, the clinical game was how much could you put into a person that they could possibly stand.

You would do a development strategy like this. Your phase one drug development is, you give more and more to populations of people until they can't stand it. You walk out with the maximally tolerated dose, which is just what it sounds like it is, and have some sense for what goes wrong when you get up to the dose-limiting toxicity.

At that point, you moved broad-based into every cancer you could afford to try and treat, because you had

no clue which cancer it was going to work in. If it happened to work in ovarian cancer, the next question you would ask is, is it better than the best we already have for ovarian cancer. It was an incredibly expensive, incredibly deliberate kind of drug development and discovery process.

Look what we are moving toward now. In fact, I would argue that at most commercial drug development houses this is already done. We go into a trial now and we use genetic and molecular biologic markers for two things. The goal of the phase one-two kind of trial is to determine the optimal biologic dose. We are now interfering with the molecular target. The notion is that any more drug than is necessary to inhibit that target will only give side effects and can't possibly be beneficial, so we need a molecular biomarker of pharmacodynamic action.

The other is, we are only going to try the drug in the cancers where we think it has some chance to work. This is often, and most often in fact, using a molecular biomarker of risk, which will ultimately become the indication. This is usually a somatic genome defect

assay. Then you get to comparative efficacy.

How did this work. We can look at an example that is familiar to all of you just to show you how this works. This is the targeting of the Bcr-Abl gene rearrangement and the product of that rearrangement. It took us a very long time to figure out that this was an enzyme that was generated by a reciprocal translocation.

Peter Knowle [ph] described the Philadelphia chromosome. Janet Raleigh [ph], one of the great women in our field, figured out that was a reciprocal translocation. Carlo Croce [ph], in the era of Southern blots and lab array screening, cloned the breakpoint, and Owen Whitty [ph], David Baltimore, and others, figured out that this was an enzyme. Enzymes are very attractive small molecule targets because they can fit into a crevice in a molecule and interfere with its function.

There was actually a little lag that probably didn't need to occur, based on the thought that the enzyme transferred a phosphate from ATP to a protein, as does a third of the genome, or something. The thought was, you couldn't develop a selective small molecule. It would interfere with all kinases. Brian Druker [ph] and

my old medical school roommate, Charles Sawyers, believed that you could and were very vigilant. They steered Novartis and their drug discovery apparatus to test Matnip [ph] for chronic myelogenous leukemia. Matnip, it turns out, fits into this crevice, prevents the movement of an application loop.

I show this slide only to tell you that the ability to discover small molecules that interact with proteins is astounding at this point, not the limiting feature anymore.

My point was going to be, look how they took this into clinical trials and look at the properties in terms of cost and time efficiency. They were not going to use this drug for anyone who did not have CML in a Bcr-Abl gene arrangement, a gene test. Similarly, they were going to dose the drug up to the point where they inhibited the kinase, the pharmacodynamic endpoint.

Look at this phase one-two trial. You can see, as they increase the dose, they begin to inhibit the kinase, and they already, in this group of people, the targeted population, have astounding clinical responses. This drug was FDA-approved on the basis of this trial, a

phase one-two trial, so compelling was the evidence that it worked.

The opposite would have been true, and this is my major point. If it didn't work here, you would stop. You wouldn't take it to more and more people to see if you could eke out a little bit of a response.

That is, many people believe, as close to a single-gene defect disease as we have in oncology. What about the big solid organ cancers. What are we dealing with. What have we been dealt. Burt Vogelstein [ph] and many others have been sequencing away at common cancers. You can see here in colorectal cancer the distance along the chromosome here, chromosomes there, the heights of these peaks where mutations are, the fraction of cases that have the mutation giving colorectal cancer and breast cancer.

The scorecard looks something like this: 60 to 80 driver point mutations, 20 or so driver homozygous losses and/or amplifications. That is what you are dealt. They seem to cluster in families that are parts of molecular pathways, and that is a reduced complexity. There is a lot of heterogeneity case to case.

The first yield of this ought to be better ways to detect and diagnose cancer, and I'm sure it is going to be. Here you see something that Burt Vogelstein and his group have done using emulsion PCR. Actually, it is probably the beginning of this. They call it molecular BEAMing. It isolates a single molecule so you can study it. If it is mutant, you can detect it.

Here is the key. In stage one, two, three, and four colorectal cancer, they find mutant DNA that could only come from a cancer. They don't see this in anyone who is healthy and normal at this frequency where there is other DNA shed in the stool. This is among human DNA.

Could something like this serve as a resource allocating tool. If the negative predictive value of a test like this were high enough, then you might be able to say that this person doesn't need a colonoscopy this year. A colonoscopy is going to be far more expensive than a test like this.

Many of you are aware that the recommendation is everyone aged 50 get a colonoscopy. If we did that, the price would be very high, so what we have is disparities in its application and use. We might be able

to reduce disparities, improve the efficacy, and improve safety by using a genetic kind of test tool.

That is genetics. Epigenetic defects are probably present at least ten-fold greater in number in any given cancer cell. The genome footprint of this that you can use genomic technologies to test are differences in DNA methylation. There are areas that are typically not intensively methylated where CPGI nucleotides are clustered. Cancers often have genes inactivated by a methylation change that results in heterochromatization, for all intents and purposes.

Look at how this can work to refine staging. Staging in cancer is the dominant way treatment decisions are made and thus resources are allocated. This is stage one lung cancer. This is work by Malcolm Brock and his colleagues. What they did was take the lymph nodes. A pathologist does not cut all the way through the lymph nodes and look at every piece and nook and cranny. They look at a couple of slices. They take the rest of the lymph node, grind it up, and say, can we see the cancer change in DNA in this lymph node. It is a more sensitive way to see it.

All these had histologically negative lymph nodes. If they were DNA methylation-negative, they did much better in terms of recurrence-free survival and overall survival. If you saw cancer DNA in the lymph node, even if you didn't see the cancer cells, they did much, much worse.

Our inclination at this point, before these data arise, are to do randomized trials of adjuvant therapy. Chemotherapy and the like is probably a $20- to $50,000 course of treatment for all these people. It is clear that these people need it much more than the others do. You can imagine this could serve as a resource-allocating and treatment decision-making kind of tool.

The other is to anticipate which kind of drugs work. This is an example. There are genetic and epigenetic examples of the same thing. In brain tumors, the active agent is a drug called Temozolomide. It actually assaults guanine bases. There is an enzyme called O-methyl-guanine-methyl-transferase that will repair damage caused by Temozolomide. For reasons that aren't completely clear now, many brain cancers have inactivated this enzyme, thus they are more likely to

respond in a beneficial way to treatment by Temozolomide.

You can do a test for this. Brain tumors are devastating diseases for anyone, but what you can see is you do far better upon treatment with Temozolomide if you have this repair enzyme inactivated. In fact, if you don't have it inactivated, you might as well not have even taken the drug. You should get a different treatment. So this is, again, a treatment decision-making, resource-allocating tool.

Remember, I have been talking all about somatic changes. Pharmacogenetics are still going to be in play for all diseases you have been talking about so far. Look at this logic. Tamoxifen is a very commonly used and relatively, at this point, inexpensive drug to treat breast cancer that requires estrogen for its growth. It turns out Tamoxifen is probably not the active part of this drug. It is metabolized by P450 and other enzymes ultimately to this compound called endoxifen, and that is probably the active agent.

It is interesting that this metabolism, in at least two different routes, requires the P450 enzyme CYP 2D6. Like many metabolic enzymes, this is highly

polymorphic in its distribution throughout the population. There is a small fraction, 7- or 10 percent or so, that are effectively, for our purposes, homozygous null for this enzyme.

Look what happens. If you take a randomized trial for breast cancer in which aromatase inhibitors were shown to be better than Tamoxifen -- remember, there is at least a 20-fold increase in price -- let's look at this more carefully. Let's look at what happens in Tamoxifen if you are effectively homozygous null, heterozygous null, or wild type for this enzyme. Look at this. If you are wild type for this enzyme, there was no benefit to the aromatase inhibitor. Tamoxifen was just as good.

In fact, I will take you a step further. The aromatase inhibitor prevents the production of estrogens. The major side effect of this, in addition to hot flashes and the like, is you have osteoporosis and bone loss. Tamoxifen doesn't cause that. In fact, it treats it.

So, look what you have here. By a genetic test, perhaps, you can increase the safety of treatment.

Women who don't need an aromatase inhibitor can get treated with Tamoxifen. You can increase the efficacy of treatment. These women should not take Tamoxifen. They should get an aromatase inhibitor. It is going to be more beneficial. By allocating expensive and inexpensive drugs more logically, you can reduce cost.

I would argue that triple ripple is hard to get to: improved safety, improved efficacy, and decreased cost. That is what genetics has the possibility of doing in cancer medicine.

You know this quite directly. The power of the genomic industry that has been launched is astonishing to me. You have heard already about somebody floating around offering a $1,000 genome. It is going to be a little more expensive to do cancer genomes because there are many more screw-ups in the genome to go after, but our ability to do this is going to rapidly improve. This is much faster than the microprocessor revolution, as you know.

Having said that, it has created a different problem for us that we have spent a lot of time working on at Johns Hopkins. We happen to have a great

information technology asset and resource and engineering resource, but our sequencing efforts by Burt Vogelstein and the like generate more than a terabyte of data every quarter. That is just on a research basis.

You have heard already that one-third of all storage of information is going to be medical imaging. This has the potential, of course, to overtake and swamp that. We have had to design entirely new architecture of servers and whatnot. With the next-generation sequencing machines, as you know, no one even stores the primary data. That is like a biostatistics foul of the highest order, but you can't. It is just too large. We are going to have to think about the way we allocate those resources, as well.

What I have tried to show you in a reasonably quick way is that both germline and somatic, genetic, and epigenetic information is going to impact cancer risk stratification screening, early detection, and the like. These new biomarkers are going to be tests that will improve efficacy, safety, and cost effectiveness of care. In the same way, hopefully they are going to reduce the cost of new cancer drug development so we can get better

drugs at cheaper prices out to more people.

Any questions?

DR. TEUTSCH: Why don't we ask you to sit here, and we will listen to the second speaker and then capture questions for both of you together. Thank you so much. That was exciting stuff.

Our next speaker is Beth Pletcher, who will focus on the impact of genomics on pediatrics. She is associate professor of pediatrics at the University of Medicine and Dentistry of New Jersey and with the Institute of Genomic Medicine. Her clinical experience includes management of patients with neurofibromatosis and Fragile X syndrome. Her research interests include genetic education for primary care providers, as well as pediatric work force issues. We look forward to how you think genomics is going to be shaping the pediatrics field, or how it could. Thank you for being with us.

The Future of Genomics: A Pediatric Perspective

Beth Pletcher, M.D.

[PowerPoint presentation.]

DR. PLETCHER: Great question. Thank you very much. I'm very happy to be here today. I am both a

pediatrician and a geneticist, but my heart is really with pediatrics. Although I spend most of my clinical time as a geneticist, I'm going to be solidly wearing my pediatric hat today. That will be my bias today.

I also spend some time -- actually, in the last few years, I have spent more time -- looking at pediatric work force issues, which is not the focus of my talk, but if you have any questions about work force, it is slightly different than what we have been hearing about the work force for adult patients.

These are some topics or some ideas that I think are going to be woven into my comments today. Certainly, there is a lot of promise and talk today about genetic technologies. It is amazing what has happened in the last decade. We need to have some application paradigms. We have heard a lot about those today, as well. We also know about financial and other barriers. There are educational and ethical issues that I think we need to look at.

When I was first asked to speak today, I thought about the crystal ball. I'm not prescient. I thought, how am I going to possibly think about how

future genomic technologies are going to apply to pediatric patients. We actually have a lot of foundation. We have heard about some new discoveries, and we are actually doing some of these things today.

Certainly, the Human Genome Project provided us the great promise as we mapped all of those genes, but mapping genes is very different than understanding and characterizing those genes. In addition to understanding each individual gene, we need to know how the genes interact with each other as well as with the environment.

The promise for genetic technologies and testing, as we have heard about, has to be through prevention. If we can prevent a disease or a cancer by knowing about someone's genetic makeup, we may be able to improve surveillance, institute lifestyle changes, and certainly employ therapeutics. We have heard quite a bit about that.

As a pediatrician, when we think about early identification we may go back to prenatal or even at birth. Early identification, although it has a lot of opportunities, also presents some great challenges.

In our current practices as geneticists, most

of us deal with relatively rare conditions, single-gene disorders, and it has a very limited scope. We often are not even able to do the genetic testing we want to do for those unusual patients who come in with relatively rare conditions. If we think about future practice in pediatrics and how some of these technologies may be applied in the future -- and I certainly don't know for sure if this will happen -- I would like to think a little more about our newborn screening model that we are using today.

Newborns at birth are tested for conditions where there is some intervention or something we can do to improve the health of those children, so something that is modifiable, something that is treatable.

We also, in the future, and even today, are looking at pharmacogenetics. I'm not going to spend any time today talking about that because we have many other speakers who are looking at those issues. Certainly, that is part of the future of genetics and will continue to expand.

Pharmacogenetics, as you have been hearing about, has a lot to do with optimal treatment, cost

savings in some cases, but also individualizing care. That would be personalized medicine, as well.

I love CGH. I love CHPs. They are beautiful. I think it is a piece of art. This microarray technology is really helping us to understand a lot about minor variations and major variations in individuals.

In addition, though, to the microarray technology, we just heard about next-generation sequencing, which will also enable us to sequence multiple genes in a single assay at, hopefully in the future, relatively reduced price. That information can also be used to treat and help patients.

I now have to take a step back and say, what are the barriers to us instituting population screening. It may be heresy to start talking about population genetic screening, but I think that we need to think about this ahead of time before we get to the point where we can actually start to implement those kinds of technologies.

We certainly have a limited knowledge today about many genes, as well as those gene-gene interactions. In order to make this useful, we need to

really understand that.

Probably most important of anything I'm talking about today has to be the selection of specific conditions for which that information is going to be valuable to the patient. That is what we need to think about as we treat patients or as we do any kind of screening program: is intervention feasible, is treatment feasible, is this going to help this patient.

On top of that, of course, are the cost issues, which may improve over time. Other than just doing the cost analysis looking at the actual testing that we are doing, once those test results are known we have to have an infrastructure in order to interpret that and to implement any treatment strategies. Just as newborn screening has been that kind of paradigm, we need to think about that. When we do testing of newborns and we identify a metabolic disorder, we then have to treat that child and make sure they get connected efficiently and get the treatments that they need. That is the infrastructure that sometimes gets lost.

Then the work force, which is one of my favorite things. We have to have a work force of

individuals who are able to interpret these results and to start the treatment.

Once again, there are ethical considerations. I will talk about those at the end.

Here is the pediatrician's medical home. We heard a lot about the medical home today. Pediatricians have been the center of patient care for their patients for many years, not just those patients with simple pediatric illnesses but children with complex medical problems. Although there are some geneticists and specialists who are the medical home for children, the pediatrician primarily serves that purpose.

The unfortunate situation is, those of us who graduated from medical school before 1990 have really had very limited exposure to some of the new genetic technologies that we see today. My children in middle school and high school learn more about genetics than I learned in medical school. Hopefully, I have learned a little more since medical school.

I went back and just did a quick calculation. I said, how many geneticists are there and how many babies were born in 2007. I did this little calculation.

Although geneticists are a mean force of nature, there were only 1,253 board-certified clinical geneticists in 2007. There were 4.3 million children born.

If we divide up the number of clinical geneticists and the number of kids born in 2007, each one of us would have had to go over test results on a screening test on over 3,000 of these newborns. If we find something, we have to explain that to the family. That is obviously not going to work.

So, how do we create a useful model going forward if we do in fact have some type of screening paradigm. I think, as a pediatrician, we need to consider that pediatricians still need to be the center of the medical home. We need to have a way to educate pediatricians and other primary care physicians, family practitioners, and others, about what these conditions are that we are looking at.

Just as with the newborn screening program, we need to have a hotline, a connection. If a pediatrician gets a genetic test result and they don't know what it means, they need to have someone to call. Help me interpret this. Help me manage this patient. Those

follow-up services, in addition to that hotline, need to be in place before we ever start considering a screening program.

The way I might envision it, and these are all my own personal opinions, is to maybe have a group of genetic experts from all areas overseeing the screening process, much as we do with newborn screening, to help with some of the interpretation of the results.

This is my wish list. If I had unlimited resources and we did everything right, this is what I would like to see to meet at least the basic needs. First, we should develop a panel of experts. We are talking about people from the laboratory side of things, from the diagnostic side, from the clinical side, and consumers. We need an entire group of people to look at this and see how this could be applied to our patients.

Obviously, the testing needs to be cost effective. We need high throughput technology, something that we can use for population screening, which we have been able to do for some conditions but certainly in the future we will be able to do for many more.

Once again, the infrastructure needs to be

there, and resources for the primary care providers.

I was heartened to hear so much about electronic medical records. I'm very much a non-tech person, but it would really be great to be able to use this information in a way that can be transmitted from place to place. I'm hoping someday that I will be able to carry my medical records and perhaps even my genome on some kind of device, maybe a chip or a flash drive.

Obviously, we need protection for those databases, but the databases aren't going to be nearly as valuable if we don't also think ahead as to how we are going to look at this data long-term. So, what are the outcomes. If we begin a screening program like we do for newborn screening and yet we don't find out if what we are doing is effective, then we are not going to go very far.

The educational initiatives we need to have not only for the primary care physicians, the pediatricians let's say, but we also need to educate parents. Somebody was talking about Consumer Reports. I have this vision of a baby having a genetic screening and coming out with a consumer genetic health report that has all of his or

her genetic variants that are potential risk factors and what to do about them. I don't know if that will happen, but it is a thought.

How do we go about measuring outcomes. For many of the outcomes that we will be looking at, we have to look long-term. We have to make sure that over the years we continually assess and reassess the effectiveness of what we are doing. If we develop a screening program looking at six specific genetic risk factors that are quite important, over time we may learn that those are not the ones that we need to continue to look at. We have to add new ideas, new genes, or new paradigms as we go along and get rid of some of those that are not going to work or are not effective.

The cost. I have no idea about cost. I know that for me, as a clinician, I have a very hard time getting genetic testing done. We have a very difficult task sometimes of getting insurance companies to pay for certain genetic screening tests for single patients. General population screening is a whole other avenue.

As the costs come down, that may be less of an issue. Today, with newborn screening, depending upon the

state in which a child lives, the hospital may pay for the newborn screening, but indirectly the insurers and the taxpayers end up paying for these tests.

Now I get onto my little soapbox. We have some moral obligations. I think, as a pediatrician and as a geneticist, we think a lot about the ethical issues. What are the things that we are trying to do and how do we protect our patients, as well.

We only want to introduce tests that are appropriate and are going to promote good health. We want to make sure that they are not used in a way that will disadvantage our patients in terms of employment, educational opportunities, or insurance coverage. Once again, we need to have ongoing assessments to make sure that what we are doing is right and to get rid of the things that are not working.

I think, finally, we need to make sure that the financial burden of this testing, if we decide to go forward with it, is mitigated in a way that benefits all children in this country, or all patients and not just some patients.

These are my closing thoughts. This has a lot

to do with work force and what I think about as we care for children in this country. Money that we spend on prevention and health for children has the potential to reap great benefits for this country, much more so than money spent on older folks. The future of our country depends on a healthy work force. The only way that we can do that is by intervening early. Early identification and intervention is really where it is at.

Ultimately, this is the goal, to have healthy, happy kids. I bet, if you look at these children, you probably wouldn't be able to figure out which ones are mine because they don't look like me. The joys of genetics.

[Laughter.]

DR. PLETCHER: Mine are in the lower right-hand corner here. Those are my two kids, but they don't look at all like me.

Thank you very much. I would be happy to answer any questions if I can.

Question-and-Answer Session

DR. TEUTSCH: Great. Thank you, Beth. Beth, why don't you join Bill here. We will open it up to a

few questions or comments. We have seen a couple ends of the world, very fine specialized care as well as general primary care. Dr. Williams.

DR. WILLIAMS: This comes back to a point that Dr. Barr had made earlier relating to the medical home. He used the example of mental health as being problematic in the sense of where do you create the time and space. I wanted to propose a model that I think is relevant to genetics and also perhaps will have some impact on the work that Barbara and her group are doing.

In our system around the mental health issue, we have embedded, in a process called mental health integration, social workers in primary care practices so that all of the patients get appropriate screening with depression screening vehicles.

Those that present with complaints, particularly in the pediatric realm, of behavioral issues, attention deficit disorder, et cetera, meet with this social worker, who then provides a triage function. They look at, where do you fall on the scale. Is this a depression that could be best managed by the primary care physician with the prescription of an antidepressant,

versus somebody that really probably needs to see a psychiatrist on an urgent basis, in which case they can facilitate that process and reduce the barriers there.

What has been interesting about deploying that is that not only do we have demonstrably better care, demonstrably improved satisfaction for both patients and providers, but the productivity increased by the primary care physicians because they are not spending their time trying to sort out these very complex issues and doing that triage function themselves. It actually pays for the person to be there.

I would contend that we could think about a similar type of model for genetic competencies, if you will. I don't think that our current work force of geneticists and genetic counselors, as you pointed out, is probably up to the task. I think we are also way too expensive to perform this function.

Imagine an entity that would look like a diabetes educator except that they are educated specifically around genetics. They could take a family history and perform a risk stratification and interpretation, and they could then perform that same

sort of a triage function to say this is what this patient is at risk for, these are the things that you should focus on in an anticipatory guidance visit, or wait a second, this looks like a BRCA family, this needs to kick up to the genetic counselor or to the geneticist. Then you could envision something that might have the same sort of return.

The other advantage of having that person embedded in a practice is that there is ongoing connection and education taking place within the point of care. This also would seem to be supported within this medical home.

I would be interested in your reflections on whether that would be something that would support your vision of where things are going and what would be needed to have that happen.

DR. PLETCHER: Wow, that is great, Marc. As you were describing that wonderful system, I was thinking, I wonder how much it costs them to do that. Your proving or demonstrating that this actually is cost effective is very exciting.

DR. WILLIAMS: It is cost-saving.

DR. PLETCHER: Cost-saving. That is even better. People love that, cost-saving.

I think it absolutely makes a lot of sense. If we are going to do any widespread population screening, even if it is for a few conditions or a few significant risk factors, that makes a lot of sense.

One of the problems in work force, as I'm sure everyone is aware, is it is not just the numbers of physicians but it is the distribution of physicians. What I'm thinking about is some practitioner out in Tucumcari, New Mexico, who doesn't have a large office. Maybe we can do those virtual or online kinds of consultations, but you wouldn't necessarily have that genetic educator embedded in every practice. It probably wouldn't be that practical, but to have that resource available across the board sounds wonderful.

DR. DALE: Bill, I enjoyed your talk. I just wanted to ask about the oncologists. Do you expect that most oncologists or all oncologists or just a few oncologists will need to be educated in genomic medicine? If they need to be educated, how is that going to happen?

DR. NELSON: That is a great question. Right now, the thought is that there is about 25 percent of the supply of medical oncologists that is needed.

If you look at outcomes for cancer care in this country as compared to others, and we are having that discussion all over, they are actually remarkably better. The question in many ways is why.

One argument is that in the Medicare population we effectively have single payer. The people who like that idea say that is the reason. Another is that we have pretty defined standards of care. You don't come in and say, you look like a little of this and a little of that. There are care standards that are widely distributed and our medical oncologists and radiation and surgical oncologists are largely educated in the ability to deliver that kind of care.

The third is the fraction of people we actually put on clinical trials. It is 4 percent overall across the country, 10 percent in a state like Maryland. The gaps are really in rural areas. We have 20 percent or more in therapeutic trials at a cancer center like ours. I think if we maintain a strategy that emphasizes those

kinds of standards and improving them, we will, as a follow-on, begin to educate health care providers in that way.

The other is something that resembles the medical home, in fact. It is the reverse end, the specialty home. In our business, what we find is that many people sample a lot of care providers. Think about a man diagnosed with prostate cancer. In a referral-based strategy, his doctor says, go see this person down the hall. He doesn't buy it. He goes to see this person over here. She will recommend radiation therapy. It is this, who you saw is what treatment you are being recommended.

The consumer-driven notion, the patient-centered version, is now saying, I would like to see all these assets together in one place to have a formal treatment plan that makes sense in some way. That seems to be a great way to deliver many of the elite services, like screening for vulnerabilities in social situations, personality, genetics, all along the line.

I suspect that at the end in our deployment strategy the treatment plan may be the whole game. That

is often where you are flagged as to breast cancer is in this family, what about other family members. I wonder if it may be the specialty version of a medical home, something like that.

DR. TEUTSCH: One more question. Gurvaneet.

DR. RANDHAWA: Thanks. I really enjoyed Dr. Nelson's talk, but as I was listening to your points I had this thought, "That's right, but."

I will make three quick points. One is, in your example of matinep and Bcr-Abl, there was this implicit one-on-one that it is specific only for Bcr-Abl tyrosine kinase activity and nothing else, which isn't true. We will see an unrelated gene, an unrelated kinase.

DR. NELSON: In fact, it was developed as a Pgf inhibitor originally.

DR. RANDHAWA: Yes. I don't want people to come away with the impression that we have a very new way of having very targeted drugs to only one gene or one receptor and that do not affect anything else.

The second point is, most of your talk was on somatic mutations, but in the earlier slides was this

whole notion of preventing disease and doing germline sequencing variation. That is conceptually a very different issue from the things you were discussing. People shouldn't get the impression that once they sequence genomes once that is enough, you can predict everything down the road, and that is all that is needed.

The third point was on the specific case of colorectal cancer screening, where we already have effective screening technologies. What is the added value of this test compared to the others? So far, the Preventive Services Taskforce has not weighed in to say that is an effective test compared to colonoscopy.

DR. NELSON: I will start with the last one first. There are a number of tests out there working their way into colorectal cancer. I did not mean to endorse this one. I wanted to create the argument, in fact, that ATAS, if it has a high enough negative predictive value, will be a tremendous asset to colorectal cancer screening.

To do colonoscopy to every 50-year-old when they become 50 in this country is equal to our health care expenditure. We can't do it. So we have proposed a

formal recommendation that we can't do, creating disparities in outcome and whatnot.

As to the test, the bar is going to be very high. It has to have a high negative predictive value. Most of them have a reasonable positive predictive value, not so high of a negative predictive value. That is going to be a test, not that one but some test.

Back to the original one, in terms of targeted tyrosine kinase. In fact, you can probably make one that is very selective for any tyrosine kinase. The ones that are out there are the first generation and really aren't that selective. I'm pretty convinced that the discovery engine we have in PhRMA can make it.

There is a huge conceptual question, which is, is that the drug that you want. That is beyond our discussion here. Do you want one that inhibits one, one that inhibits seven, one that inhibits 57 of the 300 kinases. That is a very active question. Gwen is associated with the AACR. That is a very active question in our field. You can make one that hits just one. The question of will it be an effective treatment is a legitimate question.

You had the middle one, which I already forgot what it was. Oh, germlines, absolutely. The notion that you would do risk stratification, and whatnot, from using cancer genome DNA itself would involve sequencing that genomic DNA, absolutely.

DR. TEUTSCH: I'm sorry we don't have more time because I know there are more questions here, but we very much appreciate your perspectives. Thanks for joining us.

[Applause.]

DR. TEUTSCH: I know this is a very rapid tour through all of these different areas, but we are going to change from the provider side to the patient side. We are going to a couple of speakers who serve as patient or consumer advocates and can provide some of their perspectives about the future of the health care system.

The first speaker is Katie Hood, who is the CEO of the Michael J. Fox Foundation for Parkinson's Research. As you know, it is focused on funding those research projects most translatable into some new therapies, particularly for this disease, and is focused on changing the scientific enterprise as a whole so that

research leads to faster treatments and cures.

She also blogs with the Huntington Post, where she has written about participant-driven genomic research and the possibility of a national center for cures. I will turn it over to her to talk about issues surrounding developing new therapies. Then we will follow that up with Myrl Weinberg. Please. Welcome.

Changes in Health Care

from Patient Advocates'Perspective

Katie Hood, M.B.A.

[PowerPoint presentation.]

MS. HOOD: Thank you very much. I'm glad to be here. I have to admit, when I got the invitation, my first thought was, we are clearly a patient advocacy group but we don't meet the traditional definition of a patient advocacy group. I have a few slides in here to explain the context from where my presentation will come.

I think the first thing to realize about us is, we were founded in 2000 with very clear objectives. That really is to drive the best Parkinson's research and discover improved therapies and a cure. This really stems directly from Michael Fox himself. You have heard

researchers say the science is ahead of the money and we need to get more money into research. He said, that is really where I want to be and I think focus is required.

Unlike many patient advocacy groups so named, we are exclusively focused on working in science, as opposed to engaging in patient education, doctor referrals, or support groups.

It is interesting, though, because, sitting here today, the discussion that was had about electronic medical records, for example, and the fact that for a long time recordkeeping has been left to the recordkeepers and now there is this need for more orchestration and more deliberate thinking about what should be happening and how, that has really been our experience as we come into research and we focus on the translational space. I will get to that in a second.

Today, we are the largest private Parkinson's funder in the world. We have funded over $142 million in Parkinson's research, with an additional $30- to $35 million in new commitments planned for this year. Correcting another misconception, Michael J. Fox does not fund this foundation himself. We actually get over

40,000 contributions a year. We value efficiency and accountability.

Back to translational research. When we started out, I think we just thought more money faster is better. What we realized is that that was good but it really wasn't going to get us there. In the first couple years, we had no Ph.D.s on staff. We now have eight Ph.D.s on staff, as well as people with backgrounds like mine who are more project managers and planners.

What we did is we did a landscape assessment. We literally went to every institute, every private funder, anybody working in Parkinson's, and said, where is the money, where is the activity, and where isn't it. Coming out of that, we saw very clearly, starting in about '04 -- and I think there is a lot of energy around the idea that this is a problem for all diseases -- that the translational gap was where we needed to be.

Gaps in the drug development pipeline guide all of our actions and priorities. I think the most important subpoint here is, we used to see funding as our major asset, but it is a combination of funding and leadership. A lot of my comments about the future of

genetics and how we can harness some of the potential of genetics faster really comes down to not just dollars but leadership and organization.

Then, at the bottom, how can we sufficiently derisk investment for other players. It is not lost on us that our dollar is a relatively small drop in the bucket of what is required to get to new therapies. What we try to do is fund the work that will be a tipping point of sorts for other funders to come in.

The prior two speakers really talked a lot about some of the things I have in my slides, so I will go through them quickly. Obviously, the power and potential of genetics is clear. In diseases like Parkinson's where the cause is unknown, genetics can provide really powerful clues. In Parkinson's, we have seen a great amplification of the involvement of both academic and industry researchers as genes are identified.

Increased understanding of the powerful role genes play in disease is critical to developing new therapeutics, defining targets, being the basis for rational drug discovery and development, and then better

guiding therapeutic development, clinical trial design, and patient care. Parkinson's has had a series of failed trials. What keeps me up at night is exactly what one of the prior speakers talked about, what if our definition of Parkinson's is just, frankly, too broad and everything we try is going to fail because we need to be a little bit more segmented and specialized in our approach.

That gets, really, to the third point, which is tying genomic variation to variation in clinical phenotypes is a very important piece of the puzzle. There is no doubt, if you talk to people who treat Parkinson's disease, that they see clinical subtypes of this disease. There has been almost no work to go back and see if those clinical phenotypes actually correlate with either genetic causes or different pathologies of the disease. It is basically because these are really large-scale investments that need to be made and everybody is shying away from it.

Back to what keeps me up at night, for Parkinson's and other diseases, I really wonder if we are ever going to be able to crack the case if we don't invest in those long-term projects.

Obviously, genes have value as diagnostic and prognostic markers in the clinic, for sure. I don't talk about biomarkers a lot here, but biomarkers is another area our foundation is very involved in.

Harnessing the potential of genetics, critical questions. How can we most efficiently identify the complete genetic map for PD. Standardization, data sharing, and collaboration are critical. This isn't lost on anyone in this room. How do we best validate genetic findings. Genome-wide association studies have been everywhere, but they are all too frequently underpowered to be conclusive. Plus, the amount of data produced in these studies can be overwhelming. Coordination of large-scale replication efforts is required.

Then, what do we do with genetic findings once we have them. There really isn't a systemic process by which, when a new gene is identified, it then enters a very disciplined process of building tools and resources, vetting, and whatnot. In Parkinson's that is what we are trying to do, but it is definitely missing in other diseases.

What we have done in genetics is, we have

funded the first genome-wide association study, as well as a large-scale validation of that study, which didn't validate the initial study and which some of the investigators were actually a little bit hesitant to do. The first genome-wide association came out, and then we said we really feel like we need to validate it. How do we know there is anything here.

The truth was, it didn't validate. So I think that second step of really saying it is not just about here is my GWAS, it is great, and now there are 100 other researchers working on these new leads that you have discovered, but are they real is a really important question.

In 2004, coming out of that grant, we realized we needed to fund more collaboration efforts in genetics. We have five collaborative projects that were funded then that continue to work together, exploring genes and genome expression in PD.

The last two are more about what we do today. We opportunistically fund efforts in gene discovery and subsequent validation studies. That is really bottoms-up, what comes to us through our grant application

process. We have become really focused on two genes in particular, LRRK2 and alpha sy nuclein, for the reasons listed on this page.

When we are really focused on something, we have our team on staff, a Ph.D. and business combination, literally mapping out what needs to be done in LRRK2: who is doing what, where are the gaps, and who do we need to bring together. That is what I mean by "top-down."

So, what will the future of PD genetics look like. It is pretty clear new technologies will accelerate advances. Related to this also, I think, is that the Internet has been really kept out of the discussion as a new technology that can really help in this area. I know it is early days. In my next bullet I will talk about 23andMe because we have a collaboration with them.

I think our view, when you come back to the point I made about derisking, is that we have to try things that haven't been tried before. Our general view is that experimentation is critical to progress, and so we view ourselves as people who can experiment. The Internet and what that bodes in terms of larger amounts

of data that can be collected if done well, the power that could hold for patients, is huge.

In genetics, there is a rapidly increasing interest by patients and an acceptance of the importance of understanding one's genome, driven in part by the rise of direct-to-consumer genetic testing. Again, I think it is truly driven more broadly by culture-wide shifts in view about technology and information. I think this is happening. I will talk a little bit about 23andMe and other efforts we have to increase the usability of the Internet to gather clinical research data.

We think this is happening, and we would rather be on the front end than on the back end trying to catch up. I'm sure we are going to make a lot of mistakes as we go down this path, but I think in five years or 10 years this is where it is going to be.

About two years ago, we launched a $2 million RFA to fund efforts between clinical researchers, epidemiologists, and tech people to develop Web-based surveys for gathering clinical information. This is a perfect example of a program that we launched where a lot of people said, that is crazy, you are never going to be

able to do it, and we said, we know. We know this is very likely crazy and it may not work out, but we now have five teams working on tests that could be administered over the Internet or devices that could be used to transmit data via the Internet.

23andMe, with the Parkinson's Institute, which is a Parkinson's center in Sunnyvale, California, applied to work together on this. That actually didn't get that much attention. One of the best pedi-epidemiologists in the world is at the Parkinson's Institute. They are working on surveys.

What has gotten a lot of attention is, 23andMe came to us this year and said, we really want to increase our numbers of people in the Parkinson's community. The founder of 23andMe is married to Sergey Brin, whose mother has Parkinson's, and he has the LRRK2 genetic risk factor, which he has blogged about. They said, we just think this numbers thing is going to be incredibly important, and we have a commitment to PD. The real critical thing for us, though, is we need qualified introductions to people because otherwise, if we offer a discount for this test, we are not going to be able to

develop a PD database. People are going to be coming out of the woodwork signing up for a $25 genome test as opposed to $400.

They started with the Parkinson's Institute and ourselves, who were working on this project together. They are looking to build a 10,000-person Parkinson's community. That community will have, obviously, genetic information, but also these surveys. They are looking to put surveys in about exposure data and different risk factors that we know of for the disease. Again, we know how problem-fraught this all is, but we view this as a giant experiment that could pay off.

As research progress speeds, we frequently in this country talk about health care and medical research, when in truth they really go together. Part of the reason our costs are so high for health care is because it is so expensive to create new drugs. I think that it does a disservice to the discussion to not really link these two things together more than we do today.

As research progress speeds, so will the development of related health care advances and efficiencies. Advances in screening and diagnostic and

prognostic tests will really embolden and empower preventive medicine more. As we are seeing in cancer, genetic information will accelerate personalized treatments.

I really believe that the day is not far away where one's genome is an integral piece of what they consider with their doctor. Back to the education of doctors, you will find some doctors who are really open to thinking about this and you will find others who aren't. I remember in the early days when I came to the foundation I would have doctors say to me, really great doctors, my patients come in with all these questions off the Internet that they want me to answer about everything. They should just listen to me. I can give them the best advice.

I feel like we are past that now. That is now part of common practice. This idea of going with your genome printout is now the new "What are they doing? This is crazy." I think there is a long way to go before this stuff is really integrated, but I think accelerating the pace at which it is integrated is important.

The one thing I really wanted to say at the end

of this is, I really think this issue of disease heterogeneity is very, very important. I think things can be done in isolation to speed genetics' impact on research progress as well as in the clinic, but we need this broader discussion about what are we really looking at in these screens. Are we really looking at Parkinson's or are they really five different things. I think it is important and a little bit undervalued. I will close there.

DR. TEUTSCH: Thank you very much. Please join us here at the table. We will listen to Myrl and then see if we can direct questions to both of you.

Let me turn to Myrl Weinberg, who is our next speaker. She is president of the National Health Council, which advocates for people with chronic diseases and disabilities. She is a member of the Roche Genetic Science and Ethics Advisory Group, an expert group which provides advice on ethical issues and genetics research. We turned to her as we were looking for people who think about the future of health and health care. She provided us some important insights.

We are very happy to listen to some of your

thoughts about the future of the health care system and how genetics may shape it. Thank you for being here.

Presentation by Myrl Weinberg, M.A.

[PowerPoint presentation.]

MS. WEINBERG: First, thank you very much for allowing me to present. For those of you who may not be familiar with the National Health Council, it is unique. It is a nonprofit umbrella organization. We have as our core constituency leading patient advocacy organizations like the American Cancer Society, American Diabetes Association, Huntington's Disease Society, and Alpha One. We have about 50 of those. We also have in our membership professional health and medical organizations and associations, as well as health insurers and industry representatives.

The National Health Council's mission is to provide a united voice for people with chronic diseases and disabilities and their family care givers. That is roughly about 40 percent of all Americans, and the number is somewhere in excess of 133 million people. At the council, we do not work on condition-specific issues but rather we work on systemic issues that affect everyone

with a chronic condition.

One distinction I wanted to make up front is that people diagnosed with chronic conditions are different from the average consumer. Average consumers are generally in good health and they go in and out of the health care system. As we all know, people with chronic conditions interact with the health care system their entire lives. They seek answers that will help them have a chance for a more normal life and a healthier life. In all of our research what they say is they want health care that meets their individual, personal needs and goals.

In 2000, the National Health Council convened nationwide telephone focus groups with patients to gauge their understanding of genetic research and to learn their thoughts on genetic testing. For example, we asked questions like, do patients want to know that they carry a gene for a disease that has no cure; how would this information affect their life choices; how do people balance the chance of receiving information that can be devastating with the possibility of having knowledge that could help them and their health providers plan

treatments that could really optimize their future.

While many of the focus group participants believed the societal benefits of genetic research certainly outweigh any concerns and risks, they also believed that to achieve the benefits strict controls need to be in place. They know that many serious diseases are determined by very complex interactions between genetic predisposition and the environment. They felt that it is critically important that people be educated in a way that they can understand the limitations of the technology.

Not surprisingly, the focus group participants drew a line between manipulating genes in order to cure or prevent disease, which was acceptable, and manipulating genes in order, for example, to pick the characteristics of your child, which was not acceptable. Participants in all groups did raise some concerns. Their language was that we would be playing god.

Patients were also very concerned that health insurers and employers might base hiring practices and health coverage decisions on one's genetic makeup. Of course, here in the United States, we hope that the

passage of the Genetic Information Nondiscrimination Act will really help alleviate those concerns.

We need to remember that in order to provide true value in health care emerging technologies should be used in ways that support and promote the best interests of individuals, including those who have already been diagnosed with one or more chronic conditions.

To win the support of the patient community, we need to listen to them and to their wants and needs. That is why we at the National Health Council have created the Campaign to Put Patients First. Based on the patient input we have collected over the years in discussions among our patient advocacy organization members, the National Health Council believes that meaningful health care reform should be built on five basic principles.

We believe an effective and efficient health care system for people with chronic conditions, and really everyone, should cover everyone, should curb costs responsibly, abolish exclusions for preexisting conditions, eliminate lifetime caps on benefits, and ensure access to long-term and end-of-life care.

Many of you know of Dr. Jack Winberg. He is a leading expert on medical practice variation. He has said that to improve the quality of health care and control costs responsibly there need to be organized delivery systems that, in his words, are aimed at rationalizing the care processes. To us, there is nothing more rational when it comes to health care delivery than to first focus on the end user of the system, the patient.

How does this specifically relate to health research and health care reform. Clinical research must move beyond population-based models to take into account the life circumstances of individual patients. For example, comparativeness effective research. The Stimulus package passed by Congress included, as I'm sure you know, significant funds for clinical effectiveness research, but the legislation offers few safeguards to ensure that that research will be truly patient-focused.

We believe strongly that we need to disentangle, at least in the beginning, the findings of good comparative effectiveness research from coverage or reimbursement decisions. We need to break the immediacy

of that relationship in order to avoid denial of appropriate care.

Eventually, we know that coverage decisions will be based in part on these research findings, but comparative effectiveness research results must not drive de facto coverage or reimbursement recommendations until they are evaluated in real-world settings to determine their impact on individuals and subpopulations.

Take, for example, a man in his 50s who drives a bus. If a particular medication is determined to be the most clinically effective method for treating his condition but that medication makes him drowsy or confused, he will not be a compliant or adherent patient. For some mental health patients, their medications have negative sexual side effects which can complicate their family life, an important support system for any of us.

Life is full of tradeoffs, and no segment of the population understands this better than people with chronic conditions. They wrestle every day with decisions about whether to prolong life or enhance life. For those with conditions like ALS or Alzheimer's, they face the fact that there is not even a realistic

treatment today.

The critical factor patients are concerned about is the possibility comparative effectiveness research will be used inappropriately to deny access to care or to funnel patients into a one-size-fits-all approach.

Comparative effectiveness research should supply us with good data and evidence about what works and what does not work. However, it should not be just one product against another or one process against another, or even a combination. We really need to look at how different health care delivery systems operate and be able to compare those in the context of health care reform.

The National Health Council has created a chart to illustrate what a health care delivery system that meets the needs of patients with chronic conditions would look like. From the patient's perspective, as I said, 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.

At the NHC, we describe this as balancing sound science, the left side of the diagram, with patient-focused application, the right side of the diagram. I think we would all agree that better diagnostic tools, used in alignment with a patient's individual life goals, represent the best health care and the best health outcomes.

A more effective and efficient health care delivery system would pay for integrated care, shown with the arrow at the bottom of the screen. It would also reward patient compliance and adherence with limited or not out-of-pocket cost. We show this at the top in the value-based plan design.

Going hand in hand with health and medical research, personal patient preferences, and a value-based plan design, is the need for care coordination to bring all of these elements into alignment. This is represented on the diagram by the center square.

This care coordination, which you have heard some about already, would be orchestrated using individual care plans. The care coordinator, working with the patient and their family, might be a physician

but it also might be a nurse, a social worker, or some other person. At times, the focus will be on strengthening the patient's body. At other times, the focus would be on preparing the patient's mind for inevitable death.

Just as the life goals of a human being change over time, so too must the health care system be flexible to help the individual fulfill his or her goals. Such a plan would need to be value-based and cognizant of the cost both to society and to the person.

We all know that the cost of health care is at the heart of most of the health care reform discussions today. We need to eliminate unwanted and unnecessary care and the perverse incentives that promote the practice of defensive medicine. Government and private studies have found that as much as one-third of the $2.5 trillion spent on health care each year is for duplicated tests and unneeded procedures.

We all also know that health care expenditures account for approximately 15 to 16 percent of the country's gross national product and that chronic disease accounts for roughly 75 percent of this expense. Sadly,

more and more patients with chronic diseases and their family care givers are having to dig deeper and deeper into their own pockets to pay for health services.

Take Richard as an example. Some of us have met Richard. He cared for his father for three years, spending more than $100,000 of his own money, before his father succumbed to the debilitating effects of ALS, or Lou Gehrig's disease. Now his mother has terminal brain cancer and he cannot afford the end-of-life care that she needs.

Then there is BJ, a 60-year-old cancer survivor. When she switched health plans, she was denied coverage for medication that was saving her life. In that one month, she spent more than $3,000 out of her own pocket before she was allowed the medication to be covered again.

If we simply expand coverage and increase access without addressing the out-of-pocket cost issue, people with chronic conditions will continue to face overwhelming challenges in managing their care. We must not lose sight of the overarching goal to make health care, first and foremost, patient-focused. We really do

need now to put patients first.

I want to add one final important fact the National Health Council has learned over our many years of patient research. The fact is, people with chronic diseases and disabilities are pragmatic. They know they can't have it all, but they will fight for better treatments and cures, as you have heard, not just for themselves but also for their children and grandchildren, hoping that they will be spared from a similar diagnosis. They want to take the discussion about research to a much more granular level that respects individual patients and recognizes their specific life circumstances.

I want to thank you for recognizing that the patient voice is important and needs to be included in this process. Thank you very much.

[Applause.]

Question-and-Answer Session

DR. TEUTSCH: Thanks for reminding us about the other dimensions of what we often talk about in this group about what personalized health care really means.

We have just a few moments. Let's hear from

our committee. Paul.

DR. BILLINGS: I wanted to thank you for your comments about using the Internet for promoting research, particularly in Parkinson's disease. I had a specific question about the 23andMe relationship.

Your clients or the people who are involved with you are interested in Parkinson's disease, but most of the information they are going to get is not about it. Some of that might be unwanted in the sense that it may be troubling or most of it is going to have no informational value at this point at all, really. How did you deal with that in constructing it?

MS. HOOD: First of all, the first thing we say is, this is a choice. At the end of the day, I think there are people who believe people can be entrusted with the choice and then there are people who feel like they need to be protected from the choice. Just speaking for myself personally, I feel like people should be empowered to make the choice.

That being said, they need information about the choice. So, in the letters that went out to people who had identified themselves to us as people with

Parkinson's, we said this is a really serious decision. There is not a lot of direct relative value for Parkinson's right now. This is to be part of a project to see if this could turn into something else that is bigger and does provide relevant information, but you could find things out. Even in the 23andMe study now, you have to double- and triple-check that you want information about your LRRK2 exposure, for example.

We were just clear from the start. There are going to be some people who don't want to do this. More power to you. There are going to be some people who do. More power to you. It is a grand experiment.

So, we took it very seriously, actually. Again, I think it does come down to 23andMe itself. Obviously, there are a lot of people involved with 23andMe who don't have Parkinson's. They are just interested folks. They don't have genetic counseling. They very clearly say, though, go to genetic counselors.

I don't want to speak for them, but I think that has been another issue. People feel like, should you be giving this information without a direct hand-off to a counselor of some sort. I'm not trivializing any of

these debates or discussions, but I think we are erring more on the side of wanting to give people the choice to be part of the experiment. I don't know if I answered your question or not.

MS. AU: Mine is a follow-up to Paul's question. 23andMe clearly has a research arm. So, everyone that participates from the PD community, they are also consenting to then join the research arm of 23andMe?

MS. HOOD: What do you mean by research arm?

MS. AU: They said that they do the SNP analysis and then you can opt in to have your information included in a big database. I guess that is their research arm.

MS. HOOD: Truthfully, I don't know if any of you have ever talked to them, but if you haven't, you should because it is interesting, at the least. Their goals are very research-centric. I am glad that it is not my business to run because I don't know what the business model is going to be. No, I say that with great respect for what they are trying to do. They have a very altruistic intent about the potential of this all to

affect research.

I think it is all part of the big thing in the sense that they are going to have ways to look at the Parkinson's only, but you are part of the bigger database, as well.

DR. WILLIAMS: I would just note that if you read the end user agreement for 23andMe that, essentially, the consent is broad and open. Basically, if you opt in, you will be opting in for inclusion in anything that they come up with. Of course, because they are not federally funded, there is not anything that looks like what we would be familiar with with IRBs and that type of thing.

It is a different model. It will be interesting to see how it plays out. I am perhaps slightly less sanguine about the altruism because I don't understand the business model necessarily, either.

MS. HOOD: I'm not here to talk about 23andMe, actually. I knew since I was coming that you would be interested in hearing about it. I think we are foolish, though, to not think about new models that break out of the existing model because the existing model is not

going to get us there. You simply need numbers that are way too large. The traditional clinical research model for these sorts of complex disorders is not going to function. It is going to be far too expensive.

When we talk about these studies you need to do about the complex interactions over time with all these different factors, nobody is going to fund those studies. That means we have to figure out a new way of doing the studies. Otherwise, I feel like we will be having the same discussion in 10 years.

I shouldn't have even said that comment about the business model, a throw-off comment like that. I am not a representative of 23andMe. I'm a representative of a group of people with Parkinson's that say we need to try whatever it takes to get the cures and we need to try experiments that aren't being tried elsewhere.

MS. DARIEN: I don't know a whole lot about 23andMe, and I'm actually a patient advocate as well. I have a couple comments. One of them is that I don't know, and I don't know if anybody around here knows, what the true informed consent and informed choice process is in 23andMe. That is something that I think is a concern

because there are different ways of getting more people driven to research and there are different models.

I agree with you. I have done a lot of work on clinical trials, and I understand, particularly in cancer, which is the area I work in, the very, very low participation of people in clinical trials. I have also read a lot of the AIDS literature. I think there is a tension between increasing the number of people at all costs and doing something that really protects the patient and gives them an informed choice.

I think that there is a tension there that really needs to be considered. I'm not saying you haven't considered it. I'm just bringing this out as an issue.

MS. HOOD: I could not agree more.

MS. DARIEN: As a disclaimer, I'm not involved with it, but the American Association for Cancer Research, where I work, is involved with it. There is a model that Susan Love has come up with called the Love/Avon Army of Women. I don't know if people have heard of it. It is primarily women who have not been diagnosed with breast cancer but some women who have.

They can sign up to say that they would be interested in taking part in clinical research. Then researchers come to her and the research studies are vetted, and then there is an Email and a communication that goes out to the people that have signed up for the Love/Avon Army of Women. Then they can choose to participate and are qualified in a certain way, as you have talked about.

So, I think there are multiple models and also multiple considerations. Sylvia, we talked about this a little bit on our conference call.

MS. HOOD: I just want to clarify, though, that I totally get all these concerns. I think these are early, early days for this stuff.

Again, back to what I said up there, I think our organizational philosophy is, we would rather be on the leading edge of figuring out the early days of this stuff than waiting back. I think that the risk that comes with that is there are valid criticisms, and I mean that. Honestly, there are valid concerns that people raise, but it is our organizational philosophy. From the get-go it has been about not being confined by a traditional way of doing things.

That being said, we do a lot of things traditionally, just so you know. If it is not working, we are part of trying to figure out what might work instead.

DR. TEUTSCH: I think we probably need to move on, but thank you all very much for all your thoughts.

Moving on to yet another aspect of this as we think about what the technology developers are doing, particularly in the pharmaceutical and diagnostics industries, our final speaker for this session is Murray Aitken, who is senior vice president for health care insight at IMS Health.

IMS Health provides health care market analyses to pharmaceutical and health care companies. Prior to joining IMS, Mr. Aitken had a 14-year career with McKenzie and Company, where he led the pharmaceutical and medical products practice.

As senior VP for IMS, he speaks regularly on the subject of his presentation today about the impact of health care system changes on the pharmaceutical and diagnostic industries, and vice versa. So, thank you.

The Impact of Health Care System Changes

on the Pharmaceutical and Diagnostics Industries

Murray Aitken, M.B.A., M.Comm.

MR. AITKEN: Thank you very much. I notice, as the afternoon has worn on, the number of slides per presenter has declined. Since I'm the last speaker in this group, I have no slides. So I'm glad we sorted that out.

I am pleased to be here. I have some words, not slides, and I'm happy to share the perspective of IMS Health on this very important topic and, in particular, how the prospect for health care reform, that is the elephant in the room that perhaps we haven't been talking quite as much about today as I might have expected, is going to come together with all of the excitement around genomic developments.

Just by way of introduction, IMS Health is the world's largest provider of market intelligence both to the pharmaceutical and broader health care industries. We have more than 50 years of experience. We operate across 100 countries around the world. We work essentially with every biopharmaceutical company that has commercialized products. We also work with a large

number of governmental agencies and entities.

What I want to do is cover three topics. First really is 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 at the same time, the opportunities that are very much front and center for genomics-based research both on the diagnostic and therapeutic sides.

Secondly, I want to talk about some of the ways in which health care system changes that are currently under discussion can enhance progress in genomics-based diagnostics and therapeutics through the lens of these companies.

Thirdly, I want to describe some of the perhaps unintended consequences to patients of health care system changes that really represent the risks to the ongoing programs of investment and research that are being undertaken in the private sector. That is where I hope I can be helpful to you as you develop your advice to the Secretary as we work through the next few months of discussion around health care reform.

Let me begin by briefly summarizing the current

state of play. Here I will really be mostly referencing the pharmaceutical sector. When I talk of that, I mean companies that have business models that depend on the discovery and clinical development of new chemical or biological therapeutics and the sale of those products around the world, not just in the United States but globally.

These companies are collectively facing some pretty significant commercial challenges over the next five years, which we believe places at risk the ongoing funding of genomic-based innovation.

In aggregate, the global pharmaceutical industry has sales of pharmaceutical products amounting to about $750 billion. That was last year. That includes sales around the world from all companies, regardless of their domicile, and of both patented or protected products as well as generic versions, biotech as well as small molecule therapeutics, products that are used in hospital settings, clinics, retail pharmacies, et cetera.

Over the next five years, through 2013, products that had global sales last year of about $135

billion are expected to lose their patent or other type of protection and therefore face generic competition. About $90 billion of that $135 billion is for sales of their products here in the U.S. market. There are about 18 products that currently have sales in excess of $1 billion annually, familiar products like Lipitor, Plavix, Zyprexa, and Aricept, that are included in these totals.

Many of these products first came to market back in the mid to late '90s and will essentially see the end of their life cycle by 2013, although certainly they will continue to be used in very significant ways as generic products.

The magnitude of the commercial impact that arises from the loss of exclusivity for these products is very unlikely, over the next five years at least, to be offset by new products coming into the market and the sales of those products.

Over the last several years, we have seen some very innovative products emerge from the industry's pipeline and pass regulatory scrutiny. While these products have brought new treatment options to patients for the treatment of oncology, autoimmune disorders, HIV,

the HPV vaccine, diabetes, and so on, the number of new products and their level of usage has been insufficient to offset the loss of sales that is resulting from these patent expiries.

In 2007 and 2008, for example, there were 38 new chemical or biological entities that became commercially available in the United States market. Their total cumulative sales since launch amount to about $3 billion. During that same two years, products that had sales of $26 billion in the U.S. faced the loss of their patent protection and loss about $19 billion in commercial value.

At the same time, the overall demand for pharmaceuticals has been increasing at ever slower rates since 2006. Total prescriptions dispensed -- these are retail prescriptions dispensed -- in the U.S. in 2007 grew by 2.7 percent over the prior year. In 2008, it increased by 0.9 percent, and for the first three months of this year, the number of prescriptions dispensed fell by 0.6 percent over the same period last year.

If we look at it simply in terms of branded products, it is even more dramatic. The number of

branded dispensed prescriptions fell 9 percent in '07, a 16 percent decline in 2008, and a 12 percent decline in the first quarter of 2009.

So, this slowing rate of growth, some of it is certainly attributed to the slowing economy even before the onset of the current economic crisis, as well as the response of patients, who are facing higher copayments, deductibles, and coinsurance payments for their health care and drugs.

When we take all of the dynamics that affect the demand for pharmaceuticals and the commercial sales by manufacturers, we have seen a significant decline over the past few years. We expect similar trends over the next five years.

This year, for example, we are forecasting that the sales value of pharmaceuticals at the X manufacturer point in the U.S. will decline 1- to 2 percent over last year. Globally, we see growth of 2.5- to 3.5 percent. These levels of growth are actually unprecedented.

When we look further out to 2013, our current modeling suggests there will be no net growth in the sales value of pharmaceuticals in the United States and,

globally, annual growth of between 3- and 6 percent.

What does this mean? What does it mean for companies that are pursuing genomics-based technologies, whether they are large and established companies that still have multi-billion dollar research and development budgets, or smaller companies whose ability to raise funds is dependent upon investors having confidence in the commercial opportunities for their products in the future?

What this means is increased pressure on the availability of ongoing funding for the research and development of innovative applications of genomics to develop the new diagnostics and therapeutics that are possible and that we have heard about this afternoon.

We do not expect that companies which are doing business in an environment that is not showing any growth and where their ability to increase sales is severely limited, are going to be able to continue the levels of R&D investment that we have seen in the past.

Moreover, the cost and complexity of developing new products has been rising substantially relative to their eventual commercial value over the past several

years for several reasons. One is, attrition rates remain very high -- again, we have heard that this afternoon -- especially for the very innovative approaches to therapeutics. So, the total resources required to yield one successful product actually are rising.

Regulatory requirements are, understandably, rising. They are also resulting in more expensive clinical trials and evidence development prior to a drug being able to be made available to patients.

Ongoing risk management activities and programs once a product has been launched, are also adding to the overall cost and complexity.

At the same time that we see a much lower level of commercial opportunity for companies and a consequential constraint on funding availability, we do see the significant commitment by companies, both large and small, to allocate significant funds and efforts in the areas of genomic technologies. The scientific advances are clearly very promising already. Again, we have heard more of that this afternoon. Indeed, the future prospects are conceptually transformative in terms

of the ability to diagnose and treat many different diseases.

Beyond the scientific advances, we also see high interest among payers and the recognition that genomics can be applied to health care issues in such a way as to result in lower health care system costs as well as the improvement or acceleration of positive patient outcomes.

Genomic-based research does represent the next immediate threshold in innovation that can bring benefits to a broad range of stakeholders, but the ongoing funding of private sector research is contingent on a commercial environment that rewards innovation adequately. The near-term commercial challenges for the private sector, even before we consider the prospects for health care reform over the next year or two, are daunting.

Frankly, I think a lot of folks don't have a clear sense as to where this industry is right now and the prospects that face us, partly because it has been so successful historically. But as we know, history is not a good predictor of the future.

Let me turn now to what we see as the potential

impact of some of the health care system changes that are under discussion and how they may play out on this embryonic but burgeoning area for innovation.

Overall, we see health care reform as enhancing and not hindering progress in genomics-based diagnostics and therapeutics. The current efforts to tackle the issues that have often been seen for a long time as intractable are to be lauded. These issues include the realization of the interrelationship between the myriad parts of our health care system, the extreme level of fragmentation in the delivery of health care, the dynamic nature of the scientific issues that underpin our understanding of health and disease, the role that incentives play in driving behavior throughout the system, and the willingness to directly address the uncomfortable realities of a very expensive health care system that doesn't deliver particularly good outcomes.

The fact that we are really trying to get our arms around all these issues is certainly something that we see as very positive.

We see the potential for reform in three areas having the most significant impact on genomic

technologies: first, the broad adoption of comparative effectiveness; second, changes to the drug and diagnostics reimbursement and incentives systems; and third, the adoption of health information technology.

Of course, without having the details of the specific proposal, it is impossible to define the impact except in fairly general and directional terms. Nevertheless, it is important that the ways in which each of these elements of reform may promote the advancement of genomic technologies are understood and considered prior to decisions being made.

Let me talk about each of those three. First, comparative effectiveness. The systematic evaluation of alternative approaches to health care can bring enormous benefits to patients, as it can drive providers to have a better understanding of what to do for their specific patient and when to do it. We are all aware of the potential benefits of evidence-based medicine: the use of clinical protocols, the rapid dissemination of new science-based understanding.

What we have not had in this country is a broadly recognized body or even accepted approach that

can really help advance this. The prospect of the creation of a comparative effectiveness entity that can provide leadership and guidance in these areas is a welcome one. The notion of being able to identify what works well in health care is entirely consistent with the science-based objective of genomic technologies, which are indeed being developed so that we can enable a better genetic-based understanding of what works well. So, at this level, this is a very welcome element of health care reform.

At IMS Health, we have experience in many parts of the world with health systems that have already adopted national comparative effectiveness reviews in one form or another over the past couple of decades. Suffice it to say, there is no firmly established best system, and indeed, in every country there is a high level of tension among stakeholders about the usefulness and application of the outputs of comparative effectiveness research. The approaches are definitely dynamic, with methodologies and approaches changing pretty significantly over time.

There are some learned lessons that can be

applied here in the United States as we design and implement our own approach. These can be thought of in three ways: who are we comparing, what are we comparing, and how are we using the results.

First, comparative effectiveness research 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. The challenge for comparative effectiveness is determining the appropriate definition of a patient segment.

Of course, genomics is, in a sense, complicating this because it enables these segments to be defined based on the presence or absence of specific genetic markers. There can be other bases for segmentation as well, such as disease progression, comorbidities, et cetera. The definition of patient segment may also need to change over time based on advances in scientific and clinical understanding.

What is critical is that we don't adopt a one-size-fits-all approach, which is completely antithetical to the scientific direction that we are heading in. The

most effective way to compare things is to do so at the most meaningful level, and getting the definition of patient segment right is critically important.

Secondly, what is being compared. There is typically a tradeoff required between comparing something that is sufficiently specific and narrow as to isolate its comparative effectiveness but, at the same time, comparing alternatives in a way that is meaningful to the overall objective function of health care.

What I mean by that is, the isolated comparison of one diagnostic test versus another without consideration of the full ramifications downstream in the health care system may leave you with a technically correct but hardly useful comparison. Similarly, the comparison of one therapeutic to another must be done in the context of the full course of intervention for that patient. An episode of care approach, or an approach that recognizes the full range of activities that can influence an outcome, must be utilized when defining what it is that is being compared.

Thirdly, how are the results of this comparative effectiveness research being used. Again, we

know from our global experience that comparative effectiveness, often undertaken by some type of health technology assessment agency, can be used in many different ways, from setting broad treatment protocols for all patients, to being used as the basis for rationing of health care and restricting access based on cost effectiveness.

What is most important is that there are mechanisms in place whereby the output of comparative effectiveness can be applied in the practical setting of a doctor's office, a clinic, or a hospital, to a patient based on their defined characteristics and consistent with the segment definition that was used to compare alternatives in the first place.

Again, this is an area where the prospects of health IT and the modification of incentives, which I will come to in a minute, can play a critical role and must be designed so as to be supportive of a more evidence-based approach to decisions about what tests or what therapeutics to apply to which patients and when.

We also know, from the experience in this country and others, that findings which emerge from any

sort of comparative effectiveness effort take time to be integrated into standards of care. This process requires active and ongoing support. It won't happen on its own.

An additional complication to the implementation of comparative effectiveness findings is that we operate in a very dynamic scientific field. There is a need for continuous monitoring of retrospective as well as prospective analyses to ensure that findings and conclusions are updated and current based on the best available information.

Prospective studies certainly are essential for pivotal research, but they are too slow and expensive for ongoing monitoring purposes. Instead, properly designed retrospective analyses of real-world data that can be performed by the public or private sector are essential to meet the ongoing needs of providers and patients.

So, the direction of reform with regard to comparative effectiveness we would say is positive, but the challenges in designing and implementing comparative effectiveness research are very substantial, dynamic, and interrelated to other parts of the health care system.

That being said, without transparent,

methodical approaches to comparing alternatives, we will never realize the potential of the innovation, including genomics-based innovation that is potentially becoming available to patients.

Let me turn to reimbursement and incentive issues. When we look at the current drug and diagnostic reimbursement approaches, we would say these are based on some level of assessment of a combination of cost and value of the procedure or the therapeutic. Yet we know that there are substantial distortions in current levels of payment. Fundamentally, we have encouraged a health care system where more of everything generates more revenue and profit to providers and suppliers.

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. Exploiting our understanding of genomics can result in substantial efficiencies in the diagnosis and treatment of patients.

Our health system is weighed down with redundant tests and trial-and-error approaches to

treatment protocols. Patients have to return again and again to their physicians in order to determine if they are responding to a particular course of therapy. If not, then they begin on additional or alternative treatments, followed by further testing to assess responses, and on and on.

The cumulative time to get a patient to target or to get them optimally treated can take weeks or months of testing and trialing. The cumulative cost is what we see showing up in our spending increases and growing health care funding deficits.

Moreover, the cumulative cost to the system includes crowded waiting rooms, overstretched physicians, and patients who have to take more time off work and spend more time working through the system and bringing stress not only to their lives but also those of their families.

The promise of health care reform is that we can move toward a more rational system that rewards efficient use of our provider system, more accurate diagnosis, and quicker resolution of a patient's health event. That will require an approach to reimbursement

that accepts that higher costs in some parts of the health care budget can be more than offset by lower costs in other parts of the budget. Potentially higher spending on better and quicker diagnosis and identification of optimal treatment options can lead to lower overall spending on treatment.

The prospect for genomics-based approaches that can enable patients to be pre-identified through diagnostics to determine which therapeutic likely will be the most effective and at what dosage, that is an approach that must be fully embraced by our reformed health care system. A reimbursement approach that recognizes the value brought to the entire health care system from these genomics-based methods is critical to their adoption and further development.

Managing health care costs in silos of expenditures with a budget for diagnostic tests, a budget for drugs, a budget for physician services, and a budget for hospital stays, surgical interventions, and rehabilitation services, that does not enable the entire system to be optimally managed and inevitably leads to higher health care costs.

Managing health care cost so as to reduce overall costs and reward those parts of the system that can help lower overall cost while maintaining or improving patient care and outcomes, that must be a part of reform. Mechanisms to reinforce such approaches will very much enhance, not hinder, the commitment and progress in genomics-based innovation.

The adoption of health care information technology and Eprescribing standards can also provide essential support for genomics-based technologies. The ability of IT to provide a substantially greater flow of information will enable providers to leverage the scientific understanding associated with biomarkers and genetic information and apply that to better and quicker treatment decisions and, ultimately, outcomes.

We are all well aware of the limitations of the current paper-based systems that still guide very large parts of our health care system. The replacement of these systems with IT approaches that provide the interoperability and access by appropriate users at appropriate times when critical decisions need to be made, as we heard from David Blumenthal this morning,

will advance the prospects for genomic-based approaches very substantially.

The ability to retrospectively mine large pools of anonymized patient information, including their genomic markers, will also be enhanced by full implementation of health IT. This will expand the ability of scientists to identify potential new areas of research and development and to supplement existing approaches.

Bringing the right information to the right decision-maker at the right time, and with all of the necessary patient privacy protections in place of course, this will accelerate the benefits of genomic-based research reaching patients.

So, what are the risks from health care reform. We would say the major risk to genomic technologies seen through the lens of the private sector that can come from health care reform is really the prospect that there will be less funding available for private sector investment in the high-risk research and development activities that are still needed and will be needed for a long time to sustain the innovation drive and deliver the promise of

these technologies.

It is clear that the overall approach to reforming our $2.6 trillion health care system involves resolving the long outstanding issue of what to do about those without health care insurance and resolving the cost burden that the system is placing on all of us and our children. Of course, what is much less clear today is how these are likely to be tackled and especially who is going to pay for what. I guess that is really what is under discussion literally as we speak.

The greatest risk from our perspective is the prospect of reductions in reimbursement rates or increases in rebate levels or some form of cost control that reduces the funds that can be provided to companies that are putting their capital at risk in the hopes of advancing genomic technologies. The current proposal, for example, to increase Medicaid drug rebates or an expectation that high-cost treatments should simply cost less, regardless of the value they bring to the health care system, these proposals will inevitably dampen the willingness of companies to continue their investments at current levels or, indeed, increase their spending in

order to accelerate advances.

As mentioned already, the ongoing funding of innovation is already under pressure. Further stress from price cuts or other expectations for lower expenditures for innovative diagnostics and therapeutics will potentially slow down or even stop the willingness of the private sector to invest in these areas.

In conclusion, the potential for genomic technologies is clearly enormous. The benefits can accrue not only to patients and their families through better outcomes but also to the broader economy and all of us through lower overall health care expenditures. Health care system changes can accelerate our progress toward the full realization of these benefits through the use of comparative effectiveness to changes in drug and diagnostic reimbursement and incentive systems and through the adoption of health care information technology.

We must ensure, though, that the focus of reform is on the ultimate desired outcome from the entire health care system and that we work back from there to identify the more specific changes that are needed.

Reform measures must understand the innovation cycle that exists in the public sector, in academia and the National Institutes of Health, and so on, and the private sector, to ensure ongoing support for efforts that have already brought exciting results and even more exciting prospects for improved health to all Americans. Thank you very much for your time.

DR. TEUTSCH: Great. Thank you.

[Applause.]

Question-and-Answer Session

DR. TEUTSCH: A few questions. We will start with you, David.

DR. DALE: It seems to me that many of the advances in genomic-based technologies leading to useful pharmaceutical products have come from little companies, not big companies. What do you think the future is for little biotech companies?

MR. AITKEN: Right now they are facing a very difficult near term, partly caused by the economic crisis and the essential freezing of funding from venture capital into small companies. There are various reports about how many companies face have less than six months'

cash on hand, for example.

The broader issue is that those companies will only be able to continue to attract venture capital or investment capital if there is a prospect that down the line in five years or 10 years or 15 years that the output of that product will be reimbursed, that there will be a commercial market for those products.

I think part of the reason that we have had a very poor environment for small companies in the last couple of years is because that expectation, that prospect, is a little less clear now than it was five, 10, or 15 years ago. All the talk about high-cost medications driving up the cost of health care, which again is a little different than the way we see things, given the sort of numbers I was telling you, but those prospects and the prospects that prices will have to be cut and so on, that puts a damper on capitalists who are looking to see where to invest their money and where to assume risk. So, I think it is a real issue for those small companies.

DR. NUSSBAUM: First, Murray, thank you for an intriguing perspective on health reform and what the

unintended consequences could be in terms of discovery and particularly in the field of pharmacology. I wonder if we could step back a little back. Maybe you could comment on this, and then I have a specific question.

If we look at the last six or seven years, the vast majority of new drugs and the expenditures on new drugs are basically same-class agents, correct? So, probably we have not seen the breakthrough that we might have expected in the past.

Between "me too" and breakthrough there is a progression, and the way science progresses is really iterative. I think most people who have not spent their career in science believe that so many discoveries will just be revolutionary as opposed to evolutionary.

With that in mind, number one, how can you suggest a reform proposal that might encourage greater investment in the area of new molecular diagnostics or pharmacologic agents, particularly with the consolidation? It is the corollary of what David said. Not the small companies that cut maybe single-source products or single products, but the larger companies. We are having two major mergers going on. Do you think

that we will see more discovery coming out of those mega mergers or will we see less discovery?

That is what I wonder if you could address, innovation within not health care reform but the model of consolidation that we are seeing in the pharmaceutical industry.

MR. AITKEN: Those are all interesting topics to delve into. First off, with respect to "consolidation" within the industry, there is no evidence that bigger is better from an R&D, innovation, productivity perspective. The reality, however, is this is still an extremely fragmented sector. Even with the mega mergers, no one company has more than 10 percent of the commercial market, nor 10 percent of the spending on R&D, if you want to frame it that way. Indeed, if you have just 1 percent of the market, you are still a top 20 player. This is still a very fragmented sector of innovation, despite the fact that some of the R&D budgets are many billions of dollars.

I think the other issue, though, in terms of where the innovation comes from and the whole issue of incremental versus breakthrough, I think now we are

actually at an interesting period with payers, and this is a global statement. Let's be real. The U.S. is not the only place that pays for drugs. Companies that invest in new drug development do rely on China, Western Europe, and Japan to fund their investments.

What we see, though, is that payers around the world are very clearly pushing back on the incremental improvement. We see that therefore having an impact in terms of what is coming through the pipeline. I think five to 10 years ago we saw a lot of incremental innovation coming through. We are seeing it less of now, partly because in the last couple of years, for example, products that have been incrementally innovative have not been reimbursed or have not been accepted in the health care system.

Meanwhile, the early stage pipeline of most companies is full of very high risk, very interesting, more likely to be breakthrough kinds of therapies, including genomics-based therapies, but we have five to 10 years before they come through to the marketplace, which is why we are really concerned about what impact near-term health care reforms may have on this whole

sector and whether it can tip the balance for companies in terms of their willingness to continue to invest in these very high-risk breakthrough kinds of innovations.

I think that is why we need to be very deliberate about how we think through the impact and the unintended consequences of some of the measures that are being discussed right now.

DR. BILLINGS: I would agree with you that, as someone who has tried to write small business plans, that challenges to intellectual property, the closure of the IPO market, and now not having the pharmaceutical industry necessarily as an exit, makes writing a business plan considerably more challenging.

My question is on another point you made. I think you said there were $135 billion of therapeutics coming off patent over the next period of time. What happens when a pharmaceutical comes off patent? The amount of money being spent declines because of lower-cost generics. So, what happens to the difference between the amount of money being spent on let's say a patented medication and then the lesser amount, or is it a lesser amount that is actually spent when you add up

all the generics that enter the market?

MR. AITKEN: It is a lot lesser amount, and it represents a savings to the health system that one would hope can be identified and managed appropriately, that it would be reallocated to fund some higher-cost, more experimental kinds of approaches or reallocated to other parts of the health care system. Right now I'm not sure we have a good means to, in a sense, follow where those savings flow.

DR. BILLINGS: Right. So that, in the immediate term, one potential offset to the decline in the amount of investment that the private sector might make in innovation is to capture that transitional money.

DR. TEUTSCH: One of the problems, of course, is that among the big drivers of increasing cost are aging population and chronic disease of course, but technologies in the aggregate have cost more over time. Yet we are continually talking about some of these that are not just cost effective but really are going to have net savings. Obviously, that is where all of us would like to see this go, particularly as the pressures get greater, to drive greater efficiency for our health care

dollar.

You, again, said that some of these things are on the horizon, but it has been pretty rare where we have actually seen things that save us money. That is true of public health and population health as well as within the health care system. I think this is a continuing challenge for all of the technology developers.

I wonder if you could reflect on how realistic it is that we are actually going to see, over a relatively short period of time, some of these innovations. Over the longer period, as things go generic, and whatnot, maybe we will get there, but it has been pretty tough to make that case for technology.

MR. AITKEN: It has. I think part of that is because we don't quite know how to measure the cost of health care and we don't quite have a good way of pinning a number on what it costs to have a patient flow through a treatment episode with relatively poor diagnostic approaches and with lack of health IT.

What does all that add up to? I don't think anyone can really put a number on that, which makes it difficult to then say, here is an alternative that could

actually save you cost.

I think one of the reasons we don't have a good sense of the cost savings is because we don't do a very good job of being able to identify what various parts of health care, from a patient- and an event perspective, really cost us.

I'm very confident that the ability to use diagnostic tests to predict which patients are going to respond to a particular treatment can take very substantial costs out of the system. We need to have a way of counting it and putting a finger on where it is, but I think that opportunity is absolutely there. That is the promise for genomics-based tests and therapeutics.

Our advice, by the way, to private companies that are developing this is, you had better get started now engaging with the entire health care system from a payer perspective to help them understand what they currently spend in their current approaches so that you can then come in with an ability to say here is how much less you can spend in aggregate by applying these innovative diagnostic therapeutics. Even though those may cost you more, you will take total cost out of the

system.

DR. TEUTSCH: Without specific reference to genetic technologies, let me push back a little bit. Obviously, once we have a technology out there, developers want to see it used. Frequently, you have these groups for whom it clearly provides a real advantage, but then we see it being used much more widely.

How do you see us getting to a better partnership where the providers, the payers, the patients, and the developers get us to drive things, not just in comparative effectiveness and data, but actually help create the systems where we get, as you said or somebody said earlier, the right technology to the right patient at the right time at the right price?

MR. AITKEN: I think that is one of the big opportunities from this current health care reform effort, is to really try to break down the barriers between the various silos of health care.

I think CMS is the place that it can be driven from, given their role as a payer and, really, their central role in this country. That requires them to take

a different posture than they have in the past. I'm not sure we need to set up another new entity to do it when CMS, in its quest to ensure that it gets value for its money, or value for our money, really does have the obligation to do that.

I am positive about this year being the year that everything is on the table in terms of health care. If we have the right intent and the right mind-set without being Pollyanna-ish about it, I think we can make some progress on this.

DR. TEUTSCH: Thank you very much. Obviously, these are provocative things for a very important part of the world of genomics.

We are going to go ahead and take a 15-minute break. When we come back, it is time for all of us to do the heavy lifting and figure out where it is that this committee can actually begin to add some value to this discussion. If we try to visualize a world where personalized health care is a central part of the system, what is it that we can be helping the Secretary identify and do that will help us get there.

So, why don't we take a break. We are all

going to be pumped. You are going to give us the answers. Thank you.

[Break.]

Committee Discussion

DR. TEUTSCH: So, last time we had some good discussions with the payers. Today we have heard from consumers and advocate groups. We have heard a little bit of what is going on from the industry perspective and from the providers. Now the question is, are there some opportunities within all of this that we should seize.

I'm going to try and channel Mara a little bit because, regrettably, she couldn't be here to help try to spearhead some of this discussion. I think if I could frame it, what she last told me was, if we visualize a future that has a substantial piece of the kind of personalized health care, genomic-based care, that we think could add real health benefit, and wanted to help talk about the kinds of things that we could advise the Secretary to do to help us realize that future, thinking about it in the broad terms of the health care system and health care reform, what would those things be; is there something that we actually have to contribute.

Clearly, the legislative process is going very quickly. Chances are it is going to go much faster than we will. Nonetheless, we have some ongoing opportunities to help shape that. What would that look like.

Some of the things that we have talked about include that the policies need to promote the development of cost-effective genetic and genomic technologies; what are the kinds of things that impede the development of those kinds of technologies; are there some proposals as to what we could do to try and minimize that, or to help targeting so that these technologies get to those who can benefit the most, that can facilitate their implementation and translation into care.

We have heard some of those today in the different thoughts about how to organize the health care system and health IT. We have heard about comparative effectiveness, although I would like to defer that discussion a little bit since we are going to be talking about that extensively tomorrow. Then, some of this is about timing, when these technologies are going to be ready, and how we begin to do that.

The discussion I would like to have today is,

what are the things that we think we might consider taking up to help realize that future.

DR. WILLIAMS: There are perhaps two elephants in the room that I think influence the discussion. The first one is one that, perhaps understandably, hasn't been clarified for this group but I think is critical as we think about what we take on. That issue is, how is the current secretary engaged with this group in terms of what she is looking for us to do.

It seems to me that if we go in a direction that the Secretary is not particularly interested, in that, we may be tilting at windmills. I don't know that we can actually get any sense of that, but it does seem to me to be a fundamental issue as we tee up the discussion.

The second issue is, to use a sports analogy, if anybody says it is not about the money, it is always about the money. As we were listening to the presentations today, I again came close to despair in the sense that one of the things that is really critical is being able to somehow track the value, track the dollars.

While we can pick off pieces of this that I

think we can take ownership of, the discussion in the very last presentation that Paul highlighted was the idea that the people that are engaged in certain parts of the activity are not the ones that are necessarily going to receive the reward from their participation in this activity.

So, is there anything that we as a group can do, at least within the realm of genetics, genomics, and personalized medicine and reflecting on health care reform, to say if we were to reform this aspect of how we accounted for the flow of dollars, this would in fact facilitate work in this area, which we think would add value.

Those are, obviously, unhelpful in terms of a brief targeted discussion, but I thought they needed to be said.

DR. TEUTSCH: Let me just say, clearly, the Secretary has a lot on her plate at the moment. I would hate to see what her plate looks like. I think it is not surprising we haven't heard directly what she is actually looking for from us. We are going to continue that discussion.

As Sarah said, our official channels up are actually through the NIH Director, who we hope to have permanently in place soon. I have no information to share with you. We do need to continue to work on getting those channels open so we can see what those opportunities are.

Meanwhile, I think some of these issues are general enough that if we can find the policies and issues we want to begin to tackle, we have a lot of homework to do ourselves.

DR. BILLINGS: Are you thinking about a letter, a format much as we did at the end of the last administration, to the current Secretary specifically on the topic of health care reform, or are you thinking about another process?

DR. TEUTSCH: I don't know that we want to get into all of it now. You will recall that when this administration took over we wrote a progress report which basically highlighted the work of the Committee and some of the issues that we were going to take up. We outlined the agenda going forward based on our planning process that Paul Wise had led us through and talked about some

of the things that we thought were, if you will, the priority items for implementation.

That is where things stand. We sent that forward.

DR. BILLINGS: I think we have some notion about what the congressional policy debate is going to be like now. It might not be a bad time to restate what we believe the field of genomics is going to deliver in a relatively short time. That might be relevant to the discussion of what might need to be preserved as people do some horse trading here in that policy debate.

For instance, the ability to embed the elements of genomics that comprise some part of the personalized medicine deal into a health record, would be a valuable thing to have preserved however health care reform comes about and however the electronic health record plays a role in that.

Similarly, as Marc just said, there is a problem with who is going to pay for innovation in genomics. If we believe that personalizing health care through genomics adds value to the health care system going forward in our vision of the health care system,

then some sort of improved mechanism to pay for it as it delivers that value would be important.

DR. DALE: I will echo what Paul just said. That is, the opportunity now is to have or create a health information technology system that has longitudinal patient records so that five, 10, 20, or 100 years from now we will know what happens to people with the current collecting of genomic data. What I would call data banks of tissue, if not the analyzed tissue, provide the opportunity in the future for population analysis.

That is the real opportunity right now. The technology has advanced enough to do that, and certainly, the materials could be stored for future analysis so that you could project for patient-specific outcome data.

DR. NUSSBAUM: Just a clarification question. If we look at the current legislation that has been proposed through Senate help or some of the Senate finance proposals, or even as the House takes action, have we systematically looked through that and seen where there are references to genetics, genomics, and innovative research?

The reason I say that is, to be effective I suspect we have to look at where the thinking is today. I think we know a lot of that, but for example, the comparative effectiveness legislation that has been introduced may be one approach to have our voices heard. There will be other approaches. David Blumenthal shared with us that people are really debating meaningful use, so we have had some input there and we could formalize that through communication.

It strikes me that health care reform will move, I think, pretty rapidly. The velocity will be great. Our deliberations are over a broader time interval. I just wonder if there is a way of looking at what is there and then responding through recommendations based on the 18 previous meetings. Maybe you say that has been done because you have communicated with the administration, but I think we need to look very specifically in that 600-page health bill and others where there may be opportunity.

DR. TEUTSCH: There are two things I want to say. Number one is, we, of course, are not advisory to Congress. What we do will need to be channeled through

the Secretary, which doesn't obviate that because I think it is fair to say where we think those important components need to be.

I did a quick search just looking for personalized health care and genetics and, at least in the health bill, there are a few places where it is. My recollection is one is about quality and another is about comparative effectiveness.

DR. NUSSBAUM: I do realize our advisory role, but I think since we are also being told by the administration that they are looking to Congress for some leadership or shared leadership that that is another opportunity.

DR. TEUTSCH: I think it is fair to say there are some things that we can do over the short term here that may be of that sort. Then there are some things that we may want to do over the longer term.

MS. WALCOFF: I was just going to say, one challenge of that is that it is such a moving target and it is so huge. You are going to have a Finance Committee bill in a couple of days or maybe a week. You are going to have a House bill that is moving. I don't know that

we really have the time or the manpower resources to figure out what exactly is going to be in there and anticipate that and advise on it in a meaningful way.

It might be a better use of resources if we focus on what has even recently been passed. In fact, what is going on in David Blumenthal's office; what is going on out at AHRQ. Are there some ways that things are already being implemented.

There are grants that are being distributed under the Stimulus. Maybe there is a recommendation that each of those have a tissue storage requirement. If you are going to receive federal funds from the government, then you have these requirements. I think this administration is not afraid to make those requirements on the federal dollars. It might be a little more effective if we look and see what is already there, and still move it quickly.

All of that is still moving very quickly and I think has a significant impact on what the work of this committee is, but probably enables us to give more specific advice to the Secretary about those specific agencies or offices. Also, it raises the profile of the

Committee with her.

DR. EVANS: I want to second the idea that Sheila just brought up that this is such a rapidly moving target. It seems to me trying to anticipate where their priorities are and what they want to hear isn't the best way to go about it. I think we simply need to move in a methodical manner and figure out what is the best advice we can give.

I have a much more boring view of the potential of all of this for health care, and that is, we just don't know. I think what we have to focus on are what the guiding principles are that will allow us to actually figure out what is good and what isn't, moving on in the future.

I think it would be premature to identify specific things that we think are going to be the future of genetics and medicine. We don't know yet. I think we have to focus on the methods and procedure.

MS. WALCOFF: Just to follow on with that, one of the challenges that I have experienced is that there really isn't anything specific you can point to to demonstrate. We talk about the value of doing this and

we talk about the cost savings that we believe inherently will occur, but that is a real sticking point every time you get to implementing something that will advance broadly genetics, genomics, and personalized medicine.

This is another opportunity for us to really look and perhaps bring some people in to do some kind of survey and use the authority of this committee to convene better information. We have a wide reach in terms of folks we can bring around.

DR. TEUTSCH: Just to follow up before I get to Liz and Alan, we could have a group put together some principles that we think could be raised there, not necessarily as directive and not specific comments on specific bills. If we had a group that did that, we could move that forward, although the time frame for that at best would probably still be at our October meeting, by the time we actually had a chance to consider it. I don't know if that is timely enough.

DR. FERREIRA-GONZALEZ: Steve, building on those principles, some of the issues that we are discussing for health care reform we have already tackled through all the different reports.

DR. TEUTSCH: Some of them.

DR. FERREIRA-GONZALEZ: Again, like we did with the direct-to-consumer testing, can we look at some of the issues that we are talking about on health care reform, such as a value-based system and health information systems. For example, for health information systems, we talked about them being standardized for genomic information, privacy status, and clinical decision support. Can we pull data or information from the work that we have already done to specifically address issues that we know for a fact are going to be part of this health care reform.

DR. TEUTSCH: So, from you I'm hearing that what we could do is actually go back through our work, and what you will hear about tomorrow, the work Sylvia and others have done on DTC, but pull it together a little more broadly. In some sense, we already did that in January when we pulled out the salient issues.

DR. FERREIRA-GONZALEZ: But look at the key elements, for example, moving forward.

DR. TEUTSCH: Yes, look at the key elements. Maybe it is not principles. That is not the right word.

Maybe some key components.

DR. FERREIRA-GONZALEZ: Key components that we have already discussed, and just reiterate the work that we have done. At the same time, we should identify other things that, as they move forward through this health care reform, may be big concepts that we might be able to start bringing people in to contend with. There will be variations and decisions on how better to do certain things.

The issue of reimbursement keeps popping up, and we have talked about how the reimbursement for genetic testing and services is not working. So, if that is an issue that we need to revisit, even though we already have a report there, or we need to create a new system, how are we going to engage individuals to look at that.

DR. TEUTSCH: Is your comment on this one or another one? Alan. We will come back to Liz and then Gwen.

DR. GUTTMACHER: I agree with a number of the comments that have been made, specifically the ones that Sheila and Jim have made recently. I think that it is a

little bit unrealistic to think, as dynamic and high-powered the forces are at play right now in terms of health care reform, that the Committee can in a sophisticated way really have large impact upon that directly by contacting the Secretary. It is such a fast-moving field.

At the same time, though, I think enunciating the principles that the Committee through its years of deliberation now has come up with and other kinds of principles would be important to have as we start looking at new ways of delivering health care. It is a very timely moment to be enunciating those things and having those as background for the Committee as we go forward with new leadership of the Department.

We are getting not just a new Secretary but new senior leaders across the Department, some of whom may have an interest in the question of personalized medicine and genomics' role in it. That gives us an opportunity, I think, to combine the movement towards health care reform and the work the Committee has done over the years with new leadership to get ready to move forward with some new kinds of conversations. I think doing that

background piece of pulling things together in preparation for a world where there is some change in health care -- and we don't know exactly what it is going to be yet -- could be quite useful.

MS. DARIEN: At the risk of repeating, I just wanted to say that one of the ways to potentially move forward is to take some of the things that have been put around the room and put them into one thing. I think Sheila is absolutely right; in order to move forward in personalized health care, there has to be an effective and standardized tissue banking. That has been a mandate of the NCI director.

Perhaps outlining the major things that we want to accomplish, going back to the work, looking at what some of the challenges are, and then putting down at least two or three action items that would bring us closer to these goals, would be a really worthwhile thing to do. It wouldn't be as onerous as tackling the whole world.

DR. ROYAL: I agree that looking at what the Committee has already done would be useful, but going back to someone else's comments about thinking about the

priorities of the Secretary and the Department, I think about the genomics and personalized medicine bill that Obama introduced in 2006, which had some of these things in it. It was reintroduced by Patrick Kennedy. I'm not sure where it is now. It had language about gene-environment interactions and us needing to look at that as we move forward with personalized medicine.

We may want to look at that. I don't know to what extent our work can inform what they do with that bill and how that bill moves forward, if it does. I think that could probably give us some ideas about at least where then Senator Obama's thinking was. President now, I don't know, but I'm sure some of those are still the same. That might be one way to move forward.

DR. TEUTSCH: Dora Hughes came to this meeting, didn't she? Dora Hughes is still there, who was very much part of those initiatives.

DR. ROYAL: That's right. She was, yes.

DR. WILLIAMS: I want to propose a new direction that actually builds on what --

DR. TEUTSCH: Before you go in new directions, Liz is ahead of you in that queue. Are there other

things in this discussion?

DR. WILLIAMS: This actually relates to where we started, which we left before we --

DR. TEUTSCH: Let me close this part out. What I'm hearing is that we put together some sort of -- I don't know what we want to call it -- a white paper or principles/important considerations going forward based largely on the work that we have done and that it be done on a reasonably fast track. I'm hearing preferably before our next meeting, although that may become operationally difficult. That is one thing that we could do. Can we leave that on the table?

Let me get back to Liz, and I will come back to you, Marc. I don't want to jump queue.

DR. MANSFIELD: Thanks, Steve. You will still get the last word, Marc.

A couple people have brought up the idea of tissue banking and tissue banking and tissue banking. I have been working with Carolyn Compton. If any of you are in the biobanking business at all, you know Carolyn Compton. She is quite a colorful character. I'm a subcommittee chair with her on two different committees

concerning biospecimens.

This is an area in genomics that is unbelievably important. It is not just tissue banking. There is a huge amount of specificity to what you know about the tissue, what you know about the patient it came from, what you know about how it was processed, stored, handled, and so on, that can make profound differences in what happens when you go to test that tissue to make new discoveries or to validate existing discoveries, and so on.

I would recommend that we bring Carolyn in to hear about that -- she is from NCI -- and that we perhaps recommend to the Secretary to really start focusing on that because, if it is not there, it is going to be extremely difficult to go forward in genomics and genetics.

DR. TEUTSCH: Let me ask a question. I'm hearing two things. One is the health system/health reform kind of issue and things that are key to furthering the research and development side. Are you all suggesting we somehow bring all that together under one umbrella or are these separate things?

DR. WILLIAMS: No.

DR. TEUTSCH: Do you have the bridge?

DR. WILLIAMS: I think I can clarify it, at least from the perspective of what I was thinking. I think it fits into what Liz is thinking, too. It has to do with foundational infrastructure. What triggered this for me was the remarks that Paul and David made at the very beginning of this discussion.

We can't hope at some point down the road to be able to capture value from genetics, genomics, personalized medicine, tissue banking, whatever, if we have fundamental deficits in our current infrastructure that don't allow us to handle the information.

I must admit I was not reassured from the discussion we had earlier about the direction that health IT is going. The concerns that I have specifically are that we may be moving away from some of the proposed standards around areas that are clearly gaps in health IT at the present time to handle information that is going to be absolutely critical to realizing the benefits of genetics, genomics, and personalized medicine, to something that may be more market-driven. The market may

or may not be requesting things that actually in the long run are going to add a tremendous amount of value. Michael, obviously, talked a lot about that in his standards talk at the last meeting.

What I was going to propose was that we, I think appropriately, had deferred to certain of the workgroups of the AHIC the advisory role to the Secretary relating to the ownership of aspects of health IT and personalized medicine. That doesn't exist anymore.

DR. TEUTSCH: And the Clinical Decision Support group that was within that.

DR. WILLIAMS: Exactly right. I think that, absent any sort of son of AHIC appearing in the near future, it may be appropriate for us as a committee to consider taking ownership of the health IT aspects of genetics, genomics, personalized medicine, biobanking, et cetera, to make sure that the health IT infrastructure going forward will have the capacity to support it at whatever time it appears to be appropriate that we get on the escalator.

MS. AU: I agree with Marc. I think one of the problems is that we are already behind the train. The

funding RFAs for a lot of this stuff are coming out already. They are from different agencies who are not coordinating, and the people that are responding are the states or organizations in the states. We need to figure out how we can make this all work.

Somebody is going to get funding from CDC to do this one HIT database, someone is getting funding from HRSA, and we are getting newborn screening blood spot money and being offered money to bring maternal and child health to the table to look at HIT, and then there is HIE funding. It is all not coordinated.

We are behind and the train is leaving. I'm getting notices every day that next week there is another RFA coming out on this, that, and the other thing on genomics and you need to apply for it. I don't know how fast we can work to actually make recommendations when the train has left the station already.

DR. AMOS: I think I agree with everyone.

[Laughter.]

DR. AMOS: I really think that what the Committee can do, just to be nonpolitical, is to cut to the chase and help the Secretary advise what is possible

and impossible at this point.

Jim's point that we just don't know is exactly right. We have no idea whether genomics is going to help anybody understand chronic disease or not. We really don't have any idea at this point.

We know that genetic testing has the ability to help understand what is causing a certain number of a small percentage of diseases that are plaguing mankind. That is very useful and very helpful, but the questions beyond that we just don't know.

We have spent a lot of time talking about direct-to-consumer and GWAS and all this stuff. We have enough data and enough information to provide a very clear picture of what can be done and what can't be done at this point and also a clear picture of what could be done with personalized medicine.

The reason why we are focusing on electronic health records and pharmacogenomics right now and this whole personalized medicine thing is because that is all we can do. We really don't have the ability to go beyond that. There is no clear evidence that genetics is going to get us there. If that is the case, what else can we

do.

I agree with Marc. Health IT is critical, but it is the confidence in the measurements that go into that health IT information that is also critical.

The issues of tissue are absolutely critical, but there is also blood, urine, and all sorts of things that have to be taken into account. There is real interesting information anecdotally that if you don't do certain analyses on blood within the first 10 minutes of the draw, they don't work. There are real problems. Everybody has taken blood for granted for years, but when you start putting them in microfluidics formats and things like that, you have big problems.

I think there are lots of opportunities here. We have a lot of data, and I think we can be most valuable to the Secretary by putting together all our information that we have gotten and saying what can be done up to this point, what could be done, and how do we get there. How do we get there.

You are the experts at this. You have thought about it a lot. We are here to help.

DR. WILLIAMS: I think I agree with Michael. I

think the point that Jim made and that you made that we really don't know is absolutely correct, and I concur with that.

The problem is, if our infrastructure won't collect the data that is important, we will never know. Focusing to make sure that we at least have the capacity to collect the information so that we can learn the answers over time, was the point I was trying to make.

DR. AMOS: It is more than genetics. It is more than genomics.

DR. WILLIAMS: Yes.

DR. EVANS: The rules aren't different for genetics. I think that we have to keep hammering home on the point. I'm as big a believer as anybody that genetics has the potential to transform medicine, but we have to insist that real evidence be generated before it is implemented. I think we need to continue to hit home on that.

DR. WILLIAMS: The point that I'm trying to make is that, right now, the blood test that you are talking about can be represented in the electronic health record. Genomic information cannot be represented in the

electronic health record at the present time. We do not have the standards that have been promulgated to be able to do that. That is a gap. That is why I think there is a certain argument for genetic exceptionalism if we clearly can't enter the data into what we are using at the present time. Therefore, I think that should be an emphasis.

DR. WISE: This has been an important conversation, but I'm not sure I understand a coherent plan of action, which I think is what the charge just was from our chair.

There is a sense of deja vu because back in December we tried to do precisely this, to identify central, core issues, to anticipate what those were going to be, and then to elevate those contributions from this group over the past several years that were directly relevant to those issues.

Now, we are six months smarter than we were back in December. A lot has gone on and certainly a lot more energy is being generated around these issues, but we are still faced with what are the mechanisms to identify the strategic contribution of this group. Right

now, the people working on the health reform bills are getting hit every day from 100 special interest groups. We run the risk that we are just a genetics special interest group jumping up and down about genetics, genomics, epigenomics. Of course, nobody knows what that is.

[Laughter.]

DR. WISE: I think we have to be very thoughtful, and we tried to be back in December, to create a coherent message that was intensely strategic, that was special to what this group's expertise is, and that fit a strategic utility in a very complex, very chaotic public deliberation. If we were going to move forward, we would have to have certain very specific guidelines of what we were trying to accomplish and a general understanding, actually before we leave today, about how this group is going to go ahead and do it.

When we put this together -- it was primarily Sarah and Steve. I was just a little bit part of the process -- it had to be something that we basically already agreed upon because we don't have the mechanisms in place to take a very complex set of issues, negotiate

it, think it through, and have something coherent put together by October unless we set up a process today that would be able to accomplish that.

I think we need to be very strategic in the way we think of things, recognize the processes that have been our strength, as well as constraints, as a group over the past several years, and then give some guidance to Sarah and Steve and have some general consensus about, realistically, what are the action steps that we need to do to make this really worthwhile.

DR. TEUTSCH: Mara, are you on the phone?

[No response.]

DR. TEUTSCH: Someone is on the phone.

MS. DREYFUSS: Rochelle Dreyfuss.

DR. TEUTSCH: Hi, Rochelle. Just to bring you quickly up to speed, we have been talking about --

MS. DREYFUSS: I have been listening all along. I got disconnected and just reconnected.

DR. TEUTSCH: Oh, okay. Did both of you hear what the discussion was today?

MS. DREYFUSS: Yes, I did.

DR. TEUTSCH: Mara, I tried to say what I

thought you had sent me earlier, but do you want to articulate what your idea was?

[No response.]

DR. TEUTSCH: I thought I heard her. No? No. Okay.

Most of the things that we have talked about here have been one place or another in our work today. Many of them were captured in what we did back in January. There are a few that we did not emphasize. Some of the issues regarding the biologic specimens we didn't focus on. I don't recall that we focused particularly on some of the privacy and protections issues. We can go back and bring some of those forward.

DR. BILLINGS: Steve, I'm sorry, but as I remember the summary document that was created, I don't know that that is particularly what I would think of as a meeting Paul's criteria of focused, strategic, tightly oriented, moment-of-health-care-reform document that we want to be putting forward right now.

I completely agree with what Paul Wise just said. I'm not sure that that document is what we need.

DR. TEUTSCH: No, I agree. At least the items

I heard were issues regarding biospecimens, some privacy concerns, DTC, laboratory, health information technology, some decision support, AHIC types of things, coverage and reimbursement, all things which we have done before. Now, we didn't lay them out quite that way in that report, but some of them are there and we can certainly pull some of the others together.

Hopefully you have all read the DTC summary, which is in your book. If not, that is tonight's assignment because we will be talking about that tomorrow. It could be rolled into that.

That is what I'm hearing as some of the core things that we want to lay out as of importance. I think Mike said it pretty nicely. What is the current state of the art, where are we, what do we need, and what can we do, can be a framework for doing that. That isn't a strategy for you.

DR. BILLINGS: No, I think that, actually, I would like not to have such a long laundry list of things. As Mara said, if we are in an era of health care reform, if there is going to be something different a year or two years from now, whatever the time frame is,

what are two or three things that we absolutely have to have in that to guarantee that all this brouhaha about all the things we are here for actually happen.

DR. TEUTSCH: You are talking about a reduced level of critical factors.

DR. BILLINGS: A much reduced level, yes.

DR. FERREIRA-GONZALEZ: Even if it is a much reduced level, I think we have an idea of some of the legislation. There are specific areas that we are going to be looking into, either changes in the delivery system or the results of comparative effectiveness research, but you do need the infrastructure for this. We have already identified through the different reports these needs of the infrastructure.

So, this moving train either has left the station or is already moving through the station. We know already certain key elements like tissue banking, information technology, and privacy issues will have to be in play. We might not be completely comprehensive with the final cut of the health care reform, but if we can start laying out some of the infrastructure needs to move forward, either in more detail or not so detailed,

that is what I think we need to work towards.

DR. TEUTSCH: We can do that. Sam.

DR. NUSSBAUM: It appears that the legislation and health reform over the next months will be very specific on insurance market reform, coverage, payment reform, and some capabilities of care coordination, but I suspect that it will not be very specific over the technical areas that we are talking about.

I just want to reemphasize that we do know that there is work underway with a very tight timeline on health IT. We know there is work underway on comparative effectiveness research because there has been legislation introduced that is much more specific and granular to our issues.

I would think that we can go back and not rediscover the work of the past years but just take what exists and frame it to those specific considerations. Let's inform that dialogue rather than espouse all of the potential of understanding genetics. That is where I was coming from. Let's go in that direction. Then, since this will be a journey, many elements through the administration and the Secretary will be shaped off that

foundational legislation. That is where we can address some of the more technical considerations.

DR. TEUTSCH: Those would be a strategic couple of things to do now. Sheila.

MS. WALCOFF: I think what I'm hearing is starting to gel together. I think that was a very good point. I am sitting here thinking if I were still sitting in Dora's seat, or Rick's seat from before, or the Secretary's seat, what would be most useful for me from this great committee that is here to advise me.

It doesn't always have to be an action or a specific recommendation. It can be something like you were saying, like infrastructure. I'm a big fan of three, but here are the three key issues that are somewhere in the state of play, whether it is trying to figure out how to get the standards for genomic information into electronic health records.

Just take biobanking as a top line and then say, here are some of the key issues that have been talked about a lot and are still being talked about, but these are the essential infrastructure things that are going to be necessary to build this into larger health

reform generally, however it emerges.

That might be a concise and direct way. This Committee has done a lot of work in the past on that, but we might even be able to integrate some new proposals, whether it is, here are three things you should pay attention to as you develop additional work under the comparative effectiveness research piece of it, or David Blumenthal's work, or things that are going on.

I also think it is important to reiterate a little bit in a transition like that the fact that this has been ongoing for a long time. I will say, as new people come in across all the agencies, they really don't know. You get all these books that you inherit on your bookcase and they all look blue and are all very thick, and you don't even know where to start. So you look for the little things that you can get quite quickly.

One of the things that was great for me is that I went out to NIH. I had come from FDA so I knew FDA better, but I went out to AHRQ and asked them, what do you do in this area, why is it important to this portfolio, and why is it important to the Secretary. If we can think that way through the lens of exactly what

this committee was formed for, I think we can provide something that would be very useful first to the Secretary's immediate staff and then of course to her to let her know that these are the resources that exist. You are there and you have a long history of this.

A lot of times, people will be sitting in meetings and they will say, yes, I just went to my doctor and I had this interesting thing I saw on the Internet. Wouldn't it be great if we could have our genetics in our electronic health record. They have no concept, because they haven't focused on it, that there has been all this work that has already been done. Then they say, let's start a workgroup on that.

So it is good if you can do anything to help avoid creating that additional duplication of work. I had a number of those occasions where I thought, if I had only known. So, perhaps we can narrow it down to something like that infrastructure as a real building block and identify two to four items under that that can be a key focus and that might even outline how we may proceed. Maybe we take one of each of those things at each following meeting to really delve into the details

at a more granular level.

DR. TEUTSCH: I'm hearing us devolving to a short list of things that hopefully we could get agreement on today that we could actually do fairly quickly, capture and then perhaps elaborate on as we go forward. Mike.

DR. AMOS: I just want to make one point. The tissue banking and the biospecimen infrastructure you are talking about are part of the larger measurement infrastructure. That is one aspect of measurement infrastructure. The rest of it is also with the IT piece, which goes into analyzing the measurements as well.

DR. TEUTSCH: I understand. Presumably, we are going to have to elaborate a little bit on these things and flesh some of it out a bit more.

DR. DALE: The key to that is the linking of the clinical data with the biobank and being able to analyze long-term. We heard about cancer today, but we didn't hear about long-term cancer survival as it relates to both host factors and tumor factors because there is no bank of materials available to do that. I have worked

for 20 years in this field, and I wish 20 years ago I had known what I know now about building a bigger bank.

DR. WILLIAMS: I always get strategy and tactics confused, but it seems to me that what we are talking about here is that we have larger strategies and philosophies that relate to the bigger issues of health care reform, like coverage and reimbursement, which I think, frankly, we will have to engage with after the dust settles and we see what is showing up. I'm not sure that we can engage with that now.

What I'm hearing is something that I would consider more tactical, which is to say, where are the things where we know that work is happening that relates to the work that we are doing and we can give very specific recommendations or suggestions to say here is something not to forget as you tackle the health IT piece, something of that nature. Ultimately, it is going to serve our strategy down the road. It is not a big, overarching strategy, but it is something that is actionable within the frame of what we know is happening today.

DR. TEUTSCH: I agree. If we take biobanking

as an example, and it is not an area that I know, there is a whole set of issues that need to be dealt with underneath it. We could talk about the kinds of specimens and standardization, but we also have to talk about the deliberative process that is going to get the American people to agree to such a thing, and the privacy and the protections and all of that.

So, whether it is a biobank or linking these records, there are some sets of issues that we would probably need to flesh out even under that one item that will allow us to begin to say something that is concrete enough other than we need an infrastructure that allows us to do it. I think it would be helpful if we could give them some specific things that need to happen to make it happen.

DR. WILLIAMS: The flip side of that coin, I think, is that you don't necessarily need to solve all the big issues that you are talking about in the recognition that people are already doing their biobanking under some certain set of rules, whether it be an IRB or something else. If they all collected data and represented it the same way, then, ultimately, if the

bigger problems were solved and you were able to scale it, you wouldn't have to then deal with the fact that now we have 5,500 different biobanks around the country working on 5,500 different systems that we are going to somehow have to figure out how to reconcile.

I'm very sensitive to what Sheila said about not duplicating effort, but I think what is even worse is to take efforts that were fairly well mature relating to standards around infrastructure and discard them and start over again. That is a concern to me.

DR. AMOS: The interesting thing to complement what Marc is saying is, you can collect the data in a standardized fashion but there is a profound difference in the tissue that is collected on a Friday and a Monday. On Friday, they throw it in a fridge and it sits until Monday before it is fixed. So you have to have the rules for standardized collection.

There is a difference in expression levels recognized in those tissues from just the percent of formalin or the percent of whatever they do. There are no standards for that. It is profound.

DR. FERREIRA-GONZALEZ: There is a lot of work

that has already been done in that particular area. We have been involved with NCI, but there is also CAP already involved in some of these issues on how to collect tissue.

DR. MANSFIELD: Yes, CAP is involved. I was going to say, AACR, FDA, and NCI already had a group that sat together and thought about all these issues. There is actually something written down.

DR. EVANS: I'm confused about what this conversation is about. I think that, for example, we are talking about biobanks. We could talk about biobanks for the next day or two easily, and that is kind of the point. We are not going to be able to come up with discrete recommendations to the Secretary in a short period of time about biobanks, and I don't think that is necessarily where our focus should be.

If what we have evolved to is to put together a very short list, then I agree with Sheila. I like the number three. I'm talking about a page. These are busy people. Two to four sounds like three to me.

If the intent is to put something together that is short, and it should be short because these are very

busy people, I think that we need to figure out if there are two or three or four things that rise to the level that meet two criteria. One criterion is, it is important enough to tell the new Secretary, who has a million things on her plate, that you need to spend at least five minutes thinking about this and put this in the back of your mind.

Number two, those bullet points have to be something that we actually can come to a conclusion about and say something about.

Now, I would throw out there that perhaps the medical record is one of those things that emerges. It is a very timely thing. I think we probably all agree that making sure that the electronic medical record as developed has some capacity and functionality with genetics in mind would be reasonable. I just throw that out there as one possibility.

I don't think we should get too tactical. I don't think we should get too fine-grained here. I think we need to stick with a few major bullet points if we are going to do anything.

DR. TEUTSCH: What would those bullet points

be? I heard one.

DR. EVANS: I just threw out, for example, the record. I will throw out one more, and that is the need for evidence before we embrace --

DR. TEUTSCH: The evidence development.

DR. EVANS: Evidence development, right.

DR. TEUTSCH: Comparative effectiveness, or whatever we end up calling it. Sam.

DR. NUSSBAUM: Another specific is that, since there are demonstration projects in medical home, the medical home would include genetic counseling as a component, something like that. I agree; three or more very tactical issues, not so highly technical but things that are being addressed today. I think that will be meaningful.

Having been part of other groups that have been working on communication, we are talking about, I think, one or two pages. We are not talking about treatises.

DR. TEUTSCH: No. Bullet points.

MS. DREYFUSS: Can I make a comment?

DR. TEUTSCH: Is that Rochelle?

MS. DREYFUSS: Yes. I just wanted to pick up

on the medical home issue and also on a point that Marc had made much earlier when he asked about the relationship between the primary care physician or the home physician and genetic counselors. It seems to me that that is a place where there is going to be a very fraught relationship.

As medical care is paid for by delivering cognitive information to patients, I wonder if doctors are going to be as quick to refer people to geneticists. To the extent they are not well educated, I think that is a real problem.

It seems to me that there is a question there about what motivation doctors are going to have to refer people to geneticists. That might be something we want to comment on when talking about new reimbursement plans.

DR. TEUTSCH: At least I heard that, they were part of a team so that there is the availability of that expertise at whatever level is appropriate.

DR. WILLIAMS: Right. So, if the new model of reimbursement that emerges is more of a coordinated team model, that would be part of the team. How the team delivers the care can be done in the most efficient way

and the reimbursement system would support that.

DR. TEUTSCH: Right. That would vary from location and how that care system worked. Paul, Sheila, and Paul.

DR. WISE: Having participated in basically this same process earlier, I just want to make sure that the lessons we have learned are shared with the group. I'm not sure it is the best use of the 15 minutes we have to identify each bullet point. Some are at an extremely broad level. Others are quite focused and highly technical.

Rather, I would basically suggest that a small group of the Committee distill this conversation, basically put together the bullet points in a coherent fashion that represent this conversation, and frame those bullet points in a broader context that elevates the work of this committee and elevates the claim to health care reform's attention in some way that transcends the other thousands of special interest groups yapping at this very moment.

The other criterion that we did pay a lot of attention to before that I think we need to recognize is

that any recommendation or point we want to make should be grounded in the deliberative processes the group has already done. In other words, we should draw heavily on the work that has been generated by this group or else we really don't have the legitimacy that we think we do. Also, the guidance that we provide will end after that one-page memo, rather than referring back to a body of work that is extant and also is still very much up-to-date.

So my suggestion is that we engage a small group to go through the process that we did before, identify a coherent presentation of the central bullets, provide context that elevates the role of this memo and everything else, and that we ground it in the deliberative processes of the group that have come before.

DR. TEUTSCH: With the sense, though, that there is some urgency to move it forward.

DR. WISE: Yes.

DR. TEUTSCH: I do think it would be helpful, though, to come to some general sense of what those top-level issues that we want to bring forward are. Not that

we can't reconsider them as people have a chance over a longer period of time, but I do think it would be helpful to at least be on the same page as to what those foundational infrastructure key items are. Sheila and then Paul.

MS. WALCOFF: I was just trying to think along those lines before Paul's comments in terms of what I had heard the group talking about, still trying to keep it actually a little bit top-level.

There was the biobanking issue. If we had to say these are the three key infrastructure areas that you should be focused on in some way as you move forward with all of these other many, many issues that you are moving forward on, biobanking is the issue which is more of an R&D issue. A clinical issue would be genomic and family history and the EHR.

Then, a development/product selection issue -- because there is already so much work going on in comparative effectiveness research and the whole issue of ensuring that there is a recognition of the importance of not averaging everything -- would be patient stratification, whether it is in post-market clinical

comparative effectiveness or adaptive trial design, or something like that.

I was just trying to figure out what I was hearing and if we could bring it down to a couple of key areas.

DR. TEUTSCH: The fourth one I heard in addition to those, and I don't want to do wordsmithing now, was how do we develop a coordinated system of care, whether it is the medical home or some other model that would bring in the genetic capability within it.

DR. BILLINGS: I would just add, much as we heard a speaker this afternoon talk about, that there is adequate financing for innovation and translation of innovation. We need a system and financing to translate that into useful comparative stuff. That is what we heard, that health care reform is a challenge to financing.

DR. TEUTSCH: Are you talking about reimbursement and coverage?

DR. BILLINGS: Yes, that is certainly part of it.

DR. TEUTSCH: You are talking more about the

payment end for the services, or are you talking about the R&D?

DR. BILLINGS: I'm talking a little bit about R&D.

DR. TEUTSCH: You are talking about general compensation.

DR. BILLINGS: I'm talking about an environment where innovation can be developed.

DR. TEUTSCH: One of the things, I guess, is integrated granularity. I think when you talked about comparative effectiveness and all of the things that flow out of that, one is the creation of expectations about what is needed to inform appropriate decision-making, including coverage and reimbursement guidelines, so developers would have a reasonable expectation of that kind of thing occurring. Some of that can be shaped within that as part of getting some clarity.

DR. BILLINGS: I'm really talking about that the whole field of translation and appropriate translation and comparatively effective translation is properly financed. There is a system of financing innovation and translation now. That is going to be

changed by health care reform. At the end of the day, there should still be an effective innovation system.

DR. TEUTSCH: That we are in favor of. Jim and then back to Andrea.

DR. EVANS: Trying to bring us back to what these bullets might be, I'm a little confused as to why biobanking would be a bullet and what we would say about it. This committee spent a long time addressing a very closely related topic and issued a letter to the Secretary or a report on it. That, of course, had to do with the Large Population Study. Inherent in that were issues of biobanking.

Would we be saying to the Secretary, we think there should be a big national biobank? I don't think many people are ready to really say that. I would advocate not having biobanking on this short list because I think we have addressed it. It is a very contentious issue, and it is one that I doubt we can achieve any unanimity or even consensus on in a brief period of time.

DR. FERREIRA-GONZALEZ: This is to another issue. When we talk about infrastructure to support the comparative effectiveness research enterprise, something

struck me the other day as I was reviewing grants. Some of these grants are proposing doing measurements of expressions of genes or proteins and so forth. These might be done in research laboratories without the quality controls that we might want to have so that we can really translate the results to clinical practice.

I'm not sure if we also want to bring up the issue that some of these labs might have to develop the infrastructure to start addressing quality control in the research environment or in CLIA-certified laboratories. Then there is the huge need for reference materials to make sure that the quality of the measurements that we do are actually applicable and to really bring it into the clinical practice.

DR. TEUTSCH: Many of those were in our Oversight Report, of course.

MS. DARIEN: I just had a comment because I realized I didn't understand exactly what Paul meant in terms of innovation and translation. I think it is really important that the terms be defined.

For example, Bill Nelson is co-chair of the Clinical Translational Working Group of the NCI.

Translational research to the NCI I think is different than what Paul was talking about in terms of translation.

I just ended up at a HRSA or AHRQ meeting about translating research which I thought was going to be a translational research meeting in the way that I understood it from the cancer community. Also, innovation is different in different communities.

So, I think it is really important when we are doing this that the definitions are very clear. The Secretary will hear from all the different groups. That is why I was side-barring to Paul.

I would say that that is really important because "translational" is a very different word to many different people.

DR. TEUTSCH: No, I agree. I think almost all the things that we are talking about here, though, are post the R&D original place. We are talking about as they relate to the health care system. In that sense, the biobanking, although it is a research resource, is something that is on the care side of things.

MS. DARIEN: In translational research, if you did bench-to-bedside --

DR. TEUTSCH: Right. T1, T2, T3, T4.

MS. DARIEN: Yes. So there are very different points. If you are hearing "translational" from the NCI, you are hearing something different. I think it is just important to do it. That was just an issue that I think is critical. I think people will understand it in different ways. That was all I wanted to say.

DR. AMOS: You talk about biobanking and all this other health IT stuff. I would just call it technology infrastructure.

DR. TEUTSCH: I think we have to be specific enough here that things are going to be meaningful.

DR. AMOS: You can define it.

DR. TEUTSCH: I know, and I don't want to do a whole lot of wordsmithing right now because that is obviously not something we are going to be able to do. I want to make sure we get the high-level issues pretty well under control. Then we can get a small number of volunteers or designees to see if we can't get a draft together that we could get out to get vetted and decide if we can't get to consensus over the summer.

I'm sorry. Jim, were you going to say

something?

DR. EVANS: No.

DR. TEUTSCH: I'm sorry. I don't see back there very well.

Again, what I'm hearing is things related to the electronic infrastructure, the HIT EHR, things like that. I'm hearing about comparative effectiveness evidence. I'm hearing about the medical home. I heard a little bit about coverage and reimbursement and about coordination of care and the medical home. That is five.

Do you want me to take a quick straw vote on those five? Are there others? Are there things that people think clearly should be dropped from that list? You are looking at me like I have it wrong, Gwen.

MS. DARIEN: No, no. It is all right.

DR. TEUTSCH: HIT and the electronic health records and all of the standards and things that go along with that.

MS. DARIEN: That is one.

DR. TEUTSCH: That is information infrastructure. Then, the evidence development, comparative effectiveness, how do we get the information.

Third was the issue of biobanking. Fourth was coverage and reimbursement. How do we pay for these new technologies. The fifth was the coordination of care/medical home-related issues and making sure that genetics was integrated within that.

Those are the five that I have heard. I don't know if that is right or wrong.

DR. AMOS: What I was saying was that you could put the health IT and all the other measurement infrastructures in support of the evidence and everything else and you could call it one big thing.

DR. FERREIRA-GONZALEZ: There are several issues there, not just the biobank. There are reference materials to be doing the measurements and so forth. We can put for the comparative effectiveness research "infrastructure needed" so it is biobanking, reference materials, and so forth.

DR. TEUTSCH: I would go back to what Sam has advised us. We have to keep it pretty straightforward, simple, and brief. If we can get some rich things in there, we can do that, but I suggest we wordsmith it. Is this the content that we would like to see? Are there

big things that we are missing? Is there anything that does not belong on this list?

DR. AMOS: Does oversight still play in or not? Are we done with that?

DR. TEUTSCH: It wasn't on my list right now, but Andrea brought it up. It wasn't on this list that I just made.

DR. MANSFIELD: I was just going to say, I think it is going to be important but it is probably not part of the congressional activity at the moment in health reform.

DR. EVANS: We have done oversight. I would argue we have basically done biobanking. I don't know why that is up there.

DR. TEUTSCH: We need to keep this focused on the health reform discussion, I think, and as Sam advised us, on the things that are topical.

MS. WALCOFF: One more thing for focus, and that is to remember that we are advising the Secretary and not the Congress. We need to be able to give her advice in a way that she can actually execute it. She has at her disposal the agencies under the Department of

HHS and those resources. Some of these issues can be very large and cross-government. Other than raising them as an importance or being a player in the discussions with other cabinet members or what have you, that is not something that she can really take ownership of within the Department of HHS. As we work through these, keep that in mind.

DR. TEUTSCH: While there is a lot of legislation obviously going on and she can influence that, that is only a piece of it.

I'm sorry. Rochelle, do you have a comment?

[No response.]

DR. TEUTSCH: I guess not.

DR. MANSFIELD: I'm going to go with Mike here and say let's take some larger issues, something like health care delivery, and underneath that is electronic health records and medical home. Then technology, which is biobanking, reference materials, and so on. Then comparative effectiveness. Then we actually only have three or four big headings, but there are a couple bullets under each one of those.

DR. EVANS: I think that dilutes it. I think

that is a way of sneaking in other things. I think these are busy people. I think we should have one page with three or four bullets with something to say, not just big, nebulous concepts.

MS. WALCOFF: I think your earlier point is well taken, too. I think it is something to say. If they are so important, they should be issues that we should take up in the future. Not reinvent the wheel, definitely, but here are the three big things. At the next meeting we will take up No. 1, and at the following meeting we will take up No. 2.

DR. EVANS: Come to us if we can help.

MS. WALCOFF: Right. If these things come up, we have resources and we can direct you and help you or your staff understand the resources that exist across the Department. They are really vast.

DR. TEUTSCH: Let me make a suggestion. I will go back to two things. One is, we actually have not had a lot of deliberations about biobanking. This was a good discussion. We talked about it in the Large Population Study. We said there was a lot of stuff that needs to be thought about there.

It is probably not the key issue for health reform over the very short term. I would suggest that we keep it to the narrower list of things that we talked about. We can take up biobanking as a priority issue. That is a perfectly good topic. I suggest that we limit it to the other items that we had with some high-level bullet points and that we get a small group together to do that.

To the extent that we can craft a short, pithy piece that will bring in some of these other things, I'm fine. We don't want a laundry list here. Yes, Marc.

DR. WILLIAMS: I agree with that strategy, but I'm also sensitive to what Sylvia said. I'm going to come back to what is obviously a pet project but has survived onto the list, which is the health IT piece.

DR. TEUTSCH: You are going to talk yourself out of it, or what is the plan here?

DR. WILLIAMS: No.

DR. TEUTSCH: I have to say, Marc, in my days in the PhRMA industry they said, when you have made the sale, you close the bag.

[Laughter.]

DR. AMOS: Marc is working on the appendix now.

DR. WILLIAMS: No, what I'm working on is the pragmatic issue that the Health IT Policy Group is meeting next week. It seems to me, with the small group deliberation and the possible reconsideration of bullet points at some point in the future, that this group may in fact be well out of the station before then. If this is really something that we think is important, can we craft something that could potentially get to that policy meeting.

DR. TEUTSCH: There is one thing we could do, Marc. As you know, we send thank-you letters to people who come here and offer their expertise. We can incorporate some of the comments that we heard today to David that could reiterate some of those things about the importance. I think we could do that.

DR. WILLIAMS: The other thing that I might potentially suggest is a relatively easy thing. It may be palatable, maybe not. I would suggest that there be a formal liaison between that committee and this committee.

DR. TEUTSCH: We could ask for that as part of that letter, too.

DR. AMOS: Marc, you are going to hate me, but I'm just going to ask the question. Are we in a position to offer anything new? To me, that is the question. As long as everybody is comfortable that we are offering something new to the debate, that this information to the Secretary is not going to be something that reiterates what has already been considered or is on the table with other things, then I think it is a good thing.

DR. WILLIAMS: It is not new, but I'm concerned that it is being forgotten. That is my point.

DR. EVANS: Our role is to say, remember genetics in the electronic medical record.

DR. FERREIRA-GONZALEZ: Not only remember genetics but there is already all this work that has been done. We have spent a couple of years looking at this genetic information and how we are going to pull in family history and use cases. We have to make sure that all the work that we have put into this is remembered and brought to attention. It really is important.

Is there anything in our reports that we can pull very rapidly for this?

DR. TEUTSCH: We can do some of that. I was

going to suggest that Marc write a paragraph or a small number of bullet points that will pull these things together in follow-up to our discussions, that we vote on it tomorrow, that we at least get a resolution that we are good with, and that we incorporate it and get that back to him. That is separate from anything we do with the Secretary.

Do I have a small number of people who are willing to now help craft this? You do a good job once, Paul, and you never get away.

[Show of hands.]

DR. TEUTSCH: I have David, Sheila, Paul, Andrea, and Paul. Others are free to volunteer. If we can get this together, we will vet it. David, Paul, Andrea, David, Sheila, and Paul. Paul W. and Paul B. Thank you. I think we have come a good way.

MS. CARR: What do we do with EHR?

DR. TEUTSCH: It is still there. They will think about whether it needs to be in the broader technology context or in more of the EHR standards context and family history.

Thank you. I think that was a very productive

discussion. I'm sure this won't be the last time we talk about what to do with those issues.

Since we last met, we have had the opportunity and the benefit of public comments on the Patents Report and Licensing. Jim is going to spend a moment and just let everybody know where we are and where we are going with this report. Jim, take it away.

- GENE PATENTS AND LICENSING -

Overview of Public Comments on the

SACGHS Consultation Draft Report

James P. Evans, M.D., Ph.D.

[PowerPoint presentation.]

DR. EVANS: First, I want to express a huge amount of thanks to the taskforce members, who have spent a lot of time and who are now going to spend more time, now that the public comments are in. This has been a difficult process. I also want to thank the public because the response was very good. We got a lot of great comments.

The public comment period closed as of May 15th. We received a total of 77 formal comments on the draft report. They amount to 392 single-spaced pages. I

have read them all and I'm going through them a second time now. They range from seven lines -- I think that is the shortest one -- in an Email, to 82 pages.

They come from a wide variety of sources. As you can see up there, there were 11 from professional associations, 16 from tech transfer officers. Industry organizations and life science companies represented 11 comments. Five were contributed by academic organizations, nine from health care providers, four from laboratories and laboratory managers, and 12 from private citizens. They were virtually all clearly well thought out, methodical approaches to the subject.

The responses themselves ranged over a wide spectrum. Adjectives used to describe the report in general included terms such as deceptive and fear-mongering, to beautiful, thoughtful, diligent, and intelligent. I did a word search for erotic and exciting and could not find those adjectives anywhere. We obviously have a long way to go if we are going to really involve the public in this.

[Laughter.]

DR. EVANS: I would say that the range of

opinions that were presented reflects the openness of the process. This was a very open process, as attested to by the fact that we got lots of comments that range all over the spectrum.

I was worried about what we would see. It is scary to spend all of this time and to really sweat over this kind of thing and then lay all 300-some pages out there for anybody in the world to comment on. I really was very gratified once I got looking at them.

The report was obviously criticized, at times pretty harshly. Criticisms were leveled from really opposite ends, from both ends of the spectrum, from those who have little desire to see any changes whatsoever in the patent and licensing landscape, to those who would like to see a whole-scale dismantling of the genetic IP landscape.

We really find ourselves, I think, at this juncture in a good position. We have a report that has been criticized from both sides. I think that is a good thing. I think it reflects that we have likely achieved some measure of balance.

The hard part now is going to ensue. It is

going to be an interesting and possibly a contentious process, given the wide divergence of both interests and philosophies that people on this committee and in the public at large have about this subject.

I also think, however, that the diversity that is represented on this committee that generates that kind of controversy is really our strength. It has lent the process the balance that it has, I think, thus far demonstrated.

The next steps are that we are going to review, analyze, and discuss the public comments. We are going to go through them. Each individual on the taskforce has been assigned a group of comments. I'm not sure who got stuck with the 82-page one.

One of the obvious and really, in some ways, easiest tasks is to correct any factual omissions or factual errors that arose. We will do that in consultation with the consultants to the process, et cetera.

We will discuss the policy options, of course. I will remind the taskforce that our first conference call to go over these things is going to be Monday. As

we discuss the comments, we need to keep in mind what our final aim is. Our final aim is to bring the full committee a series of recommendations to be made to the Secretary in this final report.

We will review in October the final taskforce proposed recommendations. They will then be discussed and hopefully some consensus can be come to around this table.

The way we are going to approach this as we discuss it at the taskforce level is that we are going to go through each of those policy options that we threw out there to the public and identify which ones had general support for adopting that recommendation and which ones for which there was general agreement that we should abandon that recommendation and not pursue it.

Those that will be the most difficult will be those that had majority support on the taskforce but for which there was some dissent, and those which there was minority support for but the advocates for those want it aired and discussed by the full committee.

I think -- and this would be to Sarah -- we are going to have to have sufficient time in October to talk

about these things. I anticipate there will be some disagreement. This isn't going to be like genetic discrimination, which I think we all pretty much agreed was a bad thing. It wasn't a contentious kind of issue. This is going to be contentious. There will be people who don't agree with our final recommendations.

I would also remind you as you look through those that, unless you really want to, you don't need to read the whole report. Look at the range of recommendations. Some of those are mutually exclusive. If we adopt certain ones, it precludes others. We need to keep that in mind, too, as we go forward.

There may be something where one person on the taskforce says, I want this aired by the Committee even though everybody else disagrees with me. I think we should do that. I don't think we should stifle any discussion.

I actually made a note to myself that that 82-page one is one I want to go back and scrutinize more. I think I can learn a lot from it. It was really neat to see the range of contributors to the public comments. They ranged from patients and people who take care of

patients, to industry groups, et cetera. It really gives you a view of how important this question is to people out there. Therefore, we have an important set of tasks ahead of us.

DR. TEUTSCH: I think it is, in fact, one of the things that this committee is really designed to do, to try and look at the variety of thoughts and tradeoffs and how to represent societal interests as best we can.

Thanks to Jim and the committee and all the staff. You have a little work ahead of you.

DR. EVANS: A special thanks to both Darren and Sarah, who have been really instrumental in moving this along.

DR. TEUTSCH: Before we wrap up and I give you some final comments, any other items or comments?

[No response.]

Closing Remarks

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

DR. TEUTSCH: As we come to the end of the day, it has been a productive one. Thanks, everybody, for all your attentiveness and participation. I want to particularly thank the staff, who, as always, labor long

and hard behind the scenes frequently. Whatever good comes out of this is largely due to their efforts to make us look that way.

I always want to thank Abbey and her staff, who took care of all the logistics. I don't know if Abbey is still here. We want to thank her for doing all that work.

For those of you who are planning to come to dinner, hopefully you have signed up outside. It is at 6:30 at the Heart and Soul. It is near the hotel where many of us are staying, 415 New Jersey [Avenue].

I would also recommend, as I have mentioned once or twice, please read the report in Tab 5. That is the draft on DTC that Sylvia is going to be discussing with us tomorrow. We would like to get to some conclusions so that we can move that forward.

With that, I think we can free up a few minutes. Thank you. We will see all of you tomorrow morning at 8:30. Thanks.

[Whereupon, at 4:54 p.m., the meeting was recessed to reconvene the following day.]

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CERTIFICATION

This is to certify that the attached proceedings

BEFORE THE: **19th Meeting of the Secretary's Advisory Committee on Genetics, Health, and Society (SACGHS)**

HELD: **June 11-12, 2009 – Vol. I**

were convened as herein appears, and that this is the official transcript thereof for the file of the Department or Commission.

SONIA GONZALEZ, Court Reporter