THE SECRETARY'S ADVISORY COMMITTEE ON GENETIC TESTING

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PUBLIC MEETING:
A CONSULTATION ON GENETIC TESTING

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Thursday
January 27, 2000

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University of Maryland
School of Nursing
655 W. Lombard Street
Baltimore, Maryland

Prepared by:
Performance Reporting
Silver Spring, Maryland

IN ATTENDANCE:

Chair

EDWARD R.B. McCABE, M.D., Ph.D.
Professor and Executive Chair
Department of Pediatrics
University of California, Los Angeles
Physician-in-Chief
Mattel Children's Hospital
10833 Le Conte Avenue, 22-412 MDCC
Los Angeles, CA 90095

Members

PATRICIA A. BARR
Partner
Barr, Sternberg, Moss, Lawrence & Silver, P.C.
507 Main Street
North Bennington, VT 05257

KATE C. BEARDSLEY
Partner
Buc & Beardsley
919 18th Street, N.W.
Washington, D.C. 20006

ANN HAPP BOLDT, M.S.
Certified Genetic Counselor
Maternal Fetal Medicine and Genetics Center
St. Vincent Hospital Family Life Center
2001 West 86th Street
Indianapolis, IN 46240

JOANN BOUGHMAN, Ph.D.
Vice President for Academic Affairs
Dean of the Graduate School
University of Maryland, Baltimore
520 West Lombard Street
Baltimore, MD 21201

WYLIE BURKE, M.D., Ph.D.
Associate Professor of Medicine
Department of Medicine Box 357720
Division of Medical Genetics
1959 N.E. Pacific
Seattle, WA 98195

IN ATTENDANCE:

PATRICIA CHARACHE, M.D.
Program Director
Quality Assurance and Outcomes Assessment
Department of Pathology
Johns Hopkins University Hospital
600 North Wolfe Street
Baltimore, MD 21205

MARY E. DAVIDSON, M.S.W.
Executive Director
Alliance of Genetic Support Groups
4301 Connecticut Avenue, N.W., Suite 404
Washington, D.C. 20008

ELLIOTT D. HILLBACK, JR.
Senior Vice President
Corporate Affairs
Genzyme Corporation
One Kendall Square
Cambridge, MA 02139

BARBARA A. KOENIG, Ph.D.
Executive Director
Stanford Center for Biomedical Ethics
Stanford University
701A Welch Road, Suite 1105
Palo Alto, CA 94304

JUDITH A. LEWIS, Ph.D., R.N.
Associate Professor
Maternal Child Nursing
Director of Information Technology
School of Nursing
Medical College of Virginia
Virginia Commonwealth University
1220 East Broad Street
Richmond, VA 23298

VICTOR B. PENCHASZADEH, M.D., M.S.PH.
Professor of Pediatrics
Albert Einstein College of Medicine
Chief, Division of Medical Genetics
Department of Pediatrics
Beth Israel Medical Center
First Avenue at 16th Street
New York, NY 10003

IN ATTENDANCE:

REED V. TUCKSON, M.D.
Senior Vice President
Professional Standards
American Medical Association
515 North State Street
Chicago, IL 60610

Ex Officio Members

Agency for Health Care Policy and Research

DAVID LANIER, M.D.
(Alternate for JOHN M. EISENBERG, M.D.)
Acting Director
Center for Primary Care Research

Centers for Disease Control and Prevention

MUIN KHOURY, M.D., Ph.D.
(Alternate for JEFFREY P. KOPLAN, M.D., M.P.H.)
Director
Office of Genetics and Disease Prevention

Food and Drug Administration

DAVID W. FEIGAL, JR., M.D., M.P.H.
(Alternate for JANE E. HENNEY, M.D.)
Director
Center for Devices and Radiological Health

Health Care Financing Administration

JUDITH YOST
(Alternate for NANCY-ANN MIN DePARLE, J.D., M.P.H.)
Office of Clinical Standards and Quality

Health Resources and Services Administration

MICHELE LLOYD-PURYEAR, M.D., Ph.D.
(Alternate for CLAUDE EARL FOX, M.D., M.P.H.)
Chief, Genetic Services Branch
Maternal and Child Health Bureau

IN ATTENDANCE:

National Institutes of Health

FRANCIS COLLINS, M.D., Ph.D.
(Alternate for HAROLD VARMUS, M.D.)
Director
National Human Genome Research Institute

Executive Secretary

SARAH CARR
Office of Recombinant DNA Activities
Office of Science Policy
National Institutes of Health
6000 Executive Boulevard, Suite 302
Bethesda, MD 20892

C O N T E N T S

PUBLIC COMMENTS (continued)

DISCUSSION GROUP REPORTS

CLOSING COMMENTS

P R O C E E D I N G S (8:35 a.m.)

DR. BOUGHMAN: Good morning, ladies and gentlemen. Mr. Surgeon General, Secretary Benjamin, Chairman McCabe and all you ladies and gentlemen who have braved the weather, I would like to wish you a good morning.

I'm Joann Boughman, a member of the Secretary's Committee on Genetic Testing and the chief academic officer here at the University of Maryland, Baltimore.

On behalf of the University and our president, David Ramsey, I'm very pleased to welcome you to our campus. Dr. Ramsey couldn't join us because the world does go on, and, among other things, we have our medical school accreditation occurring today.

We are a professional schools campus here at the University, with an interdisciplinary graduate school, and in addition to medicine, dentistry, pharmacy, social work, and law, we have a school of nursing that is one of the largest and consistently ranked one of the top 10 schools in the country.

I would like to thank Dr. Barbara Heller, dean of the school, and Dr. Leslie Perry, associate dean, for supporting us so much and allowing us to hold this meeting in their beautiful new facility here at the University.

I would also like to thank everybody else who has helped us today in providing the Secretary of Health and Human Services with considered advice on the many issues surrounding the use of genetic testing.

At the University of Maryland, we take our role as the state's public academic health and human services campus very seriously. We are pleased to be able to host this meeting that brings together a diverse national public group to provide important perspectives on the complex issues before us.

Finally, I would like to thank the numerous people who helped put this meeting together today. They have worked very hard with all of the details. We did slip up and didn't assign anybody to be in charge of the weather, but even that, I think, we have overcome. Each one of them, both the people from the federal office and here at the school, have been tremendous, and I would like to thank all of them.

But the success of today's meeting depends on you in the audience because it is truly a participatory meeting, and in fact, the content will be the way this meeting is measured. So I encourage all of you to listen actively, participate fully, and help us, the members of the committee, in fact, come up with the very best recommendations that we can for the Secretary.

Again, welcome to the University of Maryland, Baltimore.

(Applause.)

DR. LEWIS: Good morning. My name is Judy Lewis, and I'm an associate professor of Maternal Child Nursing at the Medical College of Virginia, campus of Virginia Commonwealth University in Richmond, Virginia. I'm also a member of the Secretary's Advisory Committee on Genetic Testing.

On behalf of the entire committee, I want to welcome all of you to this important public consultation meeting and to thank you for taking time to be with us today to share your perspectives on issues in genetic testing.

I also want to express the committee's deep appreciation to our colleague, Dr. Joann Boughman, to the administration, faculty, and staff of the University of Maryland, Baltimore for providing us with this wonderful venue to meet, and for supporting, in more ways than I can count, this gathering today. We've had very little time to organize this meeting, and we simply couldn't have done it without Dr. Boughman and the University of Maryland's extraordinary support.

Before Dr. McCabe reviews the day's agenda, I would like to take a few minutes to provide some background about the work of the SACGT and how important this meeting is to us in fulfilling our current assignment.

At our first meeting, in June of 1999, Dr. David Satcher charged the committee with addressing the broader way of complex medical, ethical, legal, and social issues that are raised by the development and use of genetic tests.

In addition to this general charge, Dr. Satcher gave us a specific and very important assignment, to assess the adequacy of oversight of genetic testing in consultation with the public, and he provided us a frame work of five central questions around which we were to organize our analysis.

Dr. Satcher further asked that if, based on what we learned from the public and after considering all of the issues, we find that further oversight is warranted, that we are to recommend options for such oversight. Our report is due to him on March 15th.

During our second meeting the committee discussed the importance of reaching as broad a spectrum of the American people as we could, including members of diverse communities who may have particular issues regarding genetic testing.

Given that the Human Genome Project expands what we know about genetic bases of many more common and chronic illnesses, and increases the applications of genetic testing, we thought it was also important to reach even members of the public who have not yet experienced genetic testing, but who are likely to face such decisions at some point in their futures.

We decided that obtaining broad based public perspectives on the questions was such an important part of our task that we should go beyond the Federal Register for public outreach. We agreed to use four other mechanisms besides the Federal Register notice, a targeted mailing to interested individuals and organizations. Many of you may have received that mailing as well.

We have a web-based consultation. We did an analysis of the scholarly literature on oversight, and then a public meeting. We agreed the public meeting was especially important because it might be our best chance to reach members of the general public, especially members of diverse communities, and to engage the public directly and hear firsthand their hopes and expectations about genetic testing and its oversight.

To provide a frame work for receiving the input, we developed a document called the Public Consultation on Oversight on Genetic Tests. The document provides background information about genetic tests, including their current limitations, benefits and risks, and provisions for oversight that are now in place. It discusses the five main issues that Dr. Satcher asked us to address, and asks for

feedback on those issues and a number of related questions.

We also developed a summary of the consultation document, in both english and spanish. On December 1st of last year, we formally launched our consultation process. We also began planning for this public meeting.

Dr. McCabe established a steering group to plan this meeting, and he asked me to chair it. The steering group was initially composed of Patricia Barr, Ann Boldt, Joann Boughman, Mary Davidson, Victor Penchaszadeh, Michele Puryear, Reed Tuckson, and Ed McCabe served in an ex officio capacity to this group.

Our first initiative was to augment our ranks with experts who could bring additional perspectives to the conceptualization, design, and organization of this meeting, and who were knowledgeable about the issues of concern to diverse communities, and who are experts in outreach.

We are enormously grateful to our colleagues for serving on the steering group and dedicating countless hours to the planning of this meeting, and I would like to acknowledge them: Maricela Aguilar; Adrienne Asch; Sylvia Au; Thomas Bleecker; Vence Bonham; Mei-Ling Chang; William Freeman; Jane Lin-Fu; Ilana Mittman; Robert Murray; Donna Olsen; Pilar Ossorio; and Gisela Rodriguez.

Vence, Jane, Ilana and Bob were also very helpful to our committee, last fall, when we were still formulating recommendations for how we would go about consulting the public. Their advice was critically important.

We also owe much to another advisor, Dr. Frank DiCappo (phonetic), who, due to the deep sadness of many of his friends and colleagues, died last fall. Dr. DiCappo was an American Indian of Hopi and Laguna heritage, an accomplished scientist and geneticist, and an important leader and mentor in his community and beyond. I know many of you, like all of us, wish very much that he were here with us today.

Our Public Consultation on Oversight Issues formally closes on January 31, but we are committed to continuing to engage the public in our work. We see this meeting as the beginning, not the end, of our consultation process, and we look forward to ongoing dialogue with all of you here today.

Thank you again for taking the time from your busy schedules to be with us to share your perspectives on the oversight of genetic testing.

(Applause.)

DR. McCABE: Thank you and good morning. I'm Ed McCabe, and as chair of the SACGT, I, too, want to welcome all of you to this meeting of the Secretary's Advisory Committee on Genetic Testing. We very much appreciate the time and effort that you have made to be with us today. For braving the snowstorm and the havoc that it caused, you all deserve an extra special thanks. I've already learned so much from so many of you who I've met during this process, and I thank you for imparting that information to us.

Now, I live in sunny Southern California, and despite the blizzard, I'm really very pleased to be back in Baltimore, which is my hometown. My ties to the University of Maryland go back many years, from when I was 15 years old. I was given an opportunity to work in the Pediatric Research

Laboratory at the University of Maryland School of Medicine with Dr. Samuel P. Bessman (phonetic), and was with him there for eight years. I'm pleased to return today for this important meeting.

Our meeting, your meeting, is a critical element in the SACGT's effort to gather public perspectives on issues of genetic testing. This is the third time that we have met, and the first time we have held a meeting devoted specifically and solely to gathering public comments. As Judy said, we see this as the first of many such engagements, and we hope to have many more with the public.

The issues in genetic testing are multi-faceted. They raise complex scientific, medical, ethical, social, personal, and public policy questions. Assessing public perspectives on these issues is critical to the developing of appropriate policy for genetic testing, and we are here today, first and foremost, to listen to you and to learn from your experiences and knowledge. We appreciate your interest in the issues, your attention to the many important questions bearing on oversight of genetic testing, and your willingness to share your perspectives with us today.

Before our discussions begin, we will spend a little time this morning providing a bit of background information about genetic testing and the specific assignment we are addressing on oversight. We are honored that Dr. David Satcher, Assistant Secretary for Health, and Surgeon General, who charged us with this assignment is able to be with us today.

Dr. Satcher is deeply interested in the issues raised by genetic testing, under-represented and under-served individuals, and health disparities in our population. He has given us an important opportunity to advise him and the Secretary about the adequacy of oversight for genetic testing.

We are also honored that Dr. Georges Benjamin, Secretary of Health and Mental Hygiene for the State of Maryland, could be here today, not only to welcome all of you to this great state, but also to introduce a close colleague and fellow public health advocate from the national level.

We are pleased that Dr. Bob Murray from Howard University, and a member of our steering group, will provide a historical overview of genetic testing. Dr. Murray will help us understand some of the experiences that minority communities have had with genetic testing and screening, and what those experiences can teach all of us.

Mr. Andrew Imparato, CEO and President of the American Association of People with Disabilities, will discuss disability rights and genetic testing. We are grateful to Mr. Imparato for being here today to help us understand the perspectives of the disabilities rights community and how these perspectives can inform our thinking about the oversight of genetic testing.

Dr. Francis Collins, Director of the National Human Genome Research Institute at the NIH, and ex officio member of the SACGT, will then give us some background on the progress of the Human Genome Project, and what the completion of the entire human genome sequence will mean for the diagnosis and treatment, and the prevention, of human diseases, disorders, and conditions.

We will then turn to a series of brief presentations from SACGT members Victor Penchaszadeh, Mary Davidson, Barbara Koenig, and Kate Beardsley. These presentations will help define some key concepts in genetic testing, outline some of the risks and benefits at individual and societal levels, and provide an overview of current oversight of the field, as well as options for increased oversight.

The rest of the day will be devoted to listening to the perspectives all of you have about

these issues. During the session later this morning, we will hear a facilitated discussion of these issues. The discussants will share personal experience and perspectives, and then together we will engage in a discussion of the issues. Audience members will be encouraged to participate in the discussion. This afternoon, we will break into discussion groups that are organized around the main issues the SACGT is currently addressing.

We hope the format of the discussion groups will provide an opportunity for participants to delve more deeply into issues, and through the sharing of perspectives in small group settings, will bring forward some important new ideas for the SACGT to consider.

In each discussion group, facilitators will help guide the discussions, and rapporteurs will record main themes and points. Summaries of the discussions will be drafted and each group's facilitator will report back to us in the plenary session toward the end of the day. The rest of the day will be devoted to hearing testimony from participants. These will necessarily be brief statements, but the committee encourages all of you to submit longer comments for SACGT consideration in writing.

The day is very full and to help keep the program on time, we will be foregoing formal introductions of speakers for most of the morning. All of the input you receive today, combined with comments received by mail, fax, e-mail, and our web site, will be carefully considered by SACGT, and will help us think through the main questions we've been asked to address by Dr. Satcher and the Secretary.

We are enormously impressed with the effort people have made to participate in this important public policy process, and we are grateful to have the benefit of your thinking on these issues. The recommendations that we make about oversight issues will be enriched by the views, opinions and perspectives that you share with us.

Before we get underway, I want to take just a moment to express my thanks to Dr. Joann Boughman and the University for the immense support they have given to this meeting. In addition to securing the meeting site, Dr. Boughman assembled a team of key staff from her immediate office, the Office of External Affairs, and the School of Nursing, to work on meeting planning and preparations. She also mobilized members of the faculty and student body to assist as science advisors and rapporteurs. Thank you.

I also want to give thanks to Mei-Ling Chang and her community for the beautiful symbols of Hawaii that they have shared with us.

We have had a tremendous amount of help in planning this meeting. There are many others to thank as well. The members of the steering group have our immense gratitude for broadening our scope and vision and helping us plan each element of this meeting. The facilitators, the rapporteurs and the science advisors who will help guide and record the discussion groups this afternoon also have our deepest thanks. This meeting has been an extraordinary collaboration among an outstanding group of people. Thank you very much.

Dr. Benjamin, thank you again for being with us this morning.

(Applause.)

DR. BENJAMIN: Good morning.

AUDIENCE: Good morning.

DR. BENJAMIN: That's kind of weak. It is too cold outside. Let's try it again. Good morning.

AUDIENCE: Good morning.

DR. BENJAMIN: That's much, much better. I get to do two things this morning. The first thing I get to do, of course, is to welcome you for the citizens of Maryland, the Governor of the great State of Maryland, and the Maryland Department of Health and Mental Hygiene. But it is the second task that I'm going to enjoy the most, and that is, certainly, to introduce someone that I have known approximately 20 years, both in a personal and professional way.

Dr. David Satcher was sworn in on February 13, 1998, as the 16th Surgeon General of the United States, and is only the second person to simultaneously hold the position of Assistant Secretary for Health and the U.S. Surgeon General. Of course, in these dual roles, Dr. Satcher has been instrumental in moving our public health forward.

Prior to this appointment, Dr. Satcher was the director of the Center for Disease Control and Prevention, and the administrator for the Agency for Toxic Substances and Disease Registry. In four years at CDC, Dr. Satcher was extremely successful, by increasing child immunization rates by at least 23 percent, upgrading our capacity to respond to emerging infectious diseases, and laying the groundwork for a new early warning system to detect and prevent food-borne illnesses.

In addition to that, Dr. Satcher expanded the National Breast and Cervical Cancer Screening Program to all 50 states. As you know, here in Maryland we are focused on our own quest to stamp out cancer in our lifetime.

Before beginning public service, Dr. Satcher spent almost 20 years in academia, 11 at the helm of the Meharry Medical College. Prior to being president of Meharry, he served at the King-Drew Medical Center in Los Angeles, where he was interim dean and chair of the Department of Family Medicine, a department which he helped develop, and director of the King-Drew Sickle Cell Center, which I am sure is where his concern for genetic disorders initially began. While at King-Drew, he also served on the faculty of the UCLA School of Medicine and Public Health.

Dr. Satcher received his M.D. and Ph.D. degrees from Case Western Reserve University in 1970, and did a residency and fellowship training at the University of Rochester, UCLA, and at King-Drew Medical Center. He certainly has been a recipient of major prestigious awards, and we could probably spend all day going through that.

He's an academic, he's a teacher, he's a clinician, he's my friend, the 16th Surgeon General of the United States, Dr. David Satcher.

(Applause.)

DR. SATCHER: Thank you very much, Dr. Benjamin, for that very kind introduction, and to Dr. McCabe and members of the Secretary's Advisory Committee on Genetic Testing, to the members of the steering committee, who worked so hard to plan today's meeting, and to all of you distinguished people. I'm delighted to be here.

It is certainly a pleasure to be here this morning on the campus of the University of Maryland, Baltimore, and to be here with all of you. I'm delighted to be here to support the work of the advisory committee. I want to commend all of you for responding to this call for public consultation on the oversight of genetic testing.

Secretary Shalala established the advisory committee to help our department address a broader array of complex medical, scientific, ethical, legal, and social issues raised by the development and the use of genetic tests.

The issues in genetic testing are extremely complex, and they range from the highly technical to very personal. So last June, I asked the committee to make recommendations, in consultation with the public, about the adequacy of our current oversight of genetic testing. I know the committee is using all of the tools at its disposal to gather the views of a wide range of people.

Given that genetic testing is likely to have a significant impact on all of our lives, we need to make sure that the American people understand its benefits, its risks, its opportunities, and its challenges, and that they in fact take part in the developmental policies to guide how the technology is incorporated into the delivery of health care and public health.

I was trying to think how to best put this in perspective and I thought about a story that I'm sure many of you have heard. Neal Lane, the former director of the National Science Foundation, and now head of the Office of Science and Technology Policy in the White House, loves to tell the story about a man who was traveling across the country in a hot air balloon.

After a while he realized that he was lost, so he started searching around and he saw a man working in the field below. He decided to lower the balloon to about 30 feet above ground, and he yelled out, "Can you tell me, where am I?" The man in the field looked up at him, and he said, "Well, you're in a hot air balloon, about 30 feet above ground."

Well, the man in the hot air balloon said, "You must be a scientist." And the man on the ground said, "I am, but how did you know that I'm a scientist?" He said, "Because what you're telling me is technically correct, but it is of no use to me right now."

(Laughter.)

DR. SATCHER: Well, the man on the ground looked up and he said, "Well, you must be a policy maker." And the man in the hot air balloon said, "You know, I am, but how did you know that I was a policy maker?" The man on the ground said, "Well, I know because you're in the same position you were when I met you. You don't know where you are. You don't know where you're going, but now you're blaming me."

(Applause.)

DR. SATCHER: I think the challenge that we face as we witness this tremendous progress in science is to make sure that we continue this progress in the first place. It is critical, but also to make sure that this progress in science, the Human Genome Project, is also tied to very sound policies.

I think that is our challenge here today, and it is certainly the challenge facing the advisory committee and our department. I think we have good reasons to celebrate the advances in genetic research and test development. The Human Genome Project is an enormous undertaking and

you'll hear more about that from Dr. Collins and others, and it is only perhaps the beginning in the sense of a genetic era.

The ability to identify genes that either cause or play a role in disease holds the promise of preventing diseases, earlier detection of diseases, better treatment of diseases, understanding and promoting health and certainly lowering mortality and morbidity.

I think it is important that these advances will pose challenges to public health and to our health care system. We may need to develop new policies to assure the safety and effectiveness of genetic tests and their appropriate use in clinical and public health practice.

We will need to move this nation toward a balanced community health system, but one of the prime components is a balanced research agenda, and that research includes research in policy development. This balanced community health approach balances health promotion, disease prevention, early detection, and access to quality health care.

There are three areas, in particular, that will need attention. One is, we need to ensure that genetic tests are only introduced into clinical practice when they're ready for clinical use. Second, we need to ensure that continuous quality assurance practices in genetic testing are as thorough and rigorous as they can be.

Third, we need to ensure that both health care providers and the public understand genetics and genetic testing so they can make the most appropriate decisions about whether and when to recommend or use a genetic test. I'm sure, when you hear from Dr. Murray about some of the history of genetic testing, you will appreciate the importance of that.

The education of providers and the public is a very critical issue. The extent to which providers and patients understand genetics, and therefore are able to make the best use of this technology, is really integral to the appropriate use of genetic tests.

Genetics will not be a small, specialized field that will affect only a portion of the population. Genetics is destined to be an important part of all of medicine and public health, and therefore it will affect all of us, men and women, young and old, sick and healthy, people of every racial and ethnic background.

Now, I must say, it is amazing how much work we're getting done while the government is closed down. As you know, the last two days the government has been closed. I met with the Advisory Council on Blood Safety and Availability yesterday, and I was amazed at the turn out, just as I am today.

The day before yesterday, we actually launched Healthy People 2010, which is the nation's health plan for the next decade. It is the third decade of health planning. It started with Dr. Julius Richman, who is the only other person who has served as both Assistant Secretary for Health and Surgeon General.

In 1979 Dr. Richman released the Surgeon General's Report on Health Promotion and Disease Prevention, and out of that report came Healthy People '90. Starting in 1980, and then in 1990, we announced the goals and objectives for Healthy People 2000. So two days ago, we announced the new goals and objectives for Healthy People 2010.

That consists of about two goals. One is to continue to improve the years of healthy life, but added to that, to really focus more attention on quality of life. To a great extent, that consideration grows out of the fact that we are an aging population. Just as people are living longer, we need to be concerned about how well they're living, what is the quality of their lives. So we've added areas like arthritis, and osteoporosis, and low back pain, and disabilities, and disability related conditions, the quality of life, the diagnosis and treatment of depression in the elderly.

The second goal for Healthy People 2010 is eliminating racial and ethic disparities in health, because one thing is clear, that we have made tremendous progress in a lot of areas, decreasing deaths from cardiovascular diseases, continuing declining deaths of motor vehicle crashes. Then, in the '90s, of course, decreasing mortality from cancer, from homicide, and a decrease in teenage pregnancy.

By the same token, we continue to see major disparities, and there are some areas where we are not yet seeing that kind of decrease, such as childhood and adult obesity, diabetes, asthma in children. We want to target those areas, but we also want to make a commitment to eliminating disparities in health on the basis of race and ethnicity.

This concern, of course, grew out of President Clinton's Race Initiative. So we have a head start on the goal of eliminating disparities because we had funds in the '99 budget, and we've already funded 32 communities that are working to develop models for eliminating disparities.

There are many examples I could cite of these disparities that we have used around the country, but the six areas that we have focused on, of course, are infant mortality, where, an African-American baby born in this country today is twice as likely to die in the first year of life.

We've used the fact that Vietnamese women living in this country are five times more likely to experience cervical cancer. African-American men are twice as likely to experience prostate cancer as White men. Asian-Americans are at increased risk for liver cancer.

There are several areas of disparities that we're looking at and we're asking questions about. Where and how do we intervene in order to begin to close the gap? It is going to be a very interesting undertaking in terms of research and implementation of programs, and access to care, and making sure that there is not discrimination in access or treatment, but it is appropriate to ask the question, what is the role of genetics in eliminating disparities in health.

Many factors can contribute to disparities in health status. What about genetics? Can our growing knowledge of the genetics contributions to disease help in our efforts to close the gap and reach our 10-year goal? Maybe.

Some of you remember the study published in JAMA, in 1993, by Bill Fagen and Mike McGuiness, looking at the major determinants of morbidity and mortality. It was really based on years of research done by CDC and surveillance. They, in that report, pointed out that there were four areas of determinants of variation in morbidity and mortality.

They pointed out that genetics and biology accounted, according to their calculations, for about 20 percent. The environment accounted for about 20 percent. Lifestyle, they said, accounted for about 50 percent, and access to health care for about 10 percent.

It is a very interesting study, but the problem with it is, as I'm sure you know, it does not account for the interaction among these variables. It does not account for the fact, for example, that

environment can certainly influence the expression of genes, that environment can even influence lifestyle, as far as that goes, and access to quality health care can influence lifestyle and exposure to environmental toxins.

I think what we have to be concerned about is the fact that the role of genetics is certainly important but cannot be separated from these other factors, and genetics at its best will certainly help us to, hopefully, improve the lifestyles of the American people, as well as improve the practice of medicine, and to understand and appreciate environmental toxins and how to respond and protect against them.

So I think it is interesting, as we approach genetic testing, to take into consideration that it is not in isolation that our genes impact upon us. Our hope is that the increased use of genetic tests in medical practice should lead to better targeting of screening tests, earlier diagnosis of disease, and an ability to predict risk of future disease, enabling people to take steps such as lifestyle changes that may help them reduce their chances of becoming ill.

These advances must benefit all Americans, not just those who can afford cutting-edge medicine. Obviously, one of our problems is the lack of access to care for so many people, that we're struggling with today.

We must address the issue of fear and distrust. If we're to realize the benefit of genetics for all people and apply them to the problems of health disparities, we have to address the issues of fear and distrust which leads many people not to take advantage of programs that are available to them, especially federally sponsored medical care and research.

We cannot, however, let the tragedies of the past, and there have been some, such as the Tuskegee study and others, we cannot allow them to become permanent barriers to participation in genetic research, prevention, early diagnosis, treatment, and retention, and care, but we must assure that there is a broad and diverse involvement in all of these activities, and that people, regardless of their racial or ethnic background, see themselves in all of our programs, people who speak their language, people who understand their culture.

Genetics has the potential to revolutionize medicine and we will need to work together to maximize its benefits and to minimize its potential harm. I think we need to work together to prevent genetics from being used to discriminate and stigmatize, and it has been used that way, as you know.

Genetic discrimination is a very real concern to many American people, and Congress, and the Administration. We're working hard to pass legislation to prohibit discrimination based on genetic information.

The Secretary's Advisory Committee on Genetic Testing is keenly aware of these problems and certainly will play a vital role in the advice it provides to the department.

About today's meeting. I think that during today's meeting, you will be exploring important questions and providing the Advisory Council with input on a number of issues in the oversight of genetic testing. You will be considering criteria for assessing the benefits and risks of genetic tests, ways to differentiate and categorize genetic tests, data collection to improve our understanding of genetic tests, options for oversight of genetic tests, the advantages and disadvantages, and you will be asked to recommend an appropriate level of oversight for different categories of genetic tests.

The advice which you give to the Advisory Council on Genetic Testing, which I think is one of the most important advisory committees ever appointed in government, the advice you give on these critical questions will play an extremely important role in the decisions which the Department of Health and Human Services must make about oversight of genetic tests, but I'm also sure that it will influence the activities of Congress.

Before closing, I do want to commend the Advisory Council on Genetic Testing for their sincere and conscientious efforts to ensure broad participation in this public consultation process. They've worked very hard to reach a wide spectrum of the American people, including members of diverse communities. I'm confident that, as a result, the report they will submit to me and the Secretary will be a thorough treatment of the issues and a balanced reflection of a range of perspectives that they will receive.

Again, I commend all of you for being here today and for taking part in this important public policy process. Your involvement provides a solid foundation for policy making, and I encourage you to share your thoughts, your hopes, and concerns about genetic testing with the committee.

Individually and collectively, we all have a vital role to play in helping to bring about the successful of integration of genetic tests into our health care system and society. It will not be easy, so I will leave you with one of my favorite quotes from John Gardner, who was Secretary of Health, Education and Welfare in the early '60s.

John Gardner likes to say that life is full of golden opportunities, carefully disguised as irresolvable problems. Thank you.

(Applause.)

DR. McCABE: Mei-Ling? Mei-Ling Chang and her community have prepared these leis, and wish to make a presentation to Dr. Satcher and Dr. Benjamin. Thank you very much, Dr. Satcher, for your comments.

(Presentation.)

(Applause.)

DR. McCABE: I think that's a symbol of an ethnic community that I certainly have enjoyed when I've been out in Hawaii as a visiting professor and as a vacationer and we appreciate the efforts that you have put in and your community has put into making these, Mei-Ling. Thank you very much. Judy?

DR. LEWIS: The next part of our agenda calls for several experts and several members of the committee to share important perspectives with everyone so that we all have some common understanding of some of the complexities of some of the issues we're going to be discussing today and I would like to start by inviting Dr. Robert Murray from Howard University to the podium. Dr. Murray?

DR. MURRAY: Good morning, everyone. I should have stayed in Washington. It is warmer there.

(Laughter.)

DR. MURRAY: First of all, let me thank you for, with tongue in cheek, asking me to speak this morning, certainly, after following the Surgeon General, but I think there is a good reason for that, and that is that now you can clearly tell us apart.

(Laughter.)

DR. MURRAY: I know Dave has never been taken for me, but I've been taken for him, believe it or not, and I'm considerably older than he is. But you can see that I'm much better looking.

(Laughter.)

DR. MURRAY: Not too modest, eh? Dr. Satcher knows better.

In any case, what I'm going to try to do in the 10 minutes allotted, because I can't cover a brief history of genetic screening, is to tell you a story which I call "A Tale of Two Genetic Testing Programs."

For one program, we might, borrowing from Charles Dickens, say it was a far, far better thing that was done than had ever been done before. For the other program, we might say it could have been the best of times, but it turned out to be the worst of times.

Once upon a time, in a large, rich and powerful kingdom there were two genetic testing programs that were carried out for two different diseases, in each of two quite different groups of people. Group 1 consisted of people who were better educated than the average population groups, and whose economic status was also above average. Group 2, on the other hand, consisted of a larger proportion of people who were less well-educated, on the whole, and whose economic status was consistently lower, overall, than average. They were called, by some in the kingdom, disadvantaged.

Each of these diseases were inherited as an autosomal recessive condition. Two parents who were carriers of a mutant gene had to mate in order to have a child with each condition. The parents themselves, of course, appeared quite normal and had to undergo a specific test to learn whether or not they were gene carriers.

Each of these programs was started in a completely different way and as a result of completely different circumstances. One of the programs started with Group 1, and we'll call that, in the fairy tale genre, the "good program," and the other for Group 2, we'll call the "bad program."

The good program came about through the efforts of a wise -- in fairy tales we always call the hero wise -- and enlightened medical geneticist who had a clear idea of what was to be accomplished for the people who took part in the testing program.

The bad program was started by a complex series of events that involved political actions by local and federal governments. In fact, the king of the kingdom was involved in getting that program started. Conflicting ideas existed about the nature of this second disease being tested for, and there was an unclear and confused idea about what might be accomplished for the people who took part in the testing program.

The good program involved a disease whose parameters were clearly defined, where life expectancy was clearly limited, and where there was no effective clinical management or therapy known to alter the course of the disease.

In contrast, the bad program was concerned with a disease where life expectancy ranged from infancy to adulthood, and where there were clear methods to modify the expression of the condition by medical means, although there was no agreement on what those methods ought to be.

The genetic defect was known in this second condition, and a definitive laboratory diagnostic procedure was well known that could be used to diagnose the uniformly fatal disease in the good program, but little was known about the precise pathophysiology of this good disease, if any disease can be good.

On the other hand, the genetic cause of the disease entity in the bad program was very well known and understood. A great deal was also known about the pathophysiology of the disorder. In fact, more was known about this disease than any other disorder, but there was no definitive way to make a reliable and safe prenatal diagnosis of the disease in pregnancies at risk when the genetic testing program was started.

When the "wise" geneticist started the good program, he went to the representatives of the people and he presented his idea for the program to them, giving speeches and holding seminars, and got their endorsement and support before beginning the program. People were informed about the program and the test before they agreed to be tested.

When they received the test result, they were counseled about the significance for them and their family. When a couple at risk to have a child with the disease was found, they had available a prenatal test that would tell them whether the fetus was affected with the disease. The couple could then terminate the affected fetus, if this was morally acceptable to them.

When the testing program with the bad program began, there was no presentation to the representatives of the people for their endorsement and support. Unfortunately, the information presented to the people came from different sources and it was often conflicting, and more often than not, incorrect.

Treatments were suggested that were ineffective. Genetic information was transmitted incorrectly. There was even erroneous information that portrayed the carrier state of the disease as dangerous and life-threatening because the condition had been brought to public attention when it was attributed to unexpected deaths in young men in the Army.

The situation was further complicated by the use of a method of testing, even though there was a reliable method of testing available, that didn't distinguish the disease from the carrier state. Add to that the absence of a way to tell a couple who were carriers at risk whether they were carrying a child affected with the condition, and you can see the confused picture that existed among the people, the disadvantaged people, who were involved in the bad program.

But how could such a program as the bad testing program get started? How could the errors and confusion be introduced, and in some cases, even be encouraged by the people themselves?

Before these testing programs previously described were begun, there had been some programs started, programs of testing for newborn infants for metabolic disorders, many of which were genetically determined, that had existed for several years. These had had a modicum of success because they were based on treatment of the underlying conditions to prevent manifestations of these diseases from developing.

The testing programs were established because of the pressure of the parents of the affected children who understood the diseases, and representatives of organizations dedicated to the improvement of diagnosis and treatment of these children. This testing and screening program was mandated by law in most states, and was applied to all groups, not just specific, separate groups.

These programs evolved over several years of trial and error in different parts of the kingdom. Mistakes were made, of course, as they always are, but then were corrected and the programs were guided by special sections of the federal and state governments, which provided funding for proper evaluation.

The good program, although not under federal or state control, was successfully adopted and promulgated from its origin to other cities across the country, and to other countries where people of a background similar to Group 1 lived.

The bad program led to further confusion and misinformation, until strong federal and state programs of education and testing, with definitive methods of testing and counseling by trained counselors was instituted. Maybe we can call them the "heroes."

It required several years of intensive education and counseling activity to correct the misinformation that had been promulgated in the initial years of the bad program. That process continues even today, as a new generation of individuals who belong to the second group of people in need of genetic testing has developed.

It would be great to be able to say that the errors of the early years have been corrected, and, as in most fairy tales, that a hero had appeared to correct the devastating errors that were created, but unfortunately, such is not really the case, even though a great deal has been done to get that program on the right track, but changes have been made in the bad program so that the benefits of the program now outweigh the harms.

All of you in the audience who aren't asleep probably recognize these programs as the Tay-Sachs Testing Program, representing the "good" testing program, and the Sickle Cell Testing Program as the "bad" testing program. These programs represent the extremes of genetic testing programs, one with a positive orientation, and the other, unfortunately at its outset, with a strong negative orientation.

Let me summarize these contrasting histories on these next series of transparencies. The first thing I'm going to say is, I've been talking about testing, and some of you may say, but those are screening programs. Well, that's one of the things we might want to discuss, when is a testing program a screening program or vice versa. I'm going to say, for the sake of discussion, and for this conference, that these were both special kinds of testing programs.

The sickle cell disease was rediscovered -- some of you have seen these slides, and I apologize for showing them again, but I haven't come up with any new or better ones -- beginning in 1970, when the disease was rediscovered as a result of the deaths of some recruits at Fort Bliss, and Robert Scott and Dick Campbell in New York began to talk about sickle cell disease as being neglected.

The leader at that time, the king in 1971, was President Nixon, who recommended $6 million for sickle cell research, and that led to the political activity that went on with the Congress and so forth. Finally, a National Sickle Cell Anemia Act was passed that supposedly allocated $115 million, but none of that money ever got to sickle cell programs, oddly enough.

Mandatory laws were passed excluding Whites. Comprehensive sickle cell centers were established to try to control the misinformation that was being promulgated. Massive media programs were established. I was involved with a report on sickle cell anemia in the armed forces because people were thinking the trait was a dangerous condition. Ethical guidelines for genetic screening were established as a result of efforts in the Hastings Center, but problems, of course, began with these programs.

People began to be stigmatized, as Dr. Satcher mentioned. Concerns about genocide for Blacks were raised because there was no good prenatal diagnostic test, or safe test. Sickle cell centers were established to try to spread even more accurate information and to do proper testing.

By 1974, these mandatory testing laws that had been mostly introduced by Black legislators who were interested in furthering their own careers but not understanding the nature of genetic testing, were abolished, and an omnibus genetics bill was introduced based upon a report of the National Academy of Science's Committee on Inborn Errors of Metabolism.

They promulgated these four reasons for genetic screening which were reviewed in 1995 and found to be consistent even today: To treat or manage disease; provide information for making reproductive decisions, and that was the focus of the good program that I mentioned; prevent the onset or manifestation of disease; and of course, to do research.

As a result of the Hastings Center activity and other ethicists, they recommended nine guidelines for principles that should guide the testing. I won't take time to go through each of them, but, especially, emphasis is on informed consent, on the protection of subjects' privacy. Provision of counseling was critical, and of course, to have an accurate and reliable testing procedure.

These were summarized in these five principles, which we still think are important to use to follow any genetic testing program: prior education of the community; informed consent; accurate diagnosis; professional counseling; and confidential testing results.

I won't take the time to go into the effects on the people who were carriers of the trait. They were many and varied, and it won't serve any purpose to discuss those right now.

By 1978, we did have a reliable prenatal diagnosis test for sickle cell disease. The Natural History Study was instituted, and by 1983, we realized that prophylactic penicillin was a good means of preventing early morbidity and mortality. In 1987, the NIH Consensus Development Conference concluded that mortality was reduced in sickle cell infants on prophylactic penicillin.

The President's Commission, in 1983, reviewed these guidelines and rearranged them, putting confidentiality first with respect to genetic information, autonomy or consent being second, et cetera. The question of the promulgation of genetic information within families became an important issue to be concerned about.

Now, if we look at the good or Tay-Sachs testing program, we can see that these were the seven ideas, or eight ideas, that came out of that program. They recognized an increased frequency of the disease in a particular group, Jewish individuals. The Jewish community was well organized and educated, and was educated prior to testing. A complex but accurate test was available. Disease mortality here was 100 percent. So nothing could be done to change that, and they had a safe and accurate method of prenatal diagnosis

.

Of course, the issues related to the pro-life movement and so forth were not raised at the time this particular program was started, and they provided counseling. The program was an overall success, so successful that in some arranged marriages in that community, this testing is done as a part of determining whether couples are suitable for each other.

If we measure these programs, and why I might call one good and one bad, and we say, what are the guidelines, what would be considered positive genetic programs, we can compare these two, the sickle cell program versus the Tay-Sachs, and see that the community was involved in one, and not the other, that the community was educated, the program was clearly voluntary.

In some sickle cell programs, school children were tested without their permission. The test was accurate in both cases, but for a while they used an inaccurate test in sickle cell testing. Counseling was provided sometimes, although more and more as time went on, in the sickle cell program, and always in the Tay-Sachs. The results were not always confidential. They were put into school records and so forth for a time in the sickle cell program. A safe reproductive option was not available early, but is now.

Now, the hope is that by recalling the mistakes that were made in the past and realizing that we "wiser" people, more knowledgeable people, might possibly make similar or worse errors if we don't pay attention to what's happened in the past, the old saying that those who don't study their history are doomed to repeat the mistakes of others. There is the outside chance that we can set up new programs of genetic testing that will have a greater probability of being classified as good overall rather than bad. Thank you.

(Applause.)

DR. LEWIS: Thank you very much, Dr. Murray. At this point, I would like to invite Andrew Imparato, who is the president and CEO of the American Association of People with Disabilities, to come to the podium to discuss the issue of genetic testing and disability rights.

DR. IMPARATO: Good morning. As a Baltimore resident, I want to thank the Secretary's Advisory Committee for inviting me and for deciding to do this in Baltimore, which made it a lot easier for me to be here this morning.

I also really want to acknowledge you for recognizing the importance of having a session on disability rights as part of the general background that folks would get for this important public meeting and I haven't had an opportunity, so I want to take this opportunity to thank Dr. Satcher for his leadership, particularly on calling attention to the stigma that people with mental illness experience in American society. As somebody with bipolar disorder, I really appreciate your leadership and the report that you recently issued to mental illness.

MS. CHANG: You deserve to be here. Aloha.

DR. IMPARATO: I wasn't sure if I was going to experience the cultural welcome. So, thank you.

(Laughter.)

DR. IMPARATO: I also want to acknowledge Dr. Adrienne Asch, who I believe is here

Dr. Asch, are you here? There you are. Great.

-- for her pioneering work in raising the disability rights perspective in the field of genetic testing and bioethics.

Finally, I want to acknowledge Dr. Francis Collins, who is going to speak after me, for his personal commitment to addressing the ethical, legal, and social implications of the Human Genome Project.

As he knows, we became acquainted with each other when I was working for EEOC Commissioner Paul Miller, and we were working on guidance, on the definition of "disability" in the Americans with Disabilities Act, where we wanted to make it clear that somebody with a genetic predisposition to develop a condition had protection against employment discrimination under that law.

Dr. Collins made himself personally available to give us some technical guidance on what we could and couldn't say, and what would be helpful and line up with the science, and what wouldn't. I remember learning about Alpha 1 antitrypsin deficiency on a level of detail that I'm sure I wouldn't have if Dr. Collins hadn't been involved.

I had worked at the Equal Employment Opportunity Commission and at the National Council on Disability and with the Senate Subcommittee on Disability Policy before coming to the American Association of People with Disabilities, and I want to say that from my perspective, this whole issue of genetic testing is a real cutting-edge issue that the disability community really needs to get more involved with because it really can have a dramatic impact on people with disabilities, both in a positive, and, if it is not well handled, in a negative way.

The purpose of where I work now, the American Association of People with Disabilities, which was founded in 1995, is to promote the political and economic empowerment of all 54 million children and adults with disabilities in the U.S. The founders took AARP as the model for a large cross-disability membership organization. We've got about 11,000 members now, and we're growing quickly.

I encourage folks here to learn about the organization and get involved. Our web site address, and this is the end of the commercial, is www.AAPD-DC.org. You can get information there. You don't have to be a person with a disability to join. It is intended for people that have an interest in disability rights and the disability movement, including folks that provide services to people with disabilities, and folks who are involved in policy that affects people with disabilities.

The basic point of my presentation today is that genetic testing can be used to facilitate discrimination against individuals with disabilities, because we as a society continue to harbor fears, myths, and stereotypes about people with disabilities. Some continue to view disability itself as a fate worse than death.

This potential for discrimination can play out in a lot of different ways, in the decision of a young couple to terminate a pregnancy upon learning of the likelihood that their baby will be born with Down's syndrome or spina bifida, without necessarily having a lot of good information about the quality of life that somebody that has that condition is able to attain, or what having a child with that condition can mean in terms of a family, and the quality of life that the family can maintain.

It can play out in the decision of an employer to withdraw an offer of employment to an individual who is tested to reveal a genetic predisposition for colon cancer, or in the decision of a managed care company to refuse to insure a potential enrollee because she carries the gene for breast cancer.

I want to talk a little bit about the social model of disability as opposed to the medical model. The disability rights movement has urged society to move from a medical model of disability to a social or civil rights model of disability. The medical model tends to equate disability with malady, or illness requiring medical interventions, and associate any negative life consequences experienced by people with disabling conditions as inherent in the conditions themselves.

The social model or civil rights model, by contrast, instead encourages us to recognize people with disabilities as a minority group or protected class that experiences discrimination based on fears, myths, and stereotypes that some in the broader society associate with their conditions.

This social model or civil rights model recognizes that disability is a natural part of human experience and should not inherently limit a person's ability to make choices, live independently, pursue meaningful careers, or participate fully in all aspects of society.

Under the social model of disability, there is an acknowledgement that many of the most isolating and harmful aspects of living with a disability derive not from the condition itself, but from society's repeated failure to plan for and welcome individuals who deviate from the norm in human functioning.

As I mentioned, there are 54 million Americans with disabilities, with a wide range of conditions and impairments. Yet, we as a society continue to plan in a way that often ignores their existence. Even though it is one-fifth of the population, it is a segment of the population that often isn't at the forefront of people's minds when they're designing buildings, when they're designing transit systems, when they're designing medical systems, when they're designing auditoriums that are not very accessible for folks who use wheelchairs.

It is something that, even though we have laws that are moving us in the right direction, it is still not on the forefront of the folks that really design what society is going to look like.

The disability rights and independent living movements seek to address longstanding social prejudices that have resulted in unnecessary isolation, dependence, and paternalism for millions of children and adults with disabilities.

So, what are the implications of the disability rights movement for the field of genetic testing? I think it is powerful to start with a finding that is contained in the Americans with Disabilities Act, and we're celebrating the tenth anniversary of the passage of the ADA this year.

Congress found, when they passed the ADA in 1990, that "Individuals with disabilities are a discrete and insular minority who have been faced with restrictions and limitations, subjected to a history of purposeful, unequal treatment, and relegated to a position of political powerlessness in our society, based on characteristics that are beyond the control of such individuals, and resulting from stereotypic assumptions not truly indicative of the ability of such individuals to participate in and contribute to society."

So, what does this mean for prenatal testing, for example? Well, I guess I ask the question as a parent who has had two children. The first time we went through the testing for spina bifida and Down's syndrome. The second time, we didn't. Why do we routinely test for spina bifida and Down's syndrome?

Dr. Murray, when he went through the characteristics of a good program, emphasized the importance of informed consent and quality professional counseling, and I ask the question, what kind of counseling is provided to couples before they have the test done and after they receive a positive test result for one of these conditions? What kinds of assumptions are the counselors making about the quality of life experienced by individuals with Down's syndrome or spina bifida? Or, about the quality of family life for families with members who have these conditions?

In my experience, we didn't get a lot of good counseling. It was basically, this is routine. I asked the question -- I was involved in disability rights at the time -- what's the value of having this done? Basically, it was so you could make an informed decision about whether to terminate the pregnancy.

My wife decided she wanted to have it done because she wanted to be more prepared in case a child was born with one of those conditions, so we did it the first time. The second time she kind of decided it wasn't going to make a big difference and she didn't want to do it. So we didn't do it the second time.

I think, and Dr. Asch has written about this, we really haven't thought through these questions very well, and the folks that provide this counseling often times don't have good information from people who live with Down's syndrome or live with family members with Down's syndrome or spina bifida, what it really means in terms of parenting.

They don't ask the questions, what are your goals in becoming a parent; what are your aspirations for your child, and really get at whether those goals or aspirations are really going to be dramatically affected by having a child with one of these conditions.

Dr. Asch makes the point powerfully in a recent article from the American Journal of Public Health, and I want to quote her. It is provocative, but I think it helps to make the point:
"Think about what people would say if prenatal clinics contained pamphlets telling poor women or African-American women that they should consider refraining from childbearing because their children could be similarly poor and could endure discrimination, or because they could be less healthy and more likely to find themselves in prison than members of the middle class or than Whites. Public health is committed to ending such inequities, not to endorsing them, tolerating them or asking prospective parents to live with them, yet the current promotion of prenatal testing condones just such an approach to life with
disability."

It is hard to do this in 10 minutes, but I want to close by bringing it down to the personal level. As I mentioned, I have bipolar disorder, or manic depression, a condition that I have been told has a strong genetic link, or can have a strong genetic link, and I have two boys, as I mentioned, one who is six and one who is thirteen months, both of whom may be able to have testing, at some point, that will predict whether they are likely to experience my condition.

If I get them tested, the information could be helpful for me and my wife to look out for signs of depression and try to help prepare them for life with this condition. Of course, we can and will do these things even without genetic test results. The same test results in the wrong hands could make it harder for my sons to get a job, to get health insurance, to get life insurance, to meet professional licensing requirements, or get elected to public office.

Some might say that we have laws that protect against the misuse of the information or

that we soon will, but can we really count on such laws when enforcement is typically lax, and very recently the Supreme Court seems to be going out of its way to find federal civil rights laws unconstitutional these days. Even if we pass a comprehensive law that outlaws this kind of discrimination, what will the Supreme Court do with it?

I guess my over-arching question for all of you, as you move into the discussion part of today's meeting, is to ask whether the benefits that can derive from genetic testing will ever outweigh the strong potential for genetic information to be used to discriminate against people with genetic anomalies in the same way that human cultures have, for centuries, discriminated against children and adults with disabilities.

At a minimum, it is clear to me that the proponents of genetic testing need to align themselves with the precepts of the disability rights movement, if they truly want to minimize the potential risks of such testing. Thank you.

(Applause.)

DR. LEWIS: Thank you very much. At this point, I would like to call forward Dr. Francis Collins, who is an ex officio member of the SACGT and the director of the National Human Genome Research Project.

DR. COLLINS: Thank you, Judy. Good morning, everyone. It is a pleasure to have a chance to speak to this group and to follow after such provocative presentations by the Surgeon General, by Bob Murray, and by Andy Imparato.

I think we are gathered here to deal with a very serious set of issues, and your input is going to be critical for the functioning of this rather important committee that is charged with this important task of deciding how we should move forward with this entire question of genetic testing.

I think we are dealing here with a two-edged sword, some would say a double-edged helix, which has both the opportunity for doing enormous good and also the potential for misuse. There are historical examples of that, that you've already heard about, that cause us to look soberly at the prospects of the future and make sure that, in the most thoughtful way, we are putting in place the kind of guidelines and oversights that will be necessary for this kind of information to benefit people rather than to injure them.

It is my job here, as director of the Human Genome Project, to give you a little bit of background, sort of a Genetics 101 on what this is all about, and maybe, also, to help us, collectively, to think about not just where we are today, but where we may be over the course of the next five to ten years because this revolution in genetics is very much underway, and it is impossible to consider this in a static way.

The kinds of things that have caused our attention toward genetic testing in the past will be somewhat different than the things that we must consider in the future. I think we are fortunate that these issues are getting a lot of public attention and I thank the Surgeon General and the Secretary of Health and Human Services for recognizing the importance of this issue and for establishing this advisory committee, which I'm honored to serve on in a liaison capacity.

The public is very interested in these issues, surveys have shown that over and over again. They are fascinated by the possibility that genetics may give each one of us an opportunity to learn something about our future risks of illness, but they're also deeply concerned that this information

might be used against them in health insurance or in employment decisions and we collectively have to address that.

I am gratified with the amount of attention this is getting. You might even hear something about genetics in a particular speech that's going to be given this evening by a rather prominent member of this particular country and that's good, we should be talking about this. And it is also good that we have not prematurely rushed to the conclusion that we know exactly what to do.

So for those of you who are here to advise us today, rest assured that you will not encounter, I think on this particular advisory committee, a lot of people with dug in positions who have exactly a clear idea in their head about what kind of oversight we should be providing for genetic tests. We are still very much looking for your genuine input and listening to every word you say.

Could I have the slides on, please? I recognize that we're running a bit behind this morning and so I'm going to try to rush through this at a fairly good pace.

Without being too grandiose, I do think it is fair to say that we are in the midst of a revolution in science and in medicine that has profound consequences and is rather unlike anything that we've encountered in a long time. This "new audacity of imagination," quoted from John Dewey, is that we might be able to understand the instructions that are responsible for a lot of the aspects of human biology that are related to health and disease.

Now, I don't want to overstate this, I am not a genetic determinist and I hope none of you are, either, but it is certainly the case that we all have inherited a certain amount of information from our parents, information that allows us to develop from single celled embryos to where we are now, and information which may carry within it certain variant spellings in our DNA sequence that places us at risk for disease or our children at such risk and we are perched on the precipice here of being able to learn about that, not just for relatively uncommon disorders that may affect people you know but maybe not yourself, but ultimately in a way that will affect all of us.

To make that point, I would challenge you -- and I'm going to need some help maybe with the focus because it doesn't seem to work from up here – I would challenge going to challenge you to come up with a disorder that does not have some hereditary contribution.

Again, let me be careful that I don't overstate this case. I am not saying that all diseases are hard sired into DNA, they most certainly are not. Certainly there are some conditions, like sickle cell anemia or Tay-Sacs disease which you heard about from Dr. Murray, or in this example Cystic Fibrosis, where if you have inherited one or two misspelled copies of a particular gene, a certain consequence will result.

If it is a dominant disorder, it may only take one misspelled copy, Huntington's disease would be an example, for you to have a very high likelihood of developing a particular set of symptoms during your lifetime. For a recessive disorder like CF or Tay-Sachs or sickle cell disease, if you've inherited two misspelled copies of that gene, your likelihood of developing the disease is very high.

Of course, that shouldn't overstate the situation, even in those circumstances interactions with the environment, particularly the kind of medical care that is offered, have a profound effect on how you do with that particular disorder.

Of course, most diseases are not as straight forward as CF or sickle cell disease and for

the most part, we haven't understood their genetics nearly as well. Most single gene disorders, as exemplified here by CF, have at this point had their genes discovered because of the powerful methods that have become available in the last 10 or 15 years.

Most of the morbidity and mortality in Western society comes not from those conditions but from common illnesses like diabetes, heart disease, schizophrenia, hypertension, the common cancers, Multiple Sclerosis. All of these are disorders which we know tend to run in families, but not in a nice, clean fashion that Gregor Mendel would have appreciated. These are what we therefore call "non-Mendelian disorders" where there seem to be several genes at work, but each one of them is relatively weak in its contribution and there is also a strong environmental effect.

For a disease like diabetes, obviously a scourge in our current situation, we suspect there may be five or 10 different genes. Individuals with diabetes may have a different mix of those, depending on their own circumstances, but a susceptible individual may never develop the disease without environmental triggers, such as high carbohydrate diet, triggering the disease to appear.

Even infectious diseases like AIDS have genetic contributions, not of course in the causative agent, the causative agent in an infectious disease comes from outside that person, but after all, your ability to handle an exposure to an infectious agent in many instances turns out to have genetic underpinnings and that's certainly true with AIDS, where we know there is a certain number of folks to can be exposed to the HIV virus repeatedly and never develop the actual clinical disease, because they lack a certain cell surface protein that's necessary for the virus to enter the cell.

Most of this is not new information. We have known for decades that every illness, if you look hard enough, tends to have some genetic underpinnings. What runs in your family is often a question you may ask yourself or your physician may ask you and of course, that is simply a reflection of the fact that things that tend to run in families may have an effect on you.

If in your circumstance there are multiple with cancer or heart disease, that obviously in your own mind raises your own risk at some level. What is new here is that we are on the brink of being able to uncover the actual genetic changes that play into this kind of complicated equation and those will allow us, in the best of situations, to make predictions about who is at risk and allow them to do something about it before the illness actually strikes.

In the worst of conditions, it allows us to make predictions about people's risks for circumstances, where we have nothing to offer them and then get discriminated against based on that information because it leaks out into places where it shouldn't be.

These are the two sides, the two edges of this double-edged helix. Speaking of the double-edged helix, if we're going to talk about genetic inheritance, we've got to talk about this molecule DNA, this wonderful, elegant way of carrying information which is the common currency of all life forms. It is the sequence of letters along the DNA double-helix, which has a simple alphabet of only four letters, A, C, G and T, that is the way in which information is carried, stored, and passed on to the next generation.

Human beings have a genome, and that is all of the DNA constituting three billion of these of these letters, which is a large number, but it is a bounded set, and we are on the brink of reading that script. In fact, we will have, as you will hear in a minute, 90 percent of it in the next four or five months.

This DNA double-helix can also have different spellings between different individuals, although, if I read off a particular part of your DNA and compared it to mine, we would be 99.9 percent identical, and that would be regardless from what ethnic group you come from.

Most human variation is ancient, was present at the time that human beings came about, about 100,000 years ago somewhere in Africa. The variants that are actually seen in a particular ethnic group more than in others is a small fraction of the total human variation. There is, in fact, no scientific basis for drawing precise boundaries around ethnic or racial groups, which is an important consequence of all this study of genetics, which ought to be of some help in the social dialogue where we are continually trying to wrestle with the tendency of human beings that carry prejudices against others who are not like themselves.

One cannot appeal to science to boost that prejudice. Science, on the other hand, tells us that such boundaries are completely unjustified, and what we consider as particular ethnic and racial groups are really social and cultural constructs more than they are based upon any rigorous biology.

Again, just quickly, the flow of information here goes from DNA, which is the script, the instruction book. Although I don't particularly like that analogy in some ways, it is one that gets used, and it has a certain accuracy, in that it does provide the instructions which are then carried out through this process of transcription into RNA, which is the messenger that carries the message from DNA out to the cytoplasm, and that in turn gets used to make proteins, and proteins do the work of the cell.

Now, how is it that variants in a DNA sequence can cause trouble? Well, if there is a letter that is out of place, or spelled in a variant way. Actually it might be a variant way that would be good for you in one environment, but in another environment it might not.

In that circumstance the RNA also has that same spelling difference and then you may end up with a difficulty where the protein does not perform its function in that particular environment. Hence, disease or the risk of disease ensues.

Now, let me hasten to say, this is not about an occasional person here and there. I'm talking about all of us. If you thought you were the perfect genetic specimen, today is going to ruin that for you because there aren't any.

(Laughter.)

DR. COLLINS: All of us are walking around with somewhere in the neighborhood of five to 50 flaws. That's a very squishy number, but I can guarantee you it is not zero for any of you, and those are of a variable sort.

Some of them are for disorders that won't come to pass in you or me because you don't encounter the environmental trigger that is necessary for that susceptibility to make any difference, or it may be that you need a certain combination of genetic flaws in order for the disease to actually appear -- there is a certain threshold -- and unless you have three or four problems in the same pathway, you're going to be okay. Or, I'm sorry to say, some of these are flaws that you won't know about because something else will get you first.

Some of these in here will probably play some role in your own future health issues. What is on the brink of happening here is the ability to uncover a lot of that information over the course of the next 10 years. All of us now have to consider the answer to the question for ourselves, do we want

to know that stuff, is that information that you would like to have and what are your concerns about how it would be delivered and what you would do with it.

The Human Genome Project has been underway now for 10 years and is an organized effort to try to understand the human genome by studying its map and its sequence and comparing it to maps and sequences of other model organisms, because it is very difficult to interpret 3 billion A's, C's, G's and T's without a reference to point to. So while it is called the Human Genome Project, it also works intensively on yeast and fruit flies and round worms and mice and bacteria because the comparisons between those organisms are telling us a lot about how the human genome works.

This enterprise, when it was started, was rather controversial. People really weren't confident that it could be successful because the technology hadn't really been developed to do the job. Over the course of the last 10 years those technologies have come along with great regularity and we now stand in a position of being able to say the project is going to deliver on one of its major goals -- that is, the sequence of the human genome -- substantially sooner than expected.

We produced genetic and physical maps of the human genome back in the 1990s, and the availability of those to anybody who has access to the Internet has made all the difference in terms of the ability to track down susceptibility genes for a long list of fairly strongly inherited disorders.

The sequence, which was due in 2005, has had its timetable recently moved forward in a fairly dramatic way. If you want to copy down a URL and keep track of what's going on with the Genome Project, the one at the bottom of the screen would be a nice place to bookmark because every Friday this particular site gets refreshed, and my slides don't get refreshed quite that often, so this one is a month out of date.

If you go to that site, what you will see is a depiction of the human chromosomes, color-coded with the progress that now exists in getting their sequence determined in the Public International Sequencing Consortium, which has been underway particularly vigorously in about the last year with a pilot project of about three years that preceded that.

As you can see the color-coding here, things that are in orange or red are regions that are finished, where the sequence is done in long contiguous regions at very high accuracy. The yellow/green coloration is the working draft, which is now a major focus of the effort between now and about May. The goal is by mid-May or June to have 90 percent of the human sequence in-hand in this working draft form and a substantial amount of it finished, and then we will go on to finish all of it in the course of the next couple of years.

The report card back in December, if you added up those two numbers, you would see 40 percent of the genome was in one form or the other. As of last week, it is more like 54 percent, so we are seeing this goal achieved rather rapidly. And the genome centers that are doing this, when they met two weeks ago face-to-face in California, concluded that they're on track to achieve this kind of 90 percent coverage by next May.

All of this data is being placed on the Internet every 24 hours without patents being filed, without any intellectual property claims being made upon it, without subscription fees or any other barriers to access and we believe rather passionately that the sequence of the human genome, the shared inheritance of humankind, if you will, ought not to be constrained and that any scientist with a good idea ought to be able to follow that idea without having to deal with a whole host of patent and licensing obstructions, and we will continue to adhere to that throughout the next two or three years as we try to

finish this enterprise.

Not only are we interested in the 99.9 percent that we all share, but of course we're profoundly interested in that 1 percent where we differ. There are several million of these places in the human genome where there are common differences between individuals. Most of those differences existed in the founder pool of about 10,000 individuals back there in Africa 100,000 years ago, and most of them are bland differences that occur in parts of the genome that aren't doing very much.

They are primarily of the sort where there is a single letter, a single nucleotide that differs, and a fancy word for that is a polymorphism, where you might have a T and I might have a C.

Again, most of those differences will not have any consequences because they occur in the part of the genome that doesn't seem to be functionally important, and that may be a pretty substantial fraction, although we are continually learning that things we thought weren't important turn out to be, so I would hesitate to predict, when the dust all settles, how much of the genome is truly dispensable -- probably not a whole lot, but some of it will be.

At any rate, some of these variants will turn out to be important because they affect the function of a particular gene, they make it act in a different way, and those are the ones we would most like to know about because, if we had the full list of those, then we could simply look at individuals with diabetes compared to people who don't.

We ought to be able to run through this list of common variants and figure out which ones are predisposing to this common disease, and that in turn would give us the best insight you could imagine to why this disease comes about and, therefore, what we might do to prevent it or treat it better if it occurs.

So the strategy that many people are now applying to understand the genetics of common illness is exactly this: To try to identify those variants in the genome that seem to be associated with an increased risk, recognizing that these are not going to be simple circumstances where having the at-risk variant tells you for sure you're going to get the disease. It will tell you that you're higher at risk than somebody else, and it is going to challenge us to figure out how to incorporate that into the practice of medicine in ways that benefit people.

I think it is useful, though, to contemplate how molecular medicine is proceeding because there are certain immutables about the way things are going that might not be the way you want it to be, but unfortunately, it is sort of the way it is.

If you want to understand a disease, a geneticist will argue that the best way to get your mind around it and to really get at the molecular aspects of what's going on is to try to identify the genes that are contributing to the onset of that illness, so that's what these top two arrows are all about, finding the genes or cloning them that are responsible for diabetes or schizophrenia or heart disease or prostate cancer, all of those targets that have not yet been sorted out.

I can promise you over the course of the next five or 10 years we are going to sort those things out because the tools that are in place from the Genome Project are now very powerful indeed.

Having identified the gene, then what happens? Well, time is over here, so you sort of have to go from top to bottom. You would love to skip a step -- I would -- and go down to the bottom here and have therapies for all these conditions the day after you understood their genetics, but that takes

a long, tough road of difficult research that requires a lot of creativity and ingenuity and funding and time, and it will not happen for most diseases in less than a number of years, maybe a decade or more.

What does come along, though, shortly after you've identified a susceptibility gene is the ability to use it diagnostically because, after all, identifying the gene meant that you found a variant spelling in the people who are at risk. That very same finding, used prospectively, would be called a diagnostic test and, in some instances, that may be extremely useful and we ought to pay attention to that.

Colon cancer, for instance. We know there is about a half a million people in the United States who are at high risk for colon cancer because they have a misspelling in one of the genes involved in DNA mismatch repair and most of those people have very strong family histories of colon cancer.

Now, here's a disease we know how to prevent, and it is called early detection. If you could identify those high-risk people and get them into a colonoscopy program while they are still without cancer, you could identify their polyps as they begin to appear and get them out of there before those polyps become malignant, invade the colon and end up metastasizing.

Right now we don't offer that to everybody because it is too expensive to do that to the entire population, but if we knew who the people were at highest risk, we could both benefit them and do something that's actually going to save us health care dollars, sort of a win for everybody.

So, in some instances, even now, having a diagnostic test available could be lifesaving, and I think most people would embrace that in that kind of circumstance.

Unfortunately, for a lot of other disorders, take Alzheimer's disease right now, knowing that you're at risk does not offer you the opportunity for an intervention that we know is successful, so you're presented with information which may be daunting and frightening and may lead to your being discriminated against if others get access to it without the opportunity for a preventive medicine intervention.

I'll say a little bit more about pharmacogenomics in a minute. Ultimately, of course, the challenges, the problems that are associated with predictive genetic testing are going to get better -- that's the good news -- because we will have better options to do something for those found to be at risk. If there is a diagnostic, it will lead you to an effective preventive medicine or, even if you fall through that safety net and you get sick anyway, there will be therapies that work successfully most of the time.

Unfortunately, the reason we're all here today struggling with this is that, for most diseases, we're not there and we're not going to be as quickly as we would like and we're going to be living in this interval here in the timetable where our diagnostic capabilities are better than our therapeutic capabilities and there is not much we can do about it.

What we have to do in that interim, sort of halfway state is to try to make sure that we do make the most of the information and make sure that it is used in ways that the public benefits from.

Genetic tests can be applied in many ways and you're going to be talking about those today and I think it is really important to talk about the context in terms of what kind of oversight is needed for a particular test and is it a circumstance where some special attention needs to be paid because the opportunity for mischief is particularly high.

There are, on this slide, six settings. You could think of a few others, but I think most

genetic tests would fall into one of these categories. A genetic test is frequently used to confirm a suspected clinical diagnosis. If you have a young male who has mental retardation and maybe hyperactivity and a certain set of physical features that lead the pediatrician to suspect the Fragile X Syndrome, then the test that's done is to look and see whether there is, in fact, a particular type of mutation in the Fragile X gene. That is then the confirmatory test that tells you the cause of the particular illness in that individual.

Detecting carriers for recessive diseases is also, for many people, a fairly familiar type of genetic testing and, again, I think in his ever-eloquent discussion of the differences that have occurred in different circumstances, Bob Murray reflected on the ways in which programs have arisen to do that kind of detection.

Another such program is in the offing. Testing individuals for Cystic Fibrosis carrier status is, in the next year or two, likely to be offered to high-risk populations, which would include Caucasians and Native Americans, but not African-Americans or Asian-Americans, by obstetricians as part of the first prenatal visit, regardless of family history of CF. That will be a significant step and one that probably deserves some discussion today.

Prenatal diagnosis. Obviously, there the circumstance is such that you're testing the fetus with the intention of learning the status, and I think Andy's comments in this regard were extremely well-taken. I'm afraid we have gotten, in many circumstances, into a format where the steps in the direction of prenatal diagnosis don't receive adequate thought and discussion before suddenly the test has been done and everybody is wondering now, why did we do that and we really have to be thoughtful about not making those mistakes over and over again.

Newborn screening also referred to is a circumstance where you are looking for the presence of a disorder which, if not detected, is likely to do havoc to that newborn, PKU being the classic example, but sickle cell anemia, as also pointed out by Bob -- now that we know that recognizing that disorder and getting penicillin prophylaxis started is beneficial, it makes sense to carry out that kind of testing.

This is, though, where I think the greatest opportunity is going to exist for growth of this field in the future and perhaps one where the greatest concern has been raised amongst the Secretary's Advisory Committee because of that growth and because a lot of these tests are going to be coming along very fast.

Already there are susceptibility tests available for people at high risk because of family history for things like breast cancer and colon cancer. Already there is much question being raised about whether those have appropriate oversights.

There is considerable interest in the idea of population screening for one particular adult-onset disorder, that's hemochromatosis, an iron storage disorder which is entirely treatable and usually not detected until it has already progressed to the point of causing some organ damage, and where the test may be rather simple and highly accurate. That is certainly one that deserves a lot of attention in terms of how to organize such a program and how to collect enough data to be sure it is the right thing to do.

Then there is this last bullet, which is predicting whether or not, when a therapy is about to be instituted, is this the right therapy for that person.

Given that the response to drugs and other interventions may well be predictable, to

some degree at least, by that individual's genetic makeup, are we in the circumstance in the not-too-distant future where, before writing the prescription, the health care provider may want to know your genotype to figure out, is this the drug that's going to help you, or is that other drug, the other alternative, a better choice and, can we avoid those side effects that all too frequently plague our efforts to treat people because those may also turn out to be, at least in part, predictable.

All of these various settings are important to consider, but I think in particular it is this last one that deserves a lot of attention today.

I know we are running substantially late, so I'm going to skip over the next four slides here and get to the conclusions. I think there are three questions that are particularly on the public's mind, and there is a long list of other ones. I could certainly come up with about 10 or 12, but let me just highlight three.

People are deeply concerned about this. If we are forecasting an era where each of us are going to begin to learn about our glitches in our DNA, will that be used against us, will it end up to our losing our health care or having us passed over for a promotion or considered unemployable because of our future risk of disease.

There are good examples where this is already happening. It is not happening on a large scale because most people haven't undergone genetic testing yet, but when you can see this train coming down the tracks, it really doesn't make much sense to wait for it to get here to act.

It is gratifying that both parties and both Houses and the Administration have considered this as a high priority and, in the past Congress, there were a half a dozen bills introduced to prevent the use of predictive genetic information in health insurance and in employment.

The bad news is that none of them actually got passed and signed by the President. Other things always seem to push this agenda out of the way because there is not perceived to be a crisis yet.

Well, I would argue that we shouldn't have to wait for that crisis, and my fervent hope would be that this might be the year where effective federal legislation, which is, I'm sorry to say, the only solution that most of us can see to this, could actually get passed to provide the kind of protection that allows people to learn genetic information about themselves without fears of this kind of misuse.

This is about all of us. We're all at risk. A system that allows that kind of discrimination is both unjust and unworkable and we ought not to make that mistake of beginning to go down that pathway. It will be a lot harder to reverse patterns once they start.

A second question that may have occurred to you in terms of how we're going to apply all of this to medical practice is, how are we all going to understand it all? This is complicated stuff.

If I'm talking about conditions for which the genetic test does not give you a yes or no, it gives you a maybe, it gives you a relative risk, how is that information going to be effectively conveyed? Who are the health care providers that are going to convey it? How are they going to get up to speed on all of this? And, how is the public going to be in a position to understand the implications of this and not interpret this in an all-or-none fashion?

We have a big challenge there. There are efforts underway to meet that challenge, but

they need to move swiftly. The major question, though, which has been placed in front of this advisory committee and which you all are going to be wrestling with is, will we figure out how to shepherd new genetic tests from research into clinical practice? Who decides when a test has reached the point that it has appropriate test criteria?

Victor will be talking about this next, to justify offering it outside of a research protocol because we don't want to give people a lot of information on tests that turn out later to have not been validated.

So for that reason and a number of others and following up on a task force on genetic testing which was organized through the ELSI Program of NIH and DOE, Secretary Shalala convened this committee back in June, and we were charged by the Surgeon General to answer by next March in an abstracted, simplified way. The question is really more sophisticated, but basically the question being asked is, do predictive genetic tests need additional oversight and, if so, by what mechanism?

You can imagine various ways in which this kind of oversight might occur and what process might be followed, and one of the things that we need to discuss is which of these or which combination of these is going to be the way to make sure that bad things don't happen.

Will we allow the marketplace alone to drive this, recognizing that testing laboratories will have a strong motivation for trying to get people to be tested because that is how they make profits. Obviously, you might worry a bit about that as the sole force coming to act on this.

Practice guidelines and professional standards could certainly play a significant role, but does the "r" word of government regulation need to kick in here I think is a profoundly important question. And, in particular, does the FDA, which has the legislative authority to play a role in overseeing predictive genetic tests that are done by service laboratories in an in-house, home-brew fashion -- should the FDA exercise that authority at a greater level than they have in the past? Is that something that the public feels is now appropriate?

This is where we need your input in a very nitty-gritty sort of way and those are the issues which the groups will be discussing this afternoon in much greater detail.

To finish, I think it is very hard to forecast or foresee the future, but we're all here today to try to make sure that it turns out right, to enable it in the most positive way. That is our task, I think that's our charge. Your charge from the Surgeon General in his eloquent remarks this morning are to help us with that. We're listening. We're listening closely. We need your advice. We need your wisdom. Thank you very much.

(Applause.)

DR. LEWIS: Thank you, Dr. Collins.

Wylie Burke. Dr. Wylie Burke, who is a member of the Secretary's Advisory Committee on Genetic Testing, was one of those who was a victim of the snowstorm in that her plane couldn't get her here and back on time, and we're really pleased that Dr. Victor Penchaszadeh, who is a geneticist and is a member of our committee and is a professor of pediatrics at Albert Einstein Medical Center, on very short notice, has agreed to substitute for Dr. Burke to talk to us about what are clinical validity and clinical utility of genetic tests and how do these affect risks and benefits of genetic tests and oversight categories.

Thank you, Victor.

DR. PENCHASZADEH: Thank you, Judy. Good morning, everyone. It is a pleasure to fill in for Wylie. We are running behind, so I'll try to be as concise as possible.

Basically, what we've been hearing this morning is that genetics seems to be a complex issue and, contrary to what we usually think, that a lab test gives a yes or no answer to a health question, we are seeing more and more that with genetic testing, this yes or no contrast is really not the case.

Basically, what genetic tests do, they look at our genome and, as Francis just pointed out, we can look at mutation, we can look at variations in genes, but the correlation within a particular misspelling in our DNA and a particular health outcome, that correlation is not 100 percent defined for most health conditions.

So many of the issues that were addressed until now can be conceptualized into characteristics of genetic testing that we need to take into account when we think in terms of benefits and risks. Clinical validity and clinical utility are the two concepts that I will spend the next few minutes trying to delineate.

Usually, when we think of lab tests in general, we think of something that I will not address, which is the analytical validity; that is, how do we know that the result issued by a particular lab is correct, that they didn't make a mistake or something like that? This is, of course, perhaps the first step that any regulatory process or oversight should make sure is correct.

For the most part, there are mechanisms in sight now that essentially address those issues, answering the question of how do we know the particular result issued by a lab is indeed correct, and that is analytical validity.

What I want to address here are the issues of clinical validity and clinical utility. By "clinical validity," what I mean is essentially, what does it mean? Once we have a result, what does it mean to the person or to the population in which that test is performed and what does it mean in terms of predicting a particular outcome?

I would remind you that, for the most part and as Francis outlined earlier, most of the future in genetic testing will be predictive in nature, in the sense that it will be performed perhaps in people who have no symptoms but may have risks. That is why predicting a disease or condition is a characteristic of clinical validity.

By "clinical utility," what we mean is actually not only what does the result mean, but what can we do about it? Is there any follow-up action that one should do after a particular result? Is this result useful, useful for the well-being or the health or to prevent the outcome of the disease or to ameliorate or diminish the severity of a condition? Et cetera.

As we will see quickly, these characteristics or these concepts are not fixed characteristics of any given test; they vary according to a number of factors. But we know that these concepts are important when defining risks versus benefits of any particular test.

When I say that clinical validity is not a fixed characteristic of any particular test, it is because it depends on what the test is done for. As was outlined earlier by Francis, a particular test can

be done either to detect a carrier of a genetic trait or to make a diagnosis on an individual who already has symptoms of a disease to confirm the diagnosis or to make assumptions about eventual future risks. So depending on the purpose of the test, the validity may vary.

It also varies with the frequency of the disease. If we have a disease that is quite frequent in the population and the particular test gives us -- let's say if we find a mutation, it increases the risk by two-fold of a particular outcome, so instead of having a frequency in the population of about 1 percent, the test gives you a 2 percent risk; it is double the risk of the general population, but it may not be necessarily -- even though it is double the risk, it may not be of significant consequence, the difference may not be of significant consequence.

Now, how do you determine, first of all, the predictive risk and how do you determine the aspect of clinical validity? You need a lot of data, and that is the bottom line and that is one of the problems. It doesn't suffice to say, well, we found this mutation in a person with colon cancer or with breast cancer or Alzheimer's disease. You have to really come up with population data correlating the finding of a particular mutation with a particular risk.

For many of these conditions, we are talking about chronic diseases that develop along many years in life, so it may take a while between the discovery of a particular mutation with a particular outcome and the determination of its actual clinical validity, and this is one of the issues that the committee is grappling with in terms of what is the minimum set of data that we need, who has to collect it, what are the agencies involved in this -- but this is one of the issues that you will be discussing later today.

The concept of clinical utility is also crucial because we may have all the information and it may not be useful, there may be nothing to do about it, so the usefulness is the utility of a test, the usefulness for the well-being and health of the people that undergo the test, potential benefits and risks. You have to, again, weigh the potential benefit of medical interventions or preventive measures versus risks of overdoing it because of a particular risk.

Medical interventions are not always benign, particularly if they are not properly indicated, so a particular genetic test confirming a particular risk may end up taking that patient into a variety of medical interventions that may not be warranted, so medical intervention also has pros and cons.

We already mentioned about the variation according to the purpose of genetic tests. Uncertainties. This is an alternative concept. A genetic mutation rarely gives you a 100 percent chance of developing a condition, so there will always be uncertainties.

Here is a completely new dimension that we haven't discussed so far: Any genetic testing of any individual gives you, indirectly, information about the rest of the family members, so you bring the family into the picture in terms of confidentiality, in terms of responsibility of health providers, et cetera.

Quality of evidence. Again, we need information to know how to assess the usefulness, the utility of a particular test to foster health and well-being of people. As you realize, there are no prescriptions that one can follow step by step for every single test. There are already hundreds of genetic tests that are on the market and there will be hundreds more in the years to come, so what are the main principles to gauge relative benefits and risks?

One could conceive, for instance, categories, like low-risk tests versus high-risk tests. This is an example of a possible scenario of a low-risk and high-benefit type of test where the clinical validity is high because it is used specifically on an individual basis and not for screening of populations, where you have good evidence that the test is accurate and, on the clinical utility side, you are either diagnosing or predicting a disease that has treatment and, if untreated, it will become a severe disease and you can identify other people in the family at risk and lead to preventive measures.

This would be a low-risk type of test, and the committee has been discussing that perhaps the types of oversight that we will end up recommending will depend on whether we are dealing with low-risk type tests or high-risk type tests.

This would be an example of a hypothetical low-risk test, and probably one could put an example of one of the genetic forms of colon cancer that fits the familial model.

On the other extreme, you can have a very high-risk test, for a variety of reasons, with low benefits, such as if you propose to use a test as a screening tool. Whenever you're talking about screening, you're talking populations, you are talking about issues of false positives, false negatives, so whenever you introduce populations as targets of tests, you are increasing the complexity and the risk by many folds.

What about if you are dealing with a particular gene, a condition that is more prevalent in some populations than others? There will be issues of discrimination, issues of racism, et cetera. If, on top of that, that test has a low accuracy, you are loading the high-risk weight on the clinical validity. And the same on the side of clinical utility if that condition has no cure or has limited treatment for symptoms and whether it can lead to identify other people at risk. But in this case, identifying family members at risk may carry a negative value in terms of stigmatization or discrimination.

You can think of possible examples of this. I don't want to name any specific condition, but if you have a late onset dementia of some sort that has no particular treatment, you can easily envision that type of situation or scenario as a high-risk/low-benefit type of test.

Finally, these are all the issues that we have to take into account when we advise on how to categorize different types of tests, according to the condition, according to the prevalence, according to the population it affects and according to whether there is effective treatment or preventive measures.

Again, let me emphasize, I said that these are not fixed characteristics of any particular test, but depending on their use, and I could add that they're not fixed in time because these things change over time. What seems to be of very low clinical utility today may change in a very short time because of research, and a condition that has no prevention or treatment, in a year from now may have it. So this requires a very dynamic look into this.

With this, I close and I call on whoever is in charge of continuing. Thank you very much.

(Applause.)

DR. LEWIS: Thank you very much, Victor. At this point I would like to invite Mary Davidson, who is the Executive Director of the Alliance of Genetic Support Groups, and Barbara Koenig, who is at the Biomedical Ethics Center at Stanford University, both of whom are members of the Secretary's Advisory Committee on Genetic Testing, to talk with us a little bit about individual and social

risk/benefit issues. Mary, Barbara?

MS. DAVIDSON: Good morning. I'm going to talk briefly about a tremendously important topic that really forms the core of informed decision-making about genetic testing, and that's the benefits and risk or the risks and benefits of genetic testing for individuals and families.

I'm going to start with just a very brief story. I had an interesting call from a news reporter this past week who asked me very insistently, where do you stand on genetic testing, are you pro or con, are you for or against genetic testing? And I tried patiently to answer his question, beginning with the fact that you can't lump all genetic tests together in one pile, that benefits and risks of each test have to be weighed on a case-by-case basis and that, in fact, it is all a moving target, that all this will change over time.

So I told him, again patiently, that you have to look at the nature of the specific condition, the medical usefulness of the test, the accuracy and reliability of test results and families and individuals in terms of their own values and beliefs.

Unfortunately, despite all my efforts, he hung up frustrated, without the story line he'd hoped because, basically, he wanted a very simple answer to a very complex and challenging question and questions that have brought all of us here today, many of us from far away.

Genetic tests cover a very broad spectrum of benefits and risks, beginning first with the condition being tested, when and for what purpose the test is being performed and the meaning and significance of those test results for that individual living within that family at that time in their history.

There is also a very broad spectrum of testing situations, each associated with certain genetic conditions, prenatal, newborn screening, diagnostic, pre-symptomatic and predictive testing, and each of these testing situations comes with a unique potential set of risks and benefits.

There isn't time here to cover all five of the situations and, fortunately, Francis has really already laid these applications out, but I am going to tell you about one testing situation that combines prenatal and pre-symptomatic testing and I think brings all of this very much to life.

A pregnant woman was watching her father-in-law die of Huntington's disease, and she wanted her amniotic fluid tested, but the baby's father didn't want to know if he himself had the gene because of all the associated risks for discrimination, stigmatization, depression, quality of life and so on. The mother chose to go ahead with the test, and, after getting a positive test result, aborted the baby.

However, she told her husband that she had miscarried the child and the burden of this secret was too great for the marriage and they ultimately divorced. So although the testing was essential and considered a benefit to the mother, it was unacceptable to the father, and this combination resulted in overwhelming difficulties for both and for the marriage.

My point in all this, in thinking about these five situations, is that the weighing of risks and benefits in each of these situations is intensely personal and that even within a single family, what's good for one isn't necessarily good for another.

As with any medical diagnosis, and perhaps even more so with genetics at this stage, the identification of an inherited and family condition has the potential to impact dramatically the health and emotional adjustment of the individual. Common sense, as well as a whole lot of psychological

literature, tells us that we need considerable time and emotional space to adjust to new information about ourselves and our families and our futures.

Interestingly, some recent studies suggest that we as a public are certainly scientifically illiterate or not as literate as we would like to be and have, perhaps, no place to process genetic knowledge in a cognitive context that is really useful and helpful.

Genetics may be so new and foreign a concept that it can create -- new information creates psycho-social difficulties on its own. New information brings psychological risks, as well as benefits. A positive test can impact a person's sense of who he or she is. A person may worry or feel more anxious or depressed about the future, effecting self-esteem, quality of life, overall health issues. Negative test results can result in survivor's guilt for escaping a disease that others in the family cannot.

It is important to remember that there may also be very strong relief that comes from knowing and some people, many of us, feel that we have more control over our life when we know about ourselves and our children and what's to come. This can lead to active preparation and gathering resources to make lifestyle changes.

Genetic test results can also change how people are viewed by family, friends and society, resulting in stigmatization, and some tests in particular carry social burdens because of their association with mental illness and dementia or perhaps for conditions that are severely disabling, disfiguring or untreatable.

I just want to add my voice to those that have gone before talking about genetic discrimination because this is really a critically important issue. Consumer and professional organizations know about people who are now, on the basis of genetic diagnosis, family history and genetic information, being denied health insurance or charged higher premiums, dismissed or denied entrance to military service, rejected by potential employers and passed over for promotions and even, in a recent case, evicted from their own condominium by their own condominium association of which they were a member.

Lastly, in terms of discrimination, it is important for us to remember that the risks increase with vulnerability and that means that those who are underserved and marginalized or those who don't understand genetics or the importance of weighing risks and benefits and making a decision are at even greater risk.

By definition, genetic testing is a family affair and the implications of genetic testing and diagnoses reach beyond the individual being tested to the individual's family and even beyond, to their extended family circle because test results can indicate that someone else in the family who never expected or maybe even wanted to know are at risk for the same disorder or perhaps that they're carriers of a condition.

Because of that, family relationships can shift in ways that are significant and sometimes permanent. When the results are kept secret, this can create emotional gaps that are insurmountable. In another family, however, genetic revelations, new genetic information that ties the family together can bring people closer together.

Finally, there is the risk of discovering true paternity in the process of testing for disease, and some recent studies have suggested this may be happening more frequently than thought previously.

I also just want to add my voice to everyone else's to remember that this is all a moving target, that the benefit-to-risk, risk-to-benefit ratio for every test will improve over time as the science improves, as we gather broad-based data, as we develop safe, affordable and good treatments, as we pass strong privacy and non-discrimination protections, as we educate the public and ourselves about genetics and as the public really becomes and is better prepared for informed choices about genetic testing and more effective consumers of genetic services.

(Applause.)

DR. LEWIS: Thank you.

DR. KOENIG: I want to add my welcome, and thank you all very, very much for coming to help us with this very difficult task. The committee faces an enormously complicated task. My job this morning, in a few minutes, is to try and turn to the social issues.

As you can see, I want to begin with the premise that the implications of genetic testing and diagnoses extend beyond the individual and family, which has just been addressed so well by Mary, to the broader society, and make the point very strongly that even tests that are accurate and clinically meaningful may require oversight because of social implications. So this isn't just a matter of getting the science right.

It is not simply a matter of having a process that allows us to get the science right. Francis Collins mentioned that we all needed to improve our genetic literacy, but I am going to argue that we need to improve also our literacy in the general population of genetics in society and those issues.

So how might social criteria be incorporated into federal oversight? This is a difficult task because, of course, we are a very diverse society, but I would argue that there are many areas where we're not going to just be able to get by with the sort of sum of people's individual choices; we're going to have to make some collective decisions as well as a society.

On the benefit side, it has been well-described this morning what the benefits are of genetic testing, the social benefits. We hope for a decrease in the disease burden and decrease in suffering. I'm only going to have time to mention a few of the social risks, but let me go through those very quickly. Some have already been mentioned.

Some of you have probably seen this cartoon before. It is the notion of what in the social sciences we technically call genetic determinism or genetic reductionism. And, although we all know, theoretically, that the nature of the gene-environment interaction is very, very complicated, unfortunately we are social beings. We don't have a way of looking directly at the DNA, and we tend to like simple explanations.

So I think what's happened is that we're increasingly using a somewhat simplistic idea, the idea that you can find a simple cause of some of these diseases is very appealing and that's expressed constantly in popular culture. I think a lot of people believe that, but it is definitely not the case.

Another broad area that I think is going to be challenged by genetics is the whole issue of what is normal. The use of genetic tests in clinical practice will likely change the definition of normal and will have an impact on disability issues. That's been discussed already this morning, but it is at a very profound level, who will live, what kinds of characteristics will be valued.

Then, finally, I think even perhaps not more importantly, but important in a different way is the issue of what does it mean to live at risk. This is that new category of genetics that was talked about by Francis Collins. It is the issue of susceptibility testing or predicting risks. This is, I think, one of the most -- where the paradigm is shifting the most with the knowledge gained by the Human Genome Project and it is a major social transformation in terms of how we live our lives.

We're moving into an era when many of us will be able to predict, for example, what illnesses we'll have, how we'll live out our lives, and learning how to deal with this and manage it is not going to be easy and how should that affect how we regulate? Should tests that have the possibility to predict disease be in a higher category of regulation? Are we going to be creating whole categories of the population of people that we might call the unhealthy well or some people have called them un-patients or pre-patients? There are a lot of ways of talking about this.

Being at risk you might think of as a new form of disease. Well, that's not the only problem. The other issue that genetics I think brings is the whole issue of what is disease. We sometimes think that we can sort of put things in neat categories and draw boundaries. Well, we'll limit genetic testing to diseases and then that will -- there won't be any possible negative effects in the rest of society.

However, on the committee we've thought a lot about the fact that genetic testing for non-health related conditions raises profound ethical questions and concerns, and one reason that we're really thinking about that a lot is because first -- I'm an anthropologist. In my own field we think a lot about the fact that the boundary between disease and non-disease varies across cultures and changes over time; it is not something that's fixed. Your DNA may be relevant to it, but it is not something we understand, live with and experience in a social and cultural context. It is not something that's pre-determined.

It is not, also, adequate to simply say we'll just regulate tests that are for diseases because I think there often is going to be a complicated boundary between what is a disease and what isn't. Is short stature a disease, for example, obesity, addiction to alcohol or cigarettes, shyness, risk-seeking? These are all things that we've heard discussed in terms of their genetics recently. It is very hard to keep these things isolated in the clinic.

The other area that we might want to consider is forensic use of these tests. For example, what if there was an overlap? What if someone tried to imagine that there might be a gene that would identify people who were weak-willed -- and I'm just totally making this up. Okay, we might want to use that in treatment programs for obesity, say -- and I'm being very stigmatizing here, but what if the criminal justice system wanted to use such a test?

Or, on the positive side, what if the military or some of the Internet start-up companies in my area in California wanted to identify risk-seekers to hire in their companies?

I'm saying these things also somewhat in a tongue-in-cheek way. In some ways, just saying them reinforces the idea that this is a reality that we can have a genetics that's so precise. I don't really believe that and I want to emphasize that, that it is much more complicated.

I think one of the most important issues is the implications of the new genetics for our understanding of "race," and I put that in quotes purposefully. An overemphasis on genetic differences may wrongly reassert the notion of a biological basis of race. That's been discussed already today.

This is an enormously difficult topic technically in my field, and I won't go into all of it, but again, it is part of the double-edged helix or the double-edged sword. Surgeon General Satcher talked about the goal of reducing health disparities, so there are ways in which we want to look at differences across groups and yet, on the other hand, when we separate out people -- and I just want to make one point.

Do screening or testing programs targeted to specific -- and I'm calling them ethno-cultural populations -- demand special attention? I'm not calling them races because I don't want to have us get into this notion that there are preexisting racial categories of the human species, because that's not the case. Unfortunately, we're always going to have to use social criteria to divide people up into groups.

This issue is complicated by the fact that we're going to have to deal with, in a diverse society, assuring the accuracy of tests in our diverse society and we know the frequency of particular genetic conditions do vary across the population, so that is perhaps one area that we might want to think about in terms of requiring some higher scrutiny.

This is the last point I would like to make, and we thank you all for being here, but one way of dealing with some of the problems that we've talked about today is community perspectives, and concerns should be incorporated into the decision-making process about the use and oversight of genetic tests.

That was the moral of Robert Murray's story that he told us this morning, who might we include? Well, we very much need to include particular groups who might become associated with particular kinds of genetic illnesses, that's one issue, the disease and disability interest groups.

However, I just want to end with my own special plea. With the new genetics and the new susceptibility testing, everyone will be affected by genetic testing and, therefore, if we're going to harness these technologies, we have to include the perspectives of everyone. Thanks.

(Applause.)

DR. LEWIS: Thank you, Barbara and Mary. One more speaker before we have an opportunity to take a break. And at this point I would like to introduce Kate Beardsley, who is also a member of Secretary's Advisory Committee on Genetic Testing and a partner in the law firm of Buc & Beardsley, who is going to talk about the current status of oversight of genetic tests and some of the options for additional oversight.

MS. BEARDSLEY: Let me also thank you for coming, as a member of the committee, and say that I recognize that we're running pretty late here, so I'm really going to move quite quickly through my presentation here.

I've been asked to talk about three things this morning. One is data collection and particularly how we can make sure that we take advantage of everything that's known about genetic tests collectively, as a society.

Secondly, how the federal government now regulates genetic tests, which is a really important question from the point of view of deciding about oversight because we need to know what we're already doing before we decide whether we need to do more. And third, some of the things that the committee has thought about in terms of additional oversight.

I want to stress that our committee has not drawn any conclusions at all about this, and we're really interested in hearing what you have to say, but we have talked a little bit about some of the choices that are at least available, and there may be a lot of choices that we haven't thought about at all.

Start with data collection. Some of you may be wondering why the task force has set out a specific question on oversight and how we might know more, collect more and make better use of the data on genetic testing that's available, and the answer is that getting accurate information about these tests and what they do is a really important issue.

Unless we focus on data collection, we could find ourselves in a situation where maybe we have tests that can identify mutations, or what Francis called genetic glitches, but we won't know enough about what they mean. We won't know if they really relate to a health condition, the extent of the risk that's being posed and that kind of thing, and we also won't necessarily know whether the information that we're being provided is worth having.

In a sort of standard medical technology development model, say if I'm a manufacturer of a heart valve, what happens is that manufacturer, the person who wants to sell that heart valve, develops it and then does the testing to figure out whether it works and what is reasonable to say about that.

That's a standard model, but it is a model that maybe is not going to work so well in the field of genetic testing, and there are a couple of reasons for that. One is that there are a lot of different kinds of people developing genetic tests, including people who don't have huge amounts of capital that is necessary to develop these tests.

Another is that the tests themselves are really hard to do. If you start thinking about a predictive test, for example, you're not going to know whether it is really predicting something for maybe years out.

So people have begun to think about whether we can pool our knowledge in some way so that everyone can take advantage of the data that's available on what tests are doing and whether they're worth doing.

It is not perfectly clear what the model for doing that is, but one thing I want to mention is the notion of having a government agency do it. The Centers for Disease Control, the CDC, which you'll be hearing more about, has developed an interagency group with the idea of thinking about how to facilitate data collection and even started, in conjunction with the private sector, a group that's taken a couple of disease conditions, Cystic Fibrosis and Hemochromatosis, and tried to bring together what's known about those conditions and known about what genetic testing tells us about those conditions.

So one of the things that the committee really wants to think about and come to some conclusions on is should the government, and if so, how can the government facilitate data collection and dissemination?

Next, let me talk about the current oversight of genetic testing. I'm going to focus on what the federal government does. I don't want to lose sight of the fact that the states are also involved and a number of private organizations, but for our purposes probably what's really important is the federal government.

Let me start at the end of this discussion by saying that I think you'll probably conclude, after we work through all the acronyms and the initials of all the government agencies, that what we have

now is probably pretty much of a mix-and-match system of regulation.

There are some aspects of genetic testing that are pretty heavily regulated, there are some that we've talked about this morning that are not regulated at all and there are some that are sort of partly regulated. And one of the questions for the committee is, is that the right mix? Have we got the right things regulated and have we skipped some of things that we ought not to have regulated? Let me go back now to this slide and talk a little bit about the federal agencies that are involved.

The first one is CLIA, the Clinical Laboratory Improvement Acts, which is administered by the Health Care Financing Administration, HCFA, and the Centers for Disease Control and Prevention, CDC. I tried to figure out a way to do this presentation without using any initials or any names of federal agencies, but it was hopeless, so you'll just have to bear with me on this.

CLIA is basically directed at regulating laboratory process, the way laboratories process the tests that they process. It requires that labs be certified and it requires them to operate according to a certain set of standards.

So far, CLIA has been directed mainly at things that are going on inside the laboratory, personnel qualifications, making sure technicians know what they're doing, making sure equipment is working right, that kind of thing, and it hasn't been as much directed at the kinds of things we've been talking about this morning, whether tests have clinical validity, whether they have clinical utility, whether there is informed consent, genetic education, that kind of thing. Whether CLIA ought to move more toward these kinds of things is one of the questions we need to answer.

Secondly, the Food and Drug Administration, FDA. If CLIA regulates process, the Food and Drug Administration regulates things. They regulate the actual tests that are being used and by that I mean the pieces of the test, the reagents, the probes, the whatever that actually do the test.

In most cases where there is a new medical technology, the manufacturer or somebody has to take it in front of FDA and FDA looks at whether the test has been shown to do what the person who wants to bring it to market says it will do before it can go on the market.

That's not the case with most of the genetic tests, at least most of the genetic tests for predisposition testing. The reason for that is sort of obscure. It has to do with the fact that, mostly, genetic tests aren't sold as whole tests. You don't put all the pieces together in a package and sell it to the lab. Mostly the labs themselves are making up the tests, buying the pieces from different places, and that has a different consequence from an FDA perspective.

That doesn't mean that FDA is not regulating these tests at all, It is. It is regulating a number of pieces. It is regulating the way manufacture of the pieces is handled, the labeling of the pieces is handled and, to some extent, it is regulating what the labs can do. For example, on most of these tests the FDA has a regulation that says that a consumer can't order one of these tests; only a health care provider or professional can order one of these tests.

So FDA is doing a lot, but it is not doing the thing that probably is most classically associated with FDA, and that's reviewing tests before they get on the market.

Third, federal human subjects regulation. Both NIH, the National Institutes of Health, and FDA are involved in protecting human subjects during research. When we're talking about this, we're talking about something a little different than CLIA and the FDA role because those are directed

mostly at when a product or a test is actually being used on people in a market on a routine basis.

The Human Subjects Regulations have to do with the period before we know that the test works, when it is being evaluated. And usually almost all kinds of medical technologies are pretty much tried out on humans before you know if they work. It is basically experimentation on humans and it is important that there be safeguards for those people, the subjects of that research, during the time that the research is being done, and that's the reason for these regulations, which require, for example, research protocols to go to institutional review boards and require usually informed consent from the people who are participating in the research.

These particular regulations, though, apply only to research that's funded by the Department of Health and Human Services or research that's going to eventually go to FDA, for some reason, one way or another. So that means that they're providing protection for subjects in some contexts, but there is probably research -- we know there is research going on that doesn't fall into either of those contexts, so another question is, are these the right kind of regulations and, if so, should they be more broadly applied? That's the current situation.

Let me move on to future oversight. As you can see, we've gone about looking at this in two ways. One is to look at kind of issues that might be subjects of further oversight. And a second way to look at it is who might do that oversight.

This first slide is about the issues that might be the subject of further oversight. Obviously, they're not all the issues; they're just kind of a sample of things that the committee has talked about, and I think you'll recognize most of them because most of the speakers this morning have talked about them one way or the other.

The first one, introduction of laboratory-developed tests into clinical practices, is what we've talked about, what Dr. Satcher mentioned this morning and what a number of speakers have talked about, and that is whether there ought to be some sort of third-party independent review of a genetic test before it is marketed for routine use.

That could be a government, it could be a private party, it could be almost anything, but it would be an independent look. That's classically what FDA does for medical technologies, but there are a number of reasons why a lot of people think FDA might not be the best organization to do it here. That's one key issue that the committee needs to grapple with.

A second issue is the issue of patient safeguards and, of course, there are a lot of patient safeguards, but the ones that have been talked about probably the most, and again, we've heard about them this morning -- Dr. Murray mentioned informed consent this morning, for example.

I've mentioned two on the slide. One is informed consent, and that's informed consent both in the research part of developing a test that we were just talking about NIH and FDA doing, and also potentially informed consent when tests are already in routine practice.

A lot of people believe that, because of the nature of genetic testing and because of the impact it can have both on the person who is hearing the result and on his family, her family and society as a whole, that really there ought to be some informed consent provision even after a genetic test is being used in routine practice.

Another thing we've talked about this morning is genetics education and counseling.

We're talking here not just about education for consumers, but also this is a new field that's growing quickly. Francis was talking about this also this morning. The need to get people educated is an important one.

Third, post-market data collection is another issue we've talked about. I've already talked to you about that earlier, so I won't do it again.

Finally, information disclosure and marketing. This is, again, linked to the education point. Obviously, there is a lot of information floating around and it is important that it be accessible. Usually with a medical technology there is a package insert of some kind that comes with it that describes the test, describes what we know about it, describes the science behind it. But with genetic tests, that's not necessarily the case and there need to be ways to make sure that what's known about these tests is communicated to the people who need to hear it.

There are also concerns that there may be marketing claims being made, in some cases, for some tests, that overstate the value of the test and perhaps understate some of the adverse consequences that come from the test. So some people have thought that the federal government or somebody needs to be more involved in making sure that that kind of thing doesn't happen.

Finally, we've talked, and it is written in the paper as well, a little bit about what kinds of oversight, assuming we want more oversight -- which is not altogether clear -- might be appropriate. These are four choices we've talked about; they kind of match Francis' three choices that he had in a slide earlier.

One of them is to take the existing mechanisms that we have in the federal government for regulation and strengthen them or sort of encourage them or direct them to get into some of these other areas that seem to be important. That would probably involve strengthening and expanding either CLIA or FDA or some combination of them.

Another way to do it is to say, well, we don't want to have mandatory oversight here, we don't think it is necessary, we think that if voluntary organizations will write strong standards, that labs and test manufacturers will adhere to them and I guess medical professionals as well, and that what we ought to be doing is, instead of telling people what they have to do, we ought to be getting private organizations to write standards and encourage people to follow those standards.

Another way to do it, and this is my third and fourth option, is to create something new altogether that would oversee genetic testing. A couple of options have been suggested. One is that there be an interagency review board, which presumably would involve a whole lot of federal agencies, HCFA, FDA, CDC, HRSA, AHCPR and a number of others.

Probably the most novel idea is the fourth one, and that is that this is an area that ought to be overseen jointly by the federal government and the private sector as well as professional organizations, and that we ought to create a consortium that will try together to work these issues out and come up with some sort of guidance to help people do this in a way that seems to me to be the most socially useful.

Thank you very much. I think we're at a break now.

(Applause.)

DR. LEWIS: Thanks, Kate, and yes, we are going to take a break, but just a couple of announcements before we move to the break. The first is if the participants in our next session would meet immediately, as soon as we break, right down front with the facilitators, we would appreciate it.

Secondly, to please ask people if, during the break, you would move your luggage and your coats to the storage racks so that there is more room in the audience for seating.

We're concerned that there aren't enough seats. And our hosts have asked please that we have no food and beverages in the auditorium, and we would like to honor their request and ask that you please consume your food and beverages outside the auditorium and not bring them in with you.

We're going to try to shorten the break to 10 minutes so we can make up a little bit of the time, so please be back in 10 minutes.

(Recess.)

DR. LEWIS: While we're waiting to begin the panel discussion, I would like to just share a little bit about what's going to happen this afternoon in the discussion groups.

The goal of the discussion sessions is to enable participants to share their perspectives with each other in an interactive discussion of the issues bearing on the oversight of genetic tests. The sessions will be held in a smaller, less formal setting to foster what we hope will be a thought-provoking discussion.

We believe that the small group discussions are important ways to elicit individual perspectives on genetic testing and that the give-and-take of conversation hopefully will help us enhance our understanding of the issues. We're not necessarily expecting the groups to reach consensus on the issues before us.

Enclosed in your meeting packet is a discussion guide. The discussion groups have been organized around each of the issues that the SACGT is seeking public input on, criteria for assessing risks and benefits, differentiation and categorization of genetic tests, issues around data collection, options for oversight and other related questions.

Also, in addition to incorporating diversity issues into the scope of each discussion group, we also felt it was important to organize a group on the specific topic of oversight issues for diverse cultural communities.

Here's how each discussion group will work. Facilitators will lead the discussion in each group. Most of the groups will have two facilitators; some of the groups will have a single facilitator. A rapporteur will take notes of the discussion and will work with the facilitator in drafting a report summary.

The summary will highlight the key issues that were discussed, general conclusions that were reached and, importantly, any strongly-held opinions in the group. Each discussion group will include a science advisor in case questions come up that are of a highly technical nature.

We encourage all of you to actively participate in your discussion groups. Members of the SACGT will be present in each of the discussion groups; however, our role is going to be to listen to the discussion. If questions come up that only we can answer, we'll certainly try to be of help, but please

take our silence as a signal that what we want to do is hear what you have to say. You've certainly heard this morning enough of what we are having to say.

Each group's facilitator will summarize their group's discussion in a plenary session that will be later this afternoon. And please, as you leave on your way to lunch, note that there are updated discussion assignment group sheets that were handed out at the registration desk this morning. If you don't have one, please pick one up.

Second, before we go to lunch, note that there are going to be box lunches sold in the lobby of this building; however, there isn't a great deal of seating in this building itself, so you may want to wander over to the cafeteria in the Student Union Building, which is right next door. There are also a number of restaurants nearby and information about them is included in your packets.

Third, we're going to hold lunch -- we know we're running behind schedule, but we're going to hold lunch to exactly an hour, and we will begin the discussion groups exactly one hour after we finish here this morning, so that when you leave for lunch, please keep that in your plan so that you're back on time so that we can get started on time because we have an opportunity to make up some time this evening, but we do need to start immediately after an hour.

At this point, I would like to turn the panel over to our facilitators, to Donna and to Reed, to start this next section. You all know how you're going to do it.

MS. OLSEN: Good morning. My name is Donna Gore Olsen, and I am the state coordinator for Indiana, for Family Voices, which is a statewide, national grassroots effort on behalf of children with special needs. I am the parent of three children. My two youngest children have Cystic Fibrosis.

Genetic testing takes on a very special interest for me and for my family in so many different ways, and so I appreciate the opportunity to chat with you about that.

During the next hour and a half or approximately hour and a half we hope to have an opportunity for these individuals to do what the committee felt so strongly about, and that is provide an opportunity for the public at large, especially families and individuals who are so personally affected by genetics and genetic testing, to share some of their thoughts, their perspectives, their concerns and comments.

We have asked them to limit their remarks to five minutes apiece. I can promise you that each one of these folks could probably speak very effectively and keep us entranced for at least an hour apiece, but they have graciously agreed to limit their remarks to five minutes.

With the challenges that we have this morning, I have a recommendation that I learned from my friends at Material and Child Health 10, 15 years ago, and it is a strategy that I use in facilitating groups of consumers all the time. I say to them, we're going to let you know when you have one minute left and I'll ask you to wrap it up within that one minute, and if you keep talking, I'll scoot my chair back so you'll know that I'm getting a little antsy. If you keep talking, I'll get up and I'll walk over and stand next to you, and if you keep talking, I'll just put my arm around you and I don't promise what happens next.

(Laughter.)

So with that in mind, we're going to begin, but before we do, we know that we're invariably going to run out of time with all the wonderful people here and all the wonderful information that we have to share, so we're going to ask you, as we go through this process and people are going to share their thoughts and then we're going to move on to the next person, that if you would please write down your comments or your questions, specific questions for a specific individual -- and we hope to get through as many of them as we can.

If we can't, what I would ask you to do is to take those comments or those questions and turn them in at the end of the hour and a half so that we can make a record of them, so if you could help us with that, please. With no further ado, I'll turn it over to Reed for the introductions.

DR. TUCKSON: Thank you very much, Donna. My name is Reed Tuckson. I am a physician who serves as Senior Vice President for Professional Standards at the American Medical Association, and I'm privileged to be a member of the committee.

Without further ado, let us turn then to hear from our panelists, but also let me thank the great committee of consultant/experts who brought these talented and interesting people to our attention and greatly facilitated, I think, the work of our committee.

Our first presenter will be Yolanda Aguilar. Yolanda is a special education teacher with a special needs children's program in San Antonio, Texas. In that capacity, she regularly deals with the concerns of her parents and of her students in terms of the meaning of their diagnoses and the risk of recurrence and other such related issues.

She also serves as a board member of the Texas Fiesta Educativa, which is intended to educate Hispanic families about the services that their children can receive through the San Antonio school system.

Having had a personal experience suffering with severe asthma and being blind since birth, she has developed ultimately a clear vision of the important issues associated with genetic testing and risk assessment and, Yolanda, we would appreciate hearing some of your perspectives.

MS. AGUILAR: A little over 50 years ago, my parents were blessed with my bouncing personality. Little did they know that they were going to encounter a lot of problems. My mother had been exposed to rubella during her first trimester and she had also had to have her gall bladder removed, which meant I was also exposed to radiation and anesthesia at the same time. She knew there was going to be a problem at birth and she was just waiting to see how severe it was going to be.

They never told me after I was born that I had a problem and they treated me like there was nothing wrong with me. I was born blind, had congenital cataracts and I was not able to have surgery until after about two and a half to three years. Since then, my parents have been dealing with insurances because they did not have insurance.

When my dad became a civil service employee, he had everything given to him, meaning he had good insurance, so I got very good care. As I got older, I attended school, regular school with normal peers, and my parents made sure I had everything I needed to be a successful person in this society. I knew I was going to college, and I knew some day I would get married and have children, but I never knew that the implications of what had happened to my mother would some day have on me.

As I was going to school, in high school and college, two of my other friends with

similar problems ended up going through some genetic counseling when they got married and they were told that their children would be fine, and both of them had children with real severe cases of blindness.

After seeing that, I said, well, I don't think that's going to be an option that I want to take and that was a decision I made very, very young in my life. I knew I did not want to put my children through some of the things I wanted to do and I couldn't do and I remember the one thing that was really, really important to me was driving.

I had boyfriends that I would talk into, if you teach me to drive, I will type your paper, your research paper. It wasn't until one day they were teaching me to drive, because we used to live out in the country, I felt like we had run over something. One of them said, Didn't you see the chicken? You ran over it.

That chicken is still on my mind sometimes when someone tells me, can't you even move the car forward. I say no. I was lucky because I thought that could have been a person, and it made a terrible impression in my mind.

I was lucky. I went to college and I was very happy, but I also felt like people out there in society need to know a lot more of what's going on and the implications.

Presently, I'm 50 years old and my classmates are now seeing their grandchildren born with the same problems, and they didn't want this to happen, but it continued.

Since then, I developed glaucoma and asthma, so they're preexisting conditions. I had a hard time getting disability insurance, even though "it is not right." When we change insurances through our district, I always have to fill out that little paper that says I have a preexisting condition, so I have to wait a year before I can be treated for certain things. That is something I have to willingly give an insurance company.

My question is, if anyone else were to have genetic testing, like some of the parents that I see come up to me and tell me that they went through genetic testing -- because I work in a very, very low income area -- they come to me and they say, oh, I'm going to have another baby. And I say, yes, this is your third child and you already have two in the special ed program, and they're very severe. They said, yes, but they told me it was only one in 10 incidents, and this is only my third.

Well, somebody didn't educate this parent very well. So maybe we also need to reach out and educate the educators on this issue because they're the ones that are really working hands-on with their children, as well as the medical field, but they're the ones that sometimes have to really get down at the level of the parent, do the home visits and give this information as well.

I really feel genetic testing is good, but I also think we need to remember what it is going to do to us because what else will the insurance companies do to us if they find out I have other things, like I have asthma and I have glaucoma and I have a very hard time selecting the doctor, selecting the medication, because with one company it is an experimental drug; with another company it is a drug that's been used for 10 years and I may have to pay for it or I may not have to pay for it.

DR. TUCKSON: Thank you very much. Those are important points, particularly now about preexisting conditions, and I love this idea of educating the educators. That's something that we really do need to attend to.

Randy Alexander is our next presenter. Randy is a man living with hereditary hemochromatosis and who also serves as chairman of the Iron Disorders Institute, headquartered in South Carolina.

In his capacity, he has spoken often on the issues of genetic testing and hemochromatosis and is politically active in patient advocacy. He is summarizing his passion and his experiences in a book that he is writing based on his experiences. Randy, what would you share with us?

MR. ALEXANDER: Thank you. In 1990 I was diagnosed with a very rare disorder that I was told, after a year's worth of blood tests and questionable, potentially misdiagnoses of chronic hepatitis, possibly AIDS, and was told that I would probably die in six months.

When I learned, after a year's worth of blood tests and after I had a general physician who was very adamant in determining what was really wrong with me, it was determined that I had this rare disorder.

Years later -- I really didn't want anybody to know I had hemochromatosis. No one heard of it, no one even thought it was for real. And when I learned that it was very common and, in fact, now is known to be the most common genetic disorder in the northern hemisphere, it has been something I've been involved with, to take on trying to create awareness with our organization, not only with the patient and consumer community, but in the medical community as well.

The one thing that genetics has done, it actually was quite beneficial in that it validated that there was such a disorder as hemochromatosis. For many years even my family said there was no such thing, they had never heard of it, if there was something to it, physicians would have known about it.

We have a daunting task before us of educating people about iron out of balance. That is an underlying cause of many diseases in this country, heart disease, cancers, depression -- which was my first and foremost symptom that led me to seeking a diagnosis -- arthritis, diabetes, many things which we were not clear as to the symptoms and effects it is having on people.

So after having many years of marketing saying that iron is good for you, the more the better, trying to educate the public and the physicians is very difficult. So when, in 1996, I literally got a phone call out of the clear blue saying, would you come meet with our client in San Francisco because they have just discovered the gene, being hemochromatosis -- I get choked up -- it changed my life, because after years of people telling you that you're crazy, that there was no such thing, it did something very good.

But there are risks, there are problems. For example, there are problems with people who have hemochromatosis in their family and they are emotional about -- if they have children or they have children, will they have it, what can they do about it and what do they do.

Because hemochromatosis is a metabolic disorder of iron accumulation over a lifetime, this is nothing you can do about hemochromatosis at a young age. There are calls by some people for newborn screening. With hemochromatosis, it is not appropriate, in our position as directed by our scientific review board of the institute and my personal opinion.

I have been in that situation with my niece, my brother and my sister-in-law. My brother has hemochromatosis. He was misdiagnosed, given iron pills for two years. My sister was not diagnosed and they said she should be institutionalized, and we were able to genetically type her and get a

diagnosis.

I went to the CDC and got a warm reception. We have generated a heightened awareness at the CDC. It came from a very obscure corner of the organization to front and center. This is one of the hottest topics in medicine and with funding, with the acknowledgement of Congress, we're continuing forward. Great progress is being made. Therefore, the number one issue on our mind is that public education and the appropriateness of genetic testing is paramount, and, along with so many issues, privacy must be addressed.

DR. TUCKSON: Thank you very, very much. Our third presenter is Mei-Ling Chang. She is the daughter of a Native Hawaiian mother and a second generation Chinese father. She directs the Native Hawaiian Health Care System of Maui.

She benefits greatly by a bachelor's degree in cultural anthropology, an MPH. from the University of Hawaii and a fellowship with the Native Researchers Cancer Control Project run by the University of Washington and the University of Arizona. She now leads a cancer research team that studies the behavior health patterns of her people. The Native Hawaiian experience with research studies informs her perspective on genetic research. Mei-Ling.

MS. CHANG: Aloha. I will share with you the breath of life. Napua o Hawaii or Kanaka Maoli (phonetic) are what you call Native Hawaiians, but we call ourselves the people, Kanaka Maoli.

We believe everything in life is sacred, everything. And we start off with ourselves, every part of our being is sacred for we are the progeny of the gods, Wakia (phonetic), the Sky Father, and Papa (phonetic), the Earth Mother.

Their first child when he was born was stillborn, so they buried him in the Ina (phonetic) or the earth, and out of him came Kaulo, the staple food of all Hawaiians, and we were told from the beginning of time that if we cared for our older brother, if we malama (phonetic) him, we will never starve.

And so it is that one of the most important cultural values of Napua o Hawaii is to care for one another and we are in this way connected with all things on the earth and in the cosmos. Caring, for us, is central to everything that we do.

You have an example here of these beautiful leis. In Hawaii, people are called Napua o Hawaii, they are the flowers of Hawaii and put together with love, they form what we call Napua O Hawaii Lei, the beautiful flowers of Hawaii.

But you can't just make a flower lei; you must choose each blossom with extreme care and you must handle them with extreme care because, if you don't, they will bruise, they will fall apart and you will not have something beautiful at the end, and this has tremendous implications for health care in our people.

In Hawaii, people are confused and wonder why that, even when Hawaiians are given, at no cost, health services, they fail to come. They do not seek screening for breast and cervical cancer, they do not come in for cardio risk clinics, they do not go in for diabetic management because we feel that so much of the health care that is offered, even though it is free, lacks what we call malama pono (phonetic), caring, and we would rather die than go into a system that does not care for us.

That is the whole truth. It is true. If you'll look at the statistics, you will know that Hawaiians die more frequently of breast and cervical cancer, cardiovascular disease than any other ethnic group.

So my message here today is to malama us, to care. And the oversight committee has a tremendous opportunity to do just that, to put into place the kinds of things that are necessary within the context of culture if you want to bring this message and the power of genetics into communities such as Kanaka Maoli, Kapoi O Hawaii neighborhood. Mahalo (phonetic).

(Applause.)

DR. TUCKSON: Thank you. Our next presenter is Christine Demark. While living in Milwaukee, Wisconsin and with the knowledge that her mother had been diagnosed with Huntington's disease, she determined to become tested. Through some issues that she may share with us, she found herself being referred out of Wisconsin to the University of Michigan, where, in fact, she did test positive for Huntington's disease.

Now, working hard every day in a retail store in Livonia, Michigan, she continues to have a very personal perspective on the issues before us. Christine, would you share them?

MS. DEMARK: Actually, I just wanted to mention it is a real privilege to come today and talk to you, and I was wanting to relay to you some of the things that occurred in my life more specifically as a result of the diagnosis.

I was fired from my job after I was diagnosed with the Huntington's disease because they felt that they were a small company, and they were self-insured, and they just didn't feel that they would be able to meet the health requirements. Of course, Huntington's has no treatment and no cure, for those of you that don't know, I'm sure most of you do in this audience, so it was totally irrational thoughts on their part.

Prior to that, just two weeks before I had gotten my test results back, I was engaged to a gentleman and he decided that he wasn't going to be able to handle what was going to happen one way or the other, and so he broke off our engagement. Then I lost my job, of course.

After that, I went to several attorneys to find out whether or not I was going to pursue a lawsuit. By that time, I was having a huge financial crisis because I was out of a job and it was just this whole stigma about whether or not I was going to be able to be employable again, because Milwaukee is a relatively small town -- there is only 600,000 people there.

I talked to some other attorneys and they said that -- a couple different attorneys, and they gave me advice that told me I could probably win my lawsuit, but they told me that I might not be able to find a job right away, so it was six of one and half a dozen of the other, so I decided pretty much just not to sue them at that time.

Then the other thing that happened, too, was that my brothers and the rest of my family members just were too devastated by this whole thing, and even though I think my father -- I know he felt really guilty as soon as I got the test results, he came with me the day -- I had gone to Dorian Marckle (phonetic). She was a genetic counselor at U of M that I went to.

I was really blessed to be able to go through that protocol, even though at the time it took me nine months to do it because I called her in January and didn't get the test results until September -- this was in 1995 -- and by this point I had been waiting two years for them, since they had found the gene, to get through all the legal stuff.

But it was a good thing that they did because that protocol has really saved my life because several things that Dorian and I talked about were things like making sure that I had health insurance and life insurance before and trying to discern whether or not I was really ready emotionally as much as I could be, but it is not possible.

No matter how much counseling or other things that doctors feel that they may have insight to, the havoc that it wreaks on your life is too enumerable. My confidence went down so bad that it took me years to even be willing to be in a relationship, let alone make friends with anybody, because when my mom was diagnosed, I took care of her, and by the time we got to the end of her life, pretty much everybody had left her.

I assumed that my symptoms would be similar to hers, even though I'm still asymptomatic, but I just assumed that they would be. Until I had talked to the people through counseling, I realized that that's not what was going to happen, so that was an encouragement there.

Still, I had the thought in the back of my mind that if I were to get sick one day, that everybody was going to leave me, the way we all left my mother, and that kind of thing causes you to not want to have relationships with people and there is no way that they could have told me about that beforehand.

And so, even though it is been a good thing that I did this and I don't regret it one minute because it has given me an opportunity to deal with things and help other people and to be here today to share with you -- and I've had other opportunities to talk to genetic groups and other counseling groups and to help to have them understand, too.

So I would like you to know, as my last thought, that we need to maintain the protocols and you shouldn't be allowed to go to an HMO or an M.D. and have the test results given to you. You need to go through this. Thank you.

DR. TUCKSON: Thank you very much, Christine. That was outstanding.

(Applause.)

DR. TUCKSON: Bob Miyamoto is a parent. He is the parent of a daughter affected with neurofibromatosis. As a result of his experience, he is now very involved in politics at the State of Washington level and at the national level, involving himself very actively in the debate on genetic testing and genetic testing services.

Trained as a physicist, he brings not only a scientist's perspective to this, but a personal passion to the questions before us. Bob?

DR. MIYAMOTO: You know, I think it is important to know who I am and who I am not in order to understand my comments. I am a Bob. Probably most of any stereotypes you might attach to a Bob apply to me. See? I even wrote down my remarks.

(Laughter.)

DR. MIYAMOTO: I'm not a geneticist nor in the health profession, but rather I'm a nerdy research physicist who probably keeps his head buried in the sand much too much, but for today I lift my head to look around.

I have a 13-year old daughter, Tamara, with a genetic condition, neurofibromatosis, or as we like to say, NF. Neither my wife nor I have neurofibromatosis, so it was quite a shock that we learned that we are now involved with genetic issues.

Although many of you may not know about NF, Francis Collins is the co-discoverer of the NF gene and Wylie Burke, who was supposed to be here, started the first NF clinic in the State of Washington.

But I'm not here to talk about NF. I'm here to offer some personal perspectives on genetic testing. I struggled to think about what I can offer this esteemed committee that you haven't thought about already. To be honest, we've really never had a genetic test, even though one is available for NF. I guess that's the reason I'm here is that genetic testing isn't a philosophical or a theoretical issue for us; it is a real need.

Do you know what it is like to be diagnosed with a genetic condition? Let me tell you. Our pediatrician was concerned with a few birthmarks on our daughter from the moment she was born. When Tamara was about six months old, the pediatrician's concern turned into action. She asked us to see a local dermatologist who was also a geneticist.

We went to the doctor's office, uncertain about what would happen, but optimistic that modern medicine would explain the spots. After a cursory examination of our daughter, the doctor told us to remove our clothes.

(Laughter.)

DR. MIYAMOTO: Excuse me? Remove my clothes? With much embarrassment, we were examined from head to toe, with special emphasis in our armpits. Not exactly what we were expecting.

She asked us to then put on our clothes and sat sternly while we did so. She then proceeded to tell us that our daughter might have neurofibromatosis, although we did not, and then she started to explain the implication that that brings.

Tamara, who at that point looked pretty much and acted like any other six-month-old child, might have tumors on the skin, potentially disfiguring tumors, tumors in the central nervous system, optic gliomas, bone deformities, learning disabilities, mental retardation and on and on and on. Breaking the heavy silence, we asked what would happen and when. There were no answers to those questions.

The odds. Think about that. What do "the odds" mean to you? To me, in a simple way, this identifies one of the major points about genetic testing. What do genetic tests really mean? Genetic tests are really about improving the decision-making process, how we live our lives. We would like to know what will happen to Tamara.

We are currently debating surgery on tumors that are compressing her spinal cord. She's fine for the moment, but will they grow or not? We are constantly faced with making decisions that are based on intuition and an educated guess. Can better decisions be made with improved genetic testing?

To me, improving the decision-making process is the key element of genetic testing, but understanding what the genetic test means is critical; otherwise, the converse can happen, that is, genetic testing may lead to poor decisions.

Have you ever looked carefully into the manner in which genetic results are provided? You talk about complicated. It is very complicated. Genetic testing is about statistical relationships. How many of you understand statistics? I don't. I'm supposed to.

(Laughter.)

DR. MIYAMOTO: If I told you that one out of 4,000 babies would be born with NF, would that deter you from having children? What if I told you it was a 50/50 chance? Now would you? What if I told you that you had a predisposition towards have disfiguring tumors on your face? Would it matter if it were a 20 percent, 40 percent or 90 percent chance? What if I forgot to tell you that those numbers only applied if you were white or black or yellow or polka dot? What do these numbers really mean?

If the issue is oversight, then I believe you must move beyond the laboratories and the science to ask, fundamentally, who is the user? How do I communicate this information to the user and how will it be used?

So the oversight can continue to maintain this mystical view of genetics by allowing the use of genetic tests to be built on a strange language, hidden from common sense or it can ensure that there is a follow-through that evaluates the process all the way through to the end user and the decision that is made.

There are many issues with genetic testing. I really just tried to walk though our need for decisions to drive to the conclusion that there is a great need that can only be fulfilled if I understand what these genetic tests really mean, so I ask you to be careful to follow through. Thank you.

(Applause.)

DR. TUCKSON: Thank you, Bob. Victoria Odesina is the mother of two children with sickle cell disease living in Hartford, Connecticut. She has served as the Alliance of Genetic Support Group's representative on the Genetic Testing Task Force and is the past co-chair of the New England Regional Genetics Network.

A nurse by training, her comments to us today will be informed not only by her clinical experience, but by her personal insight and passion. Victoria.

MS. ODESINA: Thank you. My daughter was diagnosed -- the first one was diagnosed when she was six months old with sickle cell. At that time I found out that there had been newborn screening. Unfortunately, it was not available in the state we where we living at that time.

About two years later we had the other child and I decided to request for screening, and I was told to bring her back in about six months, which I did.

You have to understand, I'm from Nigeria originally and I had to struggle with having to undergo these tests for our children because there is such stigmatization with having a genetic condition and my husband, not being in the medical field, could not understand why I was looking for trouble where there was none, simply because he thought that if I didn't go for the test, maybe it would not happen and, being a nurse, we always think of the extremes. I have a two-year old who hasn't had any problems, why do I think this one will have one and those kind of rationale.

However, I went ahead simply because I wanted to know if she had it. That way I'll be able to enter in a treatment center and we'll be able to make use of whatever medical advances were available at that time.

Unfortunately, the pediatrician didn't give very much information about the advances in sickle cell management at that time. The instruction was just monitor them, if they get sick, bring them in and we'll take care of them. There was no pre-counseling, no post-counseling, no disease education, nothing whatsoever. I had to go through the phone books and call everybody that I knew to get information on sickle cell disease. I went back to my textbooks in nursing school.

My second child had a stroke when she was 21 months old. That was the first problem with sickle cell that I had. The common sign, for most of you who know about sickle cell, is pain episodes. None of them had that until we had the one with a stroke, so this was a big learning curve, and she had to be rushed to the hospital. That was about 15 years ago.

Last month my brother-in-law had a baby. The child had underwent newborn screening and had sickle cell trait. The mother came to me and said did we get this result because you work with sickle cell, and I said, wait a minute, nobody told you about this test? She said, well, they told me about a PKU test, but I didn't know about sickle cell and I thought we got the result because they know you are a relative and you work with sickle cell.

Well, this brings us back to the issue of informed consent, the process, which means it is not just signing on the dotted line. This is one passion of mine. Whether it be individual, private, family genetic tests or newborn screening test which is done for the public, there needs to be that education.

The gap is there, and if we can justify that the benefits are there, we need to find a way to educate the people that newborn screening is not just PKU test. Some states test for seven, up to 10 conditions and parents are still not aware that their kids are being tested for it.

On the other hand, working as a nurse, I've had to deal with a lot of parents who come in and ask me why were our children tested for this condition. There is a big gap there. We need to address that.

The other thing we've gone through, discrimination, insurance denial -- also the other problem is education of providers. When we complete these tests, who are the people providing care for these children? What are our roles in deciding or making sure that, once we move from providing these tests, we have somebody who is knowledgeable enough to interpret the result and to be able to refer them to the appropriate services.

Do we have providers available to take care of all this population? We have to make sure that when we're providing genetic counseling, providing health services, providing education in the community, that we are aware and we take into consideration all the different ethno-cultural backgrounds

and that we respond to those needs.

So when we talk about oversight, finally, oversight I think should be a consortium made of all stakeholders, the federal government, the state agencies, the consumers, the policymakers, insurance companies and everybody else. Thank you.

DR. TUCKSON: Thank you.

(Applause.)

DR. TUCKSON: Traci Powell, we are very pleased that you are able to join us today. We are particularly interested in your insights gained from your personal experience with Friedrich's ataxia, but also we are fascinated that you are studying for a Ph.D. in genetics at Stanford and we would love to hear from you now.

MS. POWELL: First, I'll start off with saying that Friedrich's ataxia is a rare neurological disorder. It is a recessive disorder, so both my parents are carriers of a defective gene and I have two bad copies of this gene. So my personal history -- my first symptoms is when I was age seven, I didn't have reflexes. This is one of the hallmarks of Friedrich's, but because it is so rare, a lot of times neurologists don't even know the hallmarks. Besides that, I had no other symptoms, so the doctors were confused.

By age 11 I started having some problems with my handwriting and some problems riding a bicycle and going up and down stairs, but very slight and, yeah, I was told at that time by many people that my handwriting was the sign of a doctor's handwriting and they were trying to encourage me to go on in school.

(Laughter.)

MS. POWELL: Well, I'll stop here. One of my main points is that we need to hear more of people's stories, more of what -- you know, policymakers should gain perspectives and insights from people's stories in how they used genetic testing and whether they used genetic testing, so I'll go on with my story.

By age 15, I was having some more problems running, but again, my problems were very slight and another hallmark of Friedrich's is unpredictable, progression is very slow or it can be fast, it is a mixture of the two, so up until I was 19 it was very slow and slight and I was just very -- I was never picked on in PE class to be on teams and things like that. I was just a slow runner and not real athletic, so I threw myself into academics.

By age 19 it started going faster, and within two months I had gone from walking with no assistance or anything to holding onto people and things and kind of looking like I'm drunk when I'm walking. So at that point we went to the neurologist and said, something is wrong, obviously. So they said, okay, it is wrong, but it took about three months for them to diagnose me.

When he diagnosed me, the doctor, the neurologist, was very cold and oh, I'm sorry, I've gone -- I have a lot of things I could say, but he was just very -- let's see, I was distracted. My diagnosis was he said by age 35 I would be a vegetable, bedridden or I would be dead. That was very devastating to get that information like that.

But as far as genetic testing, my mother and I have had genetic testing. My interest in research -- is more for research and also to confirm diagnosis and in my family genetic testing is thought of -- you know, it is not a major issue. Right now my siblings -- the main way we use it is my siblings, when they do get married and start having kids there would be carrier testing to see if that's an issue, so we need to know how people and families are going to use testing.

As far as my own personal research, my project involves genetic testing for breast cancer, BRCA testing, how families influence a person's interests and decisions. And one of my results is that the usefulness of testing in people's view, in consumers' minds is a question.

One of their beliefs, individual and family beliefs is that the cause of breast cancer can -- it is a combination of environmental and genetic factors. It can be all. Some people believe it is all environmental, it is pollution or something in the air, just things like that, and some people believe it is physical features, so if they don't look like their relative who has breast cancer or similar to other people in the family who don't have breast cancer, they feel that that is a protective issue. Now about the environment, they feel that altering their lifestyle is counteractive and a protective issue.

So if they're feeling that way about their lifestyle and feeling they can control it, they don't really feel the need for genetic testing because they feel that they can't really do anything about their genes, they can't control that aspect, so they try and push that aside and say, well, we can control this and eat more broccoli and take more vitamin E and we're not going to get breast cancer. Thank you.

DR. TUCKSON: Thank you.

(Applause.)

DR. TUCKSON: Traci, thank you also for reconfirming the committee's decision to take the time and have people's stories as a part of this, and, to be quite frank, we needed that affirmation. So, thank you so much.

Brian Sydnor brings a different perspective. He is the Legislative Liaison for the democratic leader of the Michigan House of Representatives. Prior to that, for 13 years he was the Senior Policy Analyst for the Democratic Policy Staff in the great State of Michigan.

He has a very interesting set of experiences with the process of community dialogues and, from this experience, has gained useful insights into the concerns of his community. Brian.

MR. SYDNOR: Thank you. Unlike Bob, my name is not Bob, my name is Brian, but I have taken on some of the traits of a Bob because I prepared my comments as well.

(Laughter.)

MR. SYDNOR: Good afternoon. I am the Community Advisory board member from the Omega Si Phi Fraternity for the Communities of Color and Genetics Policy Project being sponsored by the National Institutes of Health, National Human Genome Research Institute, Ethical, Legal and Social Implications Branch. This project is being overseen by a consortium of three universities, the University of Michigan, Michigan State University and Tuskegee University. The participation of my fraternity is through Michigan State University.

Thank you for inviting me here to tell you a little bit about what we are doing in

Michigan and some of the dialogue that has occurred in our groups.

Our group, which has been working hand-in-hand with the Alpha Kappa Alpha Sorority Graduate Chapter in Lansing, has been convened to assemble dialogues within our community to help develop policy recommendations for laws and professional standards and institutional policies regarding the use and application of genome research and technology.

We're extremely excited about the wonderful and exciting cutting-edge research that is occurring in the field of genetics technology and the benefits we expect to realize from it.

The social conversation we have been engaged in is allowing us to share the values of our community and engage in a thought-provoking and soul-searching exercise of balancing our varied and sometimes conflicting values in mutually justifiable ways that we expect will ultimately benefit us as a whole.

The clinical validity and utility and particularly the social implications are extremely important and must be looked at thoroughly. We do not look at the benefits of this testing in a vacuum. We apply the break-through research that is occurring daily in the myriad of tests that are arising that will help to detect disease, sickness and illness in a time frame we have never seen before, but our concerns are many-fold. I will outline some of them.

The costs. The cost of cutting-edge technology is very high. Our concern is that they are arrived at in a fair and equitable manner and do not include any add-on costs, other than those that are associated with the administering and reading of the tests and their results. We do not want to see the situation where the ability to take the tests go to the highest bidder.

Affordability. Having the technology to conduct a test, but making it cost-prohibitive will do little to improve detection and determining treatments and prevention for all. Having an affordable test is key to getting many individuals to sign up to take these tests.

Accessibility and confidentiality. It is vital that all communities have access to taking the tests and not just those who happen to be in the know or in the dough. It is important that the results of those tests be limited to only those needing to know the results. They should not be made a part of any regular reporting mechanism, but be isolated on a need-to-know basis, with consent and knowledge of the test subject.

The results of these tests should not be sent to a medical information bureau, as is currently done with many tests currently taken by patients for insurance purposes. By doing so, it dramatically increases the possibility of the patient losing control of the tests and the existing results, in addition to possibly being harmed via potential employers and/or insurers.

Our group even went so far as to want to have self-tests that you could take at home, in the privacy of your own home so that you would be the only one to know the results of these tests.

Education. To reduce the fear factor, a major educational component should be attached to all genetics tests. Over the past several decades, government has given my community many reasons to be skeptical of it helping us. These examples are still fresh in the minds of all of our people as it relates to Tuskegee in Alabama.

We will need more medical personnel that looks like us to not only help to alleviate our natural fears of these tests, but also involvement at the research level, from its embryonic stages to test

fruition, to assist in alleviating these well-founded fears.

In conjunction to help steer blacks into the medical research fields, an emphasis in having fun in science will have to occur at the earliest stages of learning, at a minimum at the elementary school level. Over the long haul, this will assist in breaking down the barriers that have existed for so long between the black community and science.

Clinical studies. A substantial increase in the number of individuals of color that are involved in clinical studies -- it must occur. We strongly believe that if it were to occur, the benefits would flow both ways. There would be more of a likelihood of believability on the part of blacks that the study was actually meant to address our particular ailments and concerns. In turn, reliable data that would definitely be applicable to this community would be garnered.

Strict regulation of testing and the results. Due to the myriad of things happening at the research level, we expect a host of genetic tests to be available in the future, from a better test for many types of cancer to very simplistic data regarding the likelihood of hair loss.

Since the tests will be so varied and diverse, we would argue for the highest degree of scrutiny and protection for all of these tests. We would prefer to err on the side of caution versus the results getting into the hands of -- for unintended purposes.

Message delivery. The delivery and the size of the audience when talking about the benefits of genetic tests, A, B or C will depend greatly on the messenger. The traditional methods of getting the word out in our community does not solely rely on the black church anymore. While this method will still reach many; there are other outlets that must be tapped in getting a vital message out to the masses, an entertainer, a sports figure, et cetera. We must utilize the messengers of yesterday as well as today to effectively reach the community.

Protection and disposal of blood samples is very high on our list of protection for individuals in our dialogue groups. We had an individual who had undergone many different types of tests for prostate cancer and, in hindsight, he's extremely concerned about the possibility of his sons and grandsons being discriminated against in employment and insurance because of a possible predisposition to prostate cancer.

What happens to blood drawn by law enforcement agencies? For individuals found to be innocent, does their DNA go into a huge databank or should that sample and all data identifying that individual be destroyed? We strongly encourage that it should.

In conclusion, we have enjoyed our participation in the social conversation to date. We emphasize that strict controls must be in place to ensure the public is protected from those who may utilize this technology and the results in a way that we do not necessarily agree with.

In general, we are on the same page as majority communities when it comes to genetic testing. We, too, want what is best for society as a whole. Thank you.

DR. TUCKSON: Thank you very much.

(Applause.)

DR. TUCKSON: As we get ready for our last presenter, I just want to make a comment

that we really do want to get your questions. We're under a terrible tyranny of time. As you think about your questions, really think about narrowing them down to really very precise ones so that Donna can take us through a very efficient question-and-answer session.

Our last presenter, and we're glad you're here, is Dorothy Thomas. Dorothy is an elementary school teacher working for the Bureau of Indian Affairs in Laguna, New Mexico. She presents and brings to us some of the experiences that she has had with the Native American perspective on these issues, as well as her personal experience being a breast cancer survivor. Dorothy, thank you.

MS. THOMAS: Thank you. This is still very sore with me because it is been 14 months ago that I was diagnosed with breast cancer. I am the first in my family. After I found out that I did have it, I did research and there is nobody else in my family that has had breast cancer, although I am one of five sisters, so it has an effect on all of us.

I was diagnosed -- I mean, I went for a routine exam and they found a lump. I had a lumpectomy and they found cancer and because of the size of my tumor, I was advised to do chemotherapy, but I decided that I was going to have a radical mastectomy of my breast and when they took the lymph nodes, too, and tested them, I had no cancer.

The thing when I first knew I had a tumor that had cancer, I knew it wasn't -- instinctively, I knew it wasn't fatal. I just knew that, and so I think my message is that you listen to the person involved to know because usually -- I mean, I had to argue with the doctors at the cancer center because they wanted to do chemotherapy on me, but I knew what chemotherapy can do to you.

I am in pretty good health and I knew I could get more damage from the chemotherapy than just not doing it, so I fought it and I didn't need to do it anyway, but I take Tomoxofin, a five-year plan, and it is been a year and we haven't found anything else.

I think my message to you is that you listen to the individual and educate because genetic testing is very new to us. We don't really look for the cause. If we have somebody who is different, we just accept them in the Native American community and do the best that we can.

I had a student who was dying -- who has Lang Syndrome and they told his parents -- his parents were told that he would not live past the age of like 10. He is now like 25 years old. He takes part in all our ceremonies. It is because we accepted him how he was, how he is, so we have to do that, too. Everybody has to think about what's going on with that individual. He's accepted, so he survived all this time.

We don't really know what's going on until we get into it, so my message is that you really listen to the individuals. They know what is going on with themselves, they have some idea. And to educate. Educate where I come from because genetic testing, talking to my community, nobody really knew what it was. I'm sure some of them have had genetic testing and they don't know what has happened.

So I'm asking that you really think about getting populations educated. That's my message.

DR. TUCKSON: Thank you so much.

(Applause.)

MS. OLSEN: Reed and I had talked about my asking questions of the group, but before I do that, do you folks have comments or questions that you would like to make? And, if so, we would ask you to move to the microphones that we have here in this room. There are no comments?

DR. TUCKSON: It is very important that you ask our guests the kind of things that will take us to another level of understanding and remember, please, as you do this, the specificity of responses that we as a committee have to make back. So we really need to get the best information to this nation.

MS. OLSEN: Thank you, Reed.

DR. TUCKSON: If you could tell us who you want to address the question to, or you can point out if you can't remember the name. Go ahead.

MR. HOLDEN: Hi. My name is Arthur Holden and I am involved in genetic research. I'm leading the largest private effort to detect SNPs, which Francis Collins talked about.

I have a simple question and anyone can answer it. Given that so many of you emphasized education and effective education, how do you feel that we could improve education? What would be the practical means by which we could do that?

MR. ALEXANDER: You translate that into understandable information. We have -- our institute takes a very complex subject and, with our scientific review board and with our patient advocacy arm, we are able to work together in providing information that is useful to all parties.

Something was brought up about we need to be looking towards entertainment and media. This is very important. They're sending wrong messages to the public many, many times, sensationalism, sensationalism. We're going to have to reach out to them, as well as the insurance industry, and we're going to have to educate many populations, the public, the medical community and the insurance industry. This is a big problem.

MS. OLSEN: And one of the things that we would ask you to think about is when you're developing educational materials for whatever populations is ask them to take a look at your materials. Many of us participate with groups that we're more than happy to look at those for readability, for understanding, and we would be more than happy to help in the development of those products.

Another thing I would ask you to think about is something Reed and I were talking about earlier, understanding and appreciating learning styles, adult learning styles. Some of us like to have you tell us a story, give us an example. Other times, we want to see data. Sometimes we want to see things in writing. Sometimes we process information better if we can hear it. So you need to think about a variety of ways to help us understand.

MS. ODESINA: Also, let me mention that there is a Genetic Awareness Coalition that was initiated as a result of part of the recommendation from the Task Force and Genetic Committee, and also there is another group working on the education of health providers. I think this group has a diverse representation on the committee looking into this.

Secondly, we have a template here. We all are aware of immunization protocols and I think the community all knows about immunization. We can use some of that method in educating the

public about genetics. People don't need to know all these technical words or jargons that we all talk about, but at least they will be able to understand the basic principles or information about genetics, know where to go for genetic tests, know where to go for genetic counseling and know where to go for referrals.

If we have that basic information to the public, I think that's a step in the right direction. So we have a template there that we can use and utilize other sources, too.

DR. MIYAMOTO: I know that we've looked into the process of the kind of school level and sometimes, maybe this is rather rude, but I don't see how you couldn't improve it.

In surveying the Seattle and Tacoma area, we found one teacher who really had a strong program in genetics. One teacher out of all those schools and that was at the high school level. Everybody else might teach it for a week or two weeks, but I think that's a major deficiency. Although people are working towards this, it is just not filtered into the school system.

The other thing is when we look at what's being done in the schools, it is the science of genetics, and I think what we're trying to talk about is the impact of that genetic information on the decision-making process. That's what I was trying to say, you can bring us the statistics and make sure the accuracy is in the statistics, but how do you really involve that in the decision-making process?

I think the people here, for instance, if they went into the schools and got people involved in looking at what these numbers mean and how they impact your life, then you get students really interested in what this means, not just the round circles and the squares and all that kind of stuff, but how does it impact your life and how will you take that home and use that information? That part isn't being worked on. The science, I think, is, but the decision isn't.

DR. TUCKSON: We're going to rapid-fire these other ones so we'll be able to let you go to lunch. We're going to go real fast with questions and answers.

DR. RAND-REED: My name is Kathleen Rand-Reed and I'm a practicing applied bicultural anthropologist and I have a marketing background. And one of the issues about the education component in genetic literacy is to help foster the dialogue between the scientists and the families.

There are aspects of genetics where people want to hear universal, equal language so that they do not feel as though they're being discriminated against, and yet people come from various communities where they want to hear special messages directed to them so they know you have sensitivity.

If you had to identify what messages that you heard universally, what do you want to hear across the board and what do you want to hear in your own special way within your own ethnic group and community so that we have the fairness and the specialness?

DR. TUCKSON: Good question. Anybody want to try to tackle that?

MR. SYDNOR: Well, I think we need to hear -- the community would like to hear what the benefits of it are, what the risks are, whether there is any sensitivity involved in the message that you're trying to bring because if there is no sensitivity, you're going to scare people off from even taking the tests at all.

So if you can translate to them what the benefits are, what the risks are and what the sensitivity is for you bringing that message, I think it will go a long way in alleviating some of those barriers.

MS. CHANG: Also, I would like to add to that that we need to know how long you're going to be there, are you going to leave as soon as the funding dries up? We need to know those things.

MR. BROWN: My name is Lee Brown from Howard University. Some claim that the goal of genetics is to reduce humanity to the basic building blocks of human biology. What I hear here, especially from Mei-Ling, is that there is a lot of apprehension about the ability of these new science to attend to humane needs of people and I would like to know -- I think that's very important, to look at this.

My question is, what does science have to do in order to treat people in a more humane kind of way? You would rather die than to receive medicine without care, so how can these new procedures be done in a way that will really facilitate healing?

DR. TUCKSON: That's very provocative.

MS. CHANG: Right. There needs to be a recognition that science doesn't exist for science. Science exists because we are here. We are here and science is a tool, a very powerful tool. But science must know, first of all, the heart and the core of being a human being, which means coming into Hawaii, it means sitting down with us and learning who we are and how science can be a very powerful tool and getting to know us from a different perspective.

We know who we are as spiritual beings. There is yet to know more from the eyes of science and that way, together, we can close the gap, the terrible gap that is keeping my people from being healthy and living longer. Perhaps we can offer science a little bit of humanity.

MR. BROWN: Fantastic.

DR. TUCKSON: Thank you. We've got four minutes.

MS. EWALICO: My name is Sasa Ewalico and I'm from the Island of Maui. Please excuse me if I cry, because -- anyway, the reason I'm here is to ask you for help. Our family has been diagnosed with a rare disease called CADASIL. I never knew what CADASIL is or I'll never know because nobody knows about it.

I have, in my lifetime, seen four aunts and one uncle, eight cousins, die from this disease. I have six cousins who are in a care home with this disease and they're being treated for CAD. The medical profession didn't know what was happening with this -- what was going on with our family.

I have four other cousins with the disease, and they think it is genetic. I think it is, but four of the cousins who have this disease, and a lot of my cousins, don't live to become 50. They die 30 years old, 40, 50 years old.

I have a dear cousin that I love so much who has this disease, and she knows she will be in long-term care for a long time. My auntie just died four years ago and she was in a care home for 17 years with this disease. I have six other cousins in care homes who have been there for 5 to 10 years already. I also have a cousin who I love dearly who has the disease and she knows that her children will have it also. I just need help. That's all I need is help.

DR. TUCKSON: Let me first thank you very much for giving us a very human and poignant way to end our session.

Number two, let me say to you that we can do a couple things for you today after we finish, before we go to lunch. There are people here, number one, who can embrace you with our love and our care. We have that for you.

But, number two, we happen to have many people on our committee who are familiar, from a medical point of view and from a counseling point of view and an education point of view, who will give you more, I think, if we can just gather off to the side. More than just our love and affection, but also some information that may help you and an ability to refer you to where you need to be.

So thank you for giving us this sense of poignancy, and thank you for sharing that.

MS. EWALICO: Thank you very much.

DR. TUCKSON: Donna, let me turn it over to you for closings.

MS. OLSEN: There is never enough time and I think that that's the frustration. As you can see, people have come from all over the country because of the personal commitment that they have to genetics, genetic testing and all the other issues that surround it.

What I would ask you to seriously do is encourage partnership between the medical professionals who care about this from their perspective, and the families to whom it means so much, the partnership that we can create together. I do think that we can do a better job of educating the community at large. I think we can do a better job of educating our medical professionals, and we can be a very important part of whatever consortium of oversight can be put in place to make sure that genetic testing is what we all would like it to be. Thank you.

DR. TUCKSON: Could I ask the community of experts that are here to help me here? And by the way, as we go, can I ask you to please thank the entire panel?

(Applause.)

MS. BARR: I have a very personal thanks. I'm going to cry, and I'm not embarrassed. I'm one of the consumer reps on this panel, and I think you've done more to help me and help the panel than I could ever, ever have done alone. So I thank you very, very much.

For everyone else, and particularly my fellow members on the panel, if there is any lesson today, it is a lesson that science is always in a social context. It is the lesson that anything we do, we have to think about the people who are going to use it and why, and that there will be different points of view, and that what every individual wants is quality care. They want to be cared for. The care word is a very important word and it has to match. It has to match the best possible science we can provide.

(Applause.)

(Whereupon, at 1:00 p.m., the meeting was recessed for lunch, to reconvene at 3:00 p.m.)

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AFTERNOON SESSION (3:30 p.m.)

DR. McCABE: We're going to start with the CDC Genetic Consortium-Laboratory Workgroup Meeting. This was a meeting that was to be held in the midst of the blizzard in Baltimore the two days prior to this.

Quite a few people were unable to get there, and Pat Charache, who lives in Baltimore, who is over on the faculty at Hopkins, was able to arrange an impromptu meeting space for those who were able to get through the blizzard. I think we had a very productive meeting. I didn't make it for the first half, but I think we had a very productive meeting, and Pat is going to report on that.

DR. CHARACHE: What I'm going to do to expedite the discussion is show a few overheads. I've got two that describe what the consortium is all about. You heard this morning that there has been a lot of consideration of the advantages of a consortium. Then I'm going to show you a subset of the materials that were discussed there so you can get an understanding of the directions that this is headed in.

First of all, the idea of the consortium was the result of the, which urged that this be created to optimize the ability of private, public and government genetic groups to address issues of genetic testing.

At the meeting in October of the SACGT, there was a lunch meeting which was attended by a spectrum of private and public groups who would be highly contributory in this area, and it was decided to go forward with this meeting, which was scheduled for Tuesday and Wednesday of this week.

The CDC, under Robert Martin -- who unfortunately is still in Atlanta, although he arranged the consortium -- a meeting was organized, and there are 34 members, a small enough working group to really come out with a product, but representing a broad group of private and public and governmental agencies to meet this week.

Unfortunately, Baltimore was closed. So rather than having a working group, we called it a discussion group. I'll come back to where we go from here.

Now, we held it because of the people who were available and who represented an excellent cross-section of people who could be contributory. The discussion leader was Edward Baker. There are 10 centers at CDC. Dr. Baker is director of one of those centers, which is the one which is responsible for CLIA, for the Clinical Laboratory Improvement Act and the quality of laboratory work which goes on in the country.

The participants who were there included Dr. Rod Howell, who is President of the American College of Medical Genetics and Dr. Brad Popavitch, who is the head of their laboratory section and who is also head of the College of American Pathology Genetic Testing Group.

There was Dr. Wayne Grody who represented the College of American Pathology and also represented the Association of Molecular Pathologists, a representative from NCCLS, which is a consortium group itself between government, academics, and industry that sets guidelines and standards for laboratory testing.

There were two additional people from CDC, one a geneticist who is here today, Dr. Ira Lubin, and a second member from the Laboratory Branch. I was there as a representative of the Clinical

Laboratory Improvement Advisory Committee and its Genetics Working Group.

On the second day, we were also joined by representatives from HRSA, the National Newborn Screening and Resource Center, Dr. Edward McCabe, and the three asterisks you see are members of the Secretary's Committee.

On Day One the main discussion was triggered by the Notice of Intent, which is in the hands of the publishers of the Federal Register, and will be coming out within the next week or two. This is a notice which I would call to your attention. It is an extremely important thing to get a look at. It is the recommendations by CDC for enhanced regulations for oversight of genetic testing.

You heard this morning from Kate Beardsley that this is an option to be considered. In fact, it is actually quite far along the road. To the extent that there is an announcement coming out which we hope you will get a look at and think about and respond to within 60 days, it is advice on your thoughts on the recommendations being made to enhance testing.

That Notice of Intent is the outflow track of the Genetic Working Group which was appointed to advise CDC and the Clinical Laboratory Improvement Committee. In fact, the NIH proposal that recommended the establishment of the Secretary's Committee also recommended the establishment of the Genetic Working Group. This was a different kind of consortium body, primarily geneticists, and the result of their recommendations has led to this Notice of Intent.

So there was discussion of thoughts in some of the areas of the Notice of Intent of the consortium discussion group that was there earlier this week. It addressed all phases of the laboratory testing, and laboratory testing is divided specifically into three phases: pre-analytical, what you do before you start the testing; analytical, which is the testing itself; and post-analytical phases.

Now, within the pre-analytical phase, it includes issues such as informed consent and provision of clinical information that you need in order to be able to interpret a test. If a test is valid only in a specific ethnic group, you should not run the test if it comes from a patient who is not within the group that gives interpretable results.

The analytic phase is what the CLIA has primarily emphasized in the past, although all three phases have been addressed to various degrees and are part of CLIA's responsibilities.

The post-analytic phase includes such things as what the report content should be, should it specify exactly which alleles were tested, and should it be on a computer or on a paper, whether there is access to counseling and so on.

The group unanimously agreed that CLIA must address all three phases, and their regulations must clarify, where necessary, how they plan to address the pre- and post-analytical issues as they apply to genetic testing.

There was extensive discussion about the issues of the so-called orphan diseases, the single-test laboratory. In many of these laboratories, a scientist, out of social consciousness, will perform clinical testing. They lose money on it in many cases. It is no longer of research interest to them, but they do it because they have the knowledge and the capacity to do it. It was emphasized that oversight is needed for these facilities, but it must be put in such a format that it doesn't risk discontinuation of the needed test.

It must not be so onerous that the investigator who is doing this out of a sense of responsibility will no longer feel he can continue, but the group also emphasized that the need to ensure the accuracy and quality of testing must also take precedence. You can't have someone giving bad data just because it would be difficult to give good data.

There are a large number of other issues in which discussion was opened. I'm not giving conclusions, but just to show the spectrum of the interest of the consortium, the whole discussion emphasized all three points that were made this morning, one being the need for education of the public, of the clinicians who order the tests, and of the laboratory people who provide genetic tests. All three groups have major educational needs.

We reviewed the definition of a genetic test which is in the Notice of Intent. It separates genetic tests into two major categories, those that are on the molecular side of genetics and those that are associated with biochemical methodologies and defines them.

There was a discussion of some of the personnel requirements that are specified, what the requirements have to be for a lab director, for a technical director and so on, and then discussions of terminology.

Everyone liked the use of the word "oversight" as opposed to "regulation." It was felt that many people consider "regulations" as an expletive that should be deleted.

On the second day, we addressed what the purpose of the consortium should be and how to optimize the resources in that room. And among the 34 people who had been invited, each representing different bodies, the number one purpose, it was agreed, was communication, to be able to integrate the activities of the different groups. It was raising issues to be addressed that one group may perceive and another may not, and it was to tap the strength that is available through the members of the various private, public and government agencies.

It was recognized, for example, that the government has a regulatory structure in place for monitoring the activities of the laboratories in the pre-, the analytical, and the post-analytical state, but that other groups within the consortium would be far more appropriate to make decisions, such as, what is a sensitive test, what tests require informed consent.

Many of the pre- and post-analytical issues would be better delineated by other members of the group rather than any of the governmental agencies, and it was recognized that there is a major need to integrate the activity of the different governmental groups.

Currently, the CDC, the FDA, and the HCFA section that is associated with the monitoring of laboratory testing, and the FDA in terms of their test assessment, have been in communication and working together, but there are other very key groups that have not been pulled in. There are also some differences of opinions within agencies, and this, obviously, is very destructive. So another goal of the consortium is to unify the governmental groups in their approaches and understanding, as well as the non-governmental groups.

A major consideration was the issue, which Dr. Satcher also pointed out as key this morning, when is a test ready to be used for patient care. In discussion, the group recommended that we consider genetic testing like some other products, whether it is a pharmaceutical that is about to be introduced or a kit that the FDA is reviewing, in terms of four phrases.

Phase 1 is the development of the test itself and establishing its analytical validity. You always get the same answer when you should get the same answer.

Phase 2 is an initial testing to see if it can be applied to diagnosing patients or subjects who may have a genetic alteration. There, one or two laboratories would test a limited number of kindreds, to be specified, in order to ensure that they could define what it was they were able to detect.

In Phase 3, which is the formal pre-clinical trial, subjects and sites are added. That is where clinical validation is completed so that you understand enough about the sensitivity of the test, the specificity of the test, and its positive predictive value, and negative predictive value, that you can perform the test and provide a report that states what you do and don't know as a result of this test. Now, initially there may be quite a bit you don't know, but you have to determine that you know enough to make this clinically useful.

Phase 4 is post-market data collection. That is where data can be gathered over time to improve the precision or extent of the knowledge which you're able to derive from using this test in a larger population.

There was discussion about how to determine when a test is ready to be rolled out. The consensus was that we should devise a skeletal structure, which needs to be defined prior to rolling it out, which then can be fleshed out further to apply to any specific test.

Finally, the next steps. The first next step is that the full working group is now going to be rescheduled to meet the day before the next SACGT meeting and that this will involve everybody, hopefully all 34 people who should be there.

It was agreed that the CDC is an appropriate body to organize this and keep it moving in an expeditious way, as it did for this meeting. And it was also decided that governmental agencies in addition to CDC, FDA and HCFA should be coordinated, and there was a desire to invite others who impact on genetic testing, such as representatives of the Patent Office, for their education and our pleasure also, to address the group as appropriate.

DR. McCABE: Thank you very much, Pat. Does anyone have any brief questions for Pat? Yes.

QUESTION: Without the microphone, I don't know if you can hear me. In the CDC deliberations, was the distinction made explicitly between –

DR. McCABE: The question had to do with whether there was any differentiation made between somatic mutations versus inherited mutations.

DR. CHARACHE: No. The definition of the molecular includes acquired as well as inherited. That does not mean that the regulations won't be different as one defines which tests need which category of oversight.

DR. McCABE: If there is nothing else, thank you very much, Pat, for reporting on that, and thank you for helping to have the meeting happen, despite the inclement weather.

If anyone is speaking and had approached us previously and said they wanted to speak but haven't checked in, please do that so that we can have you on the list.

Is Michael Murphy here from PPGx?

(No response.)

DR. McCABE: Joe Pleiman?

(No response.)

DR. McCABE: Carol Barash? Is Carol Barash here?

Again, if you haven't registered in the back, please do that so that we can include you. Carol? Carol is with the Genetics Ethics and Policy Group in Boston.

MS. BARASH: I just wanted to register a couple of points. One is that the document that we were asked to comment on doesn't explicitly acknowledge several uses for genetic tests, pre-implantation diagnosis, SNP testing, multiplex testing. I would urge the committee -- I'm sure they're already considering this fact -- that the non-explicit acknowledgement of those other kinds of uses doesn't indicate that there is no need for recommendations to be made about their oversight in the future.

Point number 2 is that I think oversight of gene tests ought to be based on the value of the information that a test result confers, much more so than the mechanism by which one obtains the information.

So for example, just because a test has the big "G" word in it, and the result and information is obtained by analyzing a molecular mechanism, it doesn't mean that there ought to be a greater level of regulation or more stringent oversight.

I think we instead need to focus on what the value and significance of the information is that the test result confers, look at how easy it is for that information to be used against the person whose information it is, versus to what degree that information confers personal or medical benefit.

I think in doing this it will be a little bit clearer that while we all have a lot of societal impact concerns about the application and use of gene testing, we are really talking about regulating the technology and not lots of social problems and social applications to gene testing.

I think there is a tendency to reify genetic risks. Not all genetic risks are the same. Some tests, for example, are quite straight forward.

For example, a SNP test that could predict that a particular drug is not effective in Person A but is effective in Person B, or a test that would predict the proper dosing of a particular drug for a person. This kind of test I think is more analogous to a drug allergy test and could be handled as such in a regulatory context. I guess I'll just end there. Thanks.

DR. McCABE: Thank you very much. Our next speaker is Sandra Brandley from the Alpha 1 Association in Minneapolis.

MS. BRANDLEY: I like your weather.

(Laughter.)

MS. BRANDLEY: Honorable Chair and committee members, first of all, thank you very much for this opportunity. My name is Sandra Brandley, and I'm the executive director of the Alpha 1 Association, a worldwide advocacy and education organization created to benefit those affected by Alpha 1 antitrypsin deficiency.

Also called Alpha 1, this relatively common genetic disorder affects at least 100,000 people in the United States. Despite an occurrence remarkably similar to that of cystic fibrosis, Alpha 1 remains an under-diagnosed and under-appreciated disorder.

Alpha 1 manifests itself most commonly as lung disease in young adults at the prime of their life, and less commonly as liver disease in infants and children. Once symptoms appear in young adults, it is common for it to take seven years and visits to three or more physicians before a diagnosis is made. This delay in diagnosis allows more and more essential lung function to be lost.

We know that the earlier the diagnosis is made, more opportunities exist for treatment and lifestyle changes to halt or slow this deadly spiral, ultimately saving millions of dollars in lost wages, disability payments, and medical treatment costs. We also know that some people who have Alpha 1 will have only mild symptoms and live a perfectly normal life. It is that dichotomy that compels us to talk to you today.

Predictive testing brings two battles, one potentially with the disease and one with a system that punishes anyone with unusual genetic information by preventing them from purchasing health and life insurance, and stalls or endangers their career once that information is known.

It is important to once again state that unlike other genetic disorders, such as Huntington's disease, there is no assurance that once the Alpha 1 gene defect is found in an asymptomatic person, that disease will follow. We need strong genetic privacy laws and penalties in place for those that break them, ensuring that once identified, unwarranted discrimination cannot occur. Unfortunately, today this is not true.

Using the model championed by the HIV/AIDS community, blind genetic testing can be done. A positive test for HIV/AIDS can be withheld from medical records so that families and health care professionals will not know of their HIV status. However, unlike HIV and AIDS, Alpha 1 carries no communicable risk to the community. People have a right to be informed of their genetic issues without risk of discrimination.

Because there are significant risks and benefits to genetic testing for Alpha 1, I encourage all people considering this test to seek guidance and genetic counseling from trained health care professionals to help them make an informed decision. I also encourage all physicians to seek appropriate informed consent prior to testing for Alpha 1. Thank you for considering these comments.

DR. McCABE: Thank you very much. Our next speaker is Michael Sprinkler from the International Chemical Workers.

MR. SPRINKLER: Thank you for the opportunity to speak for a few minutes. Actually, my background is also as an industrial hygienist, and, formerly, OSHA compliance with the State of Oregon, and local union officer there. So I have a few points here, but we're very pleased to participate in this meeting. While I can't speak for all of labor or all employed workers in this country, I've had a lot of discussions with labor, both here and abroad, on this very issue of genetic testing.

We kind of have a saying in labor, too, that you leave a lot of your rights at the door when you walk into work. We've seen industrial psychology become behavioral safety, where the emphasis becomes fixing the worker, and not fixing hazards in the work place through elimination of the hazard through engineering controls or such. We've also seen cases, which still exist, where X-rays are often used to screen for susceptibility of back injury, which may be a little dubious.

The potential is there, it is one of our fears, for genetic testing to become a part of this methodology of what's called "protection." For example, genetic tests which show a person has an increased factor, could result in people being denied employment or removed from work with little or no understanding of the limits of that test or the effects of reduction of exposure on that risk, for example beta naphthalene and bladder cancer.

Of course, one thing, which, a lot of times is forgotten by employers or by folks, is that if exposures are high enough of beta naphthalene in the work place, basically everybody gets cancer.

The Supreme Court decision on the ADA and visual acuity of pilot applicants unfortunately gives us little hope for help through the courts or through ADA on this genetic issue and work.

Another concern is that genetic testing and screening could replace the need for employers to ensure that the work place is as safe and healthy as possible. Now, folks might think that, well, I've got pretty good rights for medical privacy, but the right to hold your medical records private is generally regulated by state laws, and in a number of states we've seen that there is little or no protection once someone has your medical record. A health care provider that gives that medical record up, it is too bad. In some cases employers have required employees to have records released to the employer.

Workers' Compensation is even a more frightening situation. In the State of Oregon, a compensable illness or disease must be predominantly caused by work, which sounds nice and simple, but now workers have to prove that an injury or illness was not caused, 51 percent, by a non-work factor. So take the beta naphthalene case. It could be very difficult if you've got that genetic marker.

Anyway, I need to sum up here. With Workers' Comp, one of the issues is, it is a state-run program, with very few exceptions. So we would really like to encourage the committee to look into the issues of genetic testing, its possible effects on Workers' Comp, and, of course, also on employment in general. We will be glad to help out in any way we can. Thank you.

DR. McCABE: Thank you very much. If we don't get to all of your comments, please be sure to hand in written comments so that we can include them more thoroughly.

Suzanne Feetham from the University of Illinois at Chicago. For some of you, I don't have your affiliation, so please state it for us.

DR. FEETHAM: I'm Dr. Suzanne Feetham and I represent the American Academy of Nursing. We are pleased to have the opportunity to respond to the request for public input.

The Academy's mission is to provide leadership to the nursing profession and the public in shaping future health care policy and practice. The American Academy of Nursing commends the work of the Secretary's Advisory Committee for the comprehensive discussion of the complex issues of genetic testing.

We concur in general with the considerations of the committee, and our comments speak directly to some of our concerns and recommendations. We have submitted a document with a more detailed discussion.

Nurses and other health professionals will have an expanding role in the management of genetic testing and counseling. Nurses, along with other health professionals, will support individuals in their decision to have a test. Furthermore, clients will expect nurses and other health professionals to clarify, interpret, and reinforce information gained from the tests.

Nurses advocate for the right of all to have accessible health care, genetic testing and counseling services. At the same time, it is necessary to assess the actual benefits and utility of genetic testing and to protect the confidentiality of genetic information. To ensure this, there must be oversight as to how and when genetic testing is conducted

The American Academy of Nursing finds that, while advances in knowledge about genes, genetic research, and genetic testing are beginning to bring benefits to the health of the public, there are also, as have been identified throughout the day, major ethical, legal, social, economic, and educational issues.

The public understanding of genetic testing tends to be in terms of current publicity for genetics technology. The focus is on gene discovery and the expectations for developing better treatments and cures for specific diseases. Some of the publicity, however, may be misplaced and misguided, particularly as the potential can be seen as a promise, if not evidence of existing therapies. The publicity only infers to the public that genetic testing is normative, and that there is something to lose, and always something to be gained. We talk and support the issues of informed consent.

I'm seeing that my time is running down. We do identify seven categories of tests that fall in what we would consider the higher scrutiny areas. These are new tests that are not yet completely validated in diverse populations, and that thorough testing in diverse populations must be done. Tests that are predictive rather than confirmatory, tests for disorders with no available treatment, tests that will be applied to large segments of the population are some of our considerations of these seven types of tests.

The issue of informed consent is seen as a major factor in the recommendations that we have and the privacy of genetic information and the emerging data technologies that are focused on finding patterns of information within and across databases, and we find this a particular area that needs to be looked at in the activities of oversight.

A summary of our recommendations are that sensible, systematic, and meaningful regulation of genetic tests and genetic test kits must be developed. The marketing of tests should be allowed, but only after proper clinical validation and clinical utility; full disclosure of risks must be provided; the public must be assured that genetic testing will remain voluntary; and health care coverage must include the desired genetic testing and counseling services by individuals who are not certified in genetics. Our full comments are provided to the committee. Thank you.

DR. McCABE: Thank you. Our next speaker is Michele Schoonmaker, from Vysis.

MS. SCHOONMAKER: Good afternoon, Dr. McCabe, members of the committee, ladies and gentlemen. Vysis, Incorporated is the only manufacturer with five FDA-approved in vitro diagnostic kits using DNA probes for genetic disease. We sincerely appreciate this opportunity to

comment on oversight options for genetic tests. I will summarize three points discussed in our written submission. First, all genetic tests are designed to identify a particular genetic marker. Though the detection technologies will differ depending on whether the target is a nucleic acid or a protein, the development of the actual tests will be the same as those in clinical chemistry or any other laboratory testing market. Some tests will be performed as laboratory services, while others will be developed by manufacturers and sold as kits.

FDA oversight of a manufacturing facility is currently more stringent than CLIA oversight of a clinical laboratory. While there will be medical benefits to producing a kit for many clinical genetic situations, any additional burdens of proof beyond that currently required by the FDA would create a disincentive for companies to standardize QC and commercialize genetic tests, and will reduce the genetic test manufacturer's ability to compete in the medical testing market.

Second, the FDA's risk-based classification scheme based on the intended use for diagnostic devices works for genetic tests. As an example, newborn biochemical genetic tests are arguably lower-risk and could be Class 1 medical devices. Like many immuno diagnostics, DNA probe kits for somatic mutations could be Class 2 devices, presenting only moderate risk to symptomatic patients. Pre-disposition or screening tests of greatest risk could be Class 3 devices and require more stringent evaluation and oversight.

Is it feasible to put every laboratory service through the FDA? Of course not. One way to distinguish between tests for FDA review and those regulated by strengthen CLIA provisions is by prevalence. If a clinical trial can economically and feasibly be completed, then the test should undergo FDA review, regardless of whether the developer intends to distribute the test to other users. ASR regulations should continue to facilitate test development for rare conditions and to establish pre-clinical experience for common conditions.

Finally, diagnostic tests are evaluated mainly to obtain regulatory approval and insurance coverage. For a kit manufacturer, these processes are separate, time consuming and expensive. Please consider an oversight option that would allow a test developer to request concurrent payer and regulatory review. This would be a more efficient and less expensive way to collect cost or other data in the time currently allotted for regulatory review alone.

While cost data should not be a criterion for obtaining approval, a developer should have the option to submit cost data voluntarily, to be reviewed for advertising claims of value or to determine appropriate reimbursement.

Following approval, any additional data required beyond the scope of the trial could be collected during a post-market surveillance period which the test is conditionally covered by payers. Thank you.

DR. McCABE: Thank you. Our next speaker is Christine Brunswick from the National Breast Cancer Coalition.

MS. BRUNSWICK: Thank you for the opportunity to speak to you today on genetic testing oversight. I'm Christine Brunswick, Vice President of the National Breast Cancer Coalition and it has been nine years since I've been diagnosed with breast cancer

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The National Breast Cancer Coalition, a grassroots advocacy organization, recognizes that we are on the brink of potentially extraordinary new ways to practice medicine through genetics. As

the Human Genome Project nears completion and as we witness the explosion of genetic testing, we realize the great opportunity for the advancement of diagnosis and treatment of disease.

We also are keenly aware of the limitations of genetic testing and the absolute necessity that the federal government ensure the public is effectively protected. We strongly believe that all genetic tests, including home brews, be used in clinical practice only if they meet the highest standards of evidence.

We believe that all genetic tests must meet a rigorous approval process similar to that used for kits and that the FDA must play a major role in this process. We believe that we must have legislation that protects against genetic discrimination before we move forward.

There are four major points that I would like to emphasize today. First, all genetic tests, including home brews, must meet federal minimum standards before being approved and used outside of a research setting.

These minimum standards must include the analysis of data regarding analytical and clinical validity and clinical utility to determine if a test is ready for clinical application. Each intended use of a test must be validated. A particularly stringent level of scrutiny for genetic tests that predict life-threatening, chronic or disabling diseases must be applied. Genetic tests that fall under this stringent scrutiny category must be available only if and when the validity of the test is fully established.

Second, the Food and Drug Administration must use its current regulatory authority to increase oversight of all genetic tests, including home brews. Inconsistent, unreliable pre-market review of genetic tests creates the potential for great harm in a clinical setting. Without FDA review, tests are released prematurely, before information about their predictive value is available.

To make informed health care decisions, individuals must be assured that tests provide reliable, accurate information through FDA oversight of all genetic tests. The FDA process must include expanded oversight for the protection of human subjects participating in all genetic test research, including home brew genetic tests.

Third, health care professionals and IRB members must be educated in genetic testing and its implications. Genetic testing should be a part of a health care professional's training so that the benefits and risks of tests are understood and patients can be better informed. The value of genetic tests, with scientifically proven analytical and clinical validity, and clinical utility, will be realized only if the professionals that administer and interpret those tests, and IRB members who review them, understand their benefits and risks.

Finally, individuals must be fully informed of a genetic test's benefits and risks before they consent to participate. They must also understand the social, psychological, medical, and economic impact of the test's results that they may have on themselves and their families. Guidance must be given to laboratories and health care professionals on how to obtain informed consent from patients, without pressure, what information must be included in consent forms, and what information patients must have before agreeing to future genetic testing of blood and tissue samples.

While incredible scientific advancements in genetics hold great promise and hope, we must be mindful of the speed and manner by which we adopt and use genetic tests in the delivery of medical care. We must ensure that all genetic tests meet rigorous scientific standards regulated and enforced by the federal government. We must ensure that the public is protected. Thank you very much.

DR. McCABE: Thank you. Our next speaker is Emily Winn-Deen from Celera.

MS. WINN-DEEN: I would like to thank the committee for the opportunity to testify here today. I'm here on behalf of the American Association for Clinical Chemistry, which represents nearly 11,000 professional laboratory scientists, including M.D.s, Ph.D.s, and medical technologists who work in hospitals, independent laboratories, and the diagnostics industry nationwide.

Our primary objectives are to improve clinical laboratory science, further the public interest in education, and to help maintain high professional standards. AACC shares the objectives of this panel, namely to ensure that genetic testing is performed accurately, and that results remain confidential. We have supported, and continue to support, legislative and administrative efforts to ensure appropriate federal regulation of laboratory testing. We believe the current frame work, as administered by the Centers for Disease Control, HCFA and the FDA adequately protect patients, although there is certainly room for improvement.

AACC's primary message is to urge the committee not to make an artificial distinction between genetic testing and other types of laboratory testing. All clinical testing, including genetic and non-genetic testing, uses analytical techniques that isolate, characterize and/or quantify clinical analyses and all analytical techniques, whether measuring the nucleic acids in genetic material or any other analyte can be subject to errors of imprecision and inaccuracy. Safeguards against these errors already exist under CLIA 88 which apply to all laboratory testing.

AACC also thinks it is unwise and unworkable to implement differing levels of scientific and analytical scrutiny based on the intended use of a test. While it is theoretically possible to classify tests based on their purpose, in reality, tests that are initially ordered for one purpose are often used for different purposes. A test may be ordered to diagnose a disease, but when a genetic disease is confirmed or ruled out, that same information can be used subsequently to predict future health.

It is important to note that it is the laboratorian's responsibility to ensure that all tests are done in compliance with the appropriate regulations. In-house assays, including all genetic tests, are rigorously controlled at each step, from specimen receipt to final report. CLIA 88 also requires that laboratories confirm the clinical accuracy and precision of these tests before implementing them.

We do not believe that genetic tests need to be subject to a different set of rules governing accuracy and precision when the existing regulatory framework can easily be adapted for this purpose.

We believe the public has three primary interests in genetic testing. They want (1) more and better information about genetic testing and how it can be used to improve their health; (2) to ensure that access to their genetic testing results is limited to the appropriate personnel; and (3) assurance that these results will not be used to deny employment or health insurance.

AACC agrees that patients have a right to be informed of the reasons for and the possible implications of their genetic tests. The physician or health care professional ordering the test should provide this information to the patient. We also support greater physician education in this area, given that much genetic testing is relatively new, and it is a rapidly expanding specialty within laboratory medicine.

Our comments extend slightly here, and I'm going to just stop at this point and refer the

committee to the remainder of our comments in the written form. Thank you very much.

DR. McCABE: Thank you. Our next speaker is Tene Hamilton from Tuskegee University.

MS. HAMILTON: Good afternoon. My name is Tene Hamilton. I am a genetic counselor at Tuskegee University, National Center for Bioethics in Research and Health Care.

We heard earlier this afternoon from Brian Sydnor, a representative of the Communities of Color Genetics Policy Project where three schools, Tuskegee University, the University of Michigan, and Michigan State are collaborating. I am here representing Tuskegee University today.

The goal of our project of the Communities of Color and Genetics Policy Project is to elicit policy recommendations as they surround genetic technologies. As I said, I'm here representing Tuskegee, but I'm here more so representing the African-American community at Tuskegee, Alabama, those individuals that are participating in the project.

Tuskegee, Alabama is well known for the United States Public Health Service Study of Syphilis at Tuskegee, and even today there is still a great sensitivity towards the health care providers and the health care field in general, on research and human subjects and also on medical testing.

We are in the process of holding group dialogue discussions about genetic testing and research. The concerns that come up most often surround these issues. Just briefly, three main points that have come out of our first tier of dialogue sessions in Tuskegee. Policy recommendations that have been voiced thus far include access to accurate genetic information, both in clinical genetic tests and research genetic tests.

There should be a person who is able to explain genetic tests and the results accurately, such as a genetic counselor. If there is not a genetic counselor available, the health care provider should be adequately informed about the genetic tests and able to provide accurate information to the consumer.

In the case of genetic research, as well as genetic testing, there must be informed consent to ensure the rights of the consumer of the genetic tests and also the research participant. Informed consent should also provide a basis for education about genetic tests. There would be representatives that reflect the demographic makeup of the community on the institutional review board. This way, the community can adequately be represented and informed about all aspects of genetic research studies.

These recommendations, in turn, will help foster a relationship of trust with the researchers and the community, which will also help ensure that another tragedy like the United States Public Health Service Study of Syphilis at Tuskegee does not happen again. Thank you.

DR. McCABE: Thank you. Just so that everybody knows, we're running about a half hour late. So we're going to run until 5:00. Not all of our reports are ready, and that will give people more time to get ready.

Our next speaker is Deborah Kent from Chicago.

MS. KENT: Thank you. As I listened to the presentations and discussions today, I heard a lot of talk about the benefits of genetic testing, and a lot of talk and subtext about the tragedy of genetic disease. I heard a very widespread perception that life with genetic disorder is burdensome to the affected

person and to his or her family, and to the community.

I feel that I have a very different perspective, and I would like to speak for a few moments about my own experience. I was born with a condition called labors congenital amaurosis, which caused me to be totally blind from birth. I grew up in a very loving family that encouraged me to take part in every aspect of life.

I made friends. I was a Girl Scout. I got into mischief from time to time as a child, feeling very normal about myself. Eventually, I became a professional writer of children's books, with a few detours in other professions, such as teaching and psychiatric social work.

When my husband and I thought about becoming parents, we knew that our child could inherit my eye condition and could also be blind, like I am. Talking about this issue led me to think about my own life. I knew that my life has been rich and fulfilling, that I've received many gifts and been granted many opportunities to make my own contribution to society.

I don't believe that my life could be any more meaningful if I had 20/20 vision. My life experience told me that my child, blind or sighted, had the potential to have a fully meaningful life as well. My daughter is fully sighted, but if she had been born blind, that would have been okay, too.

As we think about the uses and implications of genetic testing, I hope that we can always be aware that a human being is so very much more than their medical symptoms or their physical limitations, and that every human life has potential, that the experiences of people with disabilities and medical conditions very much belie the fact that a genetic disability or a genetic medical condition is a tragedy.

People are living very full lives. What we very much need to keep in mind is the fact that a great deal of information about disabilities is based on fear, is based on misperceptions in society that run very deep, and that we really need to look at the ways that society perceives people with disabilities and people with medical conditions, and the ways that society creates road blocks in the lives of such people, which, if reduced, could vastly minimize the burdens of disability.

To go back to the some of the things that were said this morning by Mr. Imparato, disability is really, in many ways, a social construct much more than a medical issue, and you need to keep that in mind when you think about what messages we're giving people regarding genetic testing. Thank you.

(Applause.)

DR. McCABE: Thank you. Our next speaker is Janine Cody from El Puente.

(No response.)

DR. McCABE: Okay. Our next speaker, then, is Gualberto Ruano from Genaissance Pharmaceuticals.

MR. RUANO: I wanted to thank the committee for allowing me to present my remarks today. I want to go back to the question of, how do you make the transition from research to actual clinical practice and how the genetic associations can be validated substantially.

At our company, we're pursuing genetic associations to drug response as a whole area of pharmacogenetics. What I would like to do is bring you back to the fundamental population processes that are going on. This may be a little bit technical, but it will tell you a little bit on how we can improve the process of going from research to medically validated genetic markers.

First of all, we should think of markers not as individual polymorphism, but as haplotypes. Haplotypes, if you will, colloquially, you could think of how the polymorphism hang together in a given chromosome. It is the given organization of the polymorphism. It is not just a single SNP. It is how they're aligned. The quality of those markers is much superior to independent polymorphisms.

The second point I want to make is, the genetic association has to be subject to a very statistically rigorous analysis. You don't do 20 genes and you say, I found an association with this gene; this is the one I'll publish. Unfortunately, that's the way the process works now.

We believe that the 19 genes of the 20 that did not have association are also informative to making a given condition genetically predictable. So it should be done on several genes involving a given pathway or a given action mechanism, and then, the negatives are as important as the positives, as we look at it.

The final point is, you have to look at population substructure. When we look at populations, they are very heterogeneous. What holds in one does not hold in the other. So you have to look at the lineage of populations, and you have to find markers that tell you what that lineage is so that you can do appropriate control studies, what is the treatment group, what is the placebo group, how do you match, genetically, one patient to the other so that you can elicit genetic signals.

Those are the three main points. Again, haplotype analysis, multiple gene comparisons, and finally, analysis of population substructure.

Why do I bother you with these technical points? Ladies and gentlemen, we're in the midst of a revolution in the use of genetics. It is not going to be for rare diseases anymore. It is going to be for common pharmaceuticals. It is going to be related to your control of cholesterol, to your control of hypertension, to schizophrenia and Alzheimer's disease.

It is absolutely essential that, as this new wave of genetic testing comes into the medical market place, that its uses be fully validated, and we believe that the approach that I have outlined for you is the way to go. We already have found associations of selected genes through the treatment of asthma, that you have to look at it at the haplotype level or the multiple comparison level, and there are other cases in the works concerning the treatment of high cholesterol and atherosclerosis.

So bear in mind these technical issues, otherwise I'm afraid that the emerging field of pharmocogentics is going to be troubled by the same lack of variability and reliability that has been a problem in classical epidemiology. I thank you for allowing me these remarks.

DR. McCABE: Thank you. Our next speaker is Paula Rieger from the Oncology Nursing Society.

MS. RIEGER: Good afternoon. I'm Paula Rieger, here as the president-elect of the Oncology Nursing Society. The Oncology Nursing Society is a national organization of more than 29,000 registered nurses and other health care professionals dedicated to excellence in patient care,

teaching, research, administration, and education in the field of oncology.

It is within the scope of cancer nursing practice that oncology nurses with specialized training and skills provide cancer genetic counseling and are adding to the evolving body of knowledge within cancer genetics. We thank the committee very much for the opportunity to speak today and to offer commentary on the oversight of genetic tests. We would propose the following recommendation and will also provide additional written commentary.

In cancer care, certain categories of genetic tests do require a higher level of oversight. Molecular tests used in cancer diagnostics and prognostics currently have a sufficient level of oversight with respect to clinical validity and reliability, although questions do remain regarding utility.

Cancer predisposition genetic testing which determines disease susceptibility should be held to a higher level of scrutiny because of the ethical, legal, and psychosocial implications associated with the tests. In addition, patients often make decisions regarding medical management that are irrevocable, such as prophylactic surgeries.

There is currently insufficient oversight in place for clinical validity and utility of cancer predisposition testing. Both the public and health care professionals depending on these results must be assured of a high level of reliability and validity. We recommend that criterion oversight be put in place to assure safe and appropriate testing processes, with the inclusion of quality assurance procedures.

Oversight should be workable so as not to cause overburden. All stakeholders in the provision of genetic test results should be involved in the formulation of these standards and procedures. We believe that voluntary informed consent must be obtained in all settings where cancer predisposition genetic testing occurs. We recommend that standards be developed that will delineate the minimum information that should be reviewed during the process of informed consent.

Cancer predisposition genetic testing must occur within the context of cancer genetic counseling to assure that consumers receive sufficient education for informed decision making related to testing. Health care providers to perform cancer genetic testing must have sufficient knowledge and expertise in this area. We recommend that standards of the minimum competencies are set for the provision of cancer genetic counseling, that all professional groups providing these services have equal roles in decision making.

Oncology nurses with specialized education have much to offer in helping people before, during, and after the genetic testing process. The use of genetic information for the management of cancer will profoundly impact oncology practice in the coming years. ONS supports the active inclusion of nurses and other health care professionals in delineating future guidelines for cancer predisposition genetic testing.

We wish to continue this dialogue with the Secretary's Advisory Committee as it refines the guidelines and develops the recommendations to the Secretary. We look forward to future work that will assure that cancer predisposition testing is safely and ethically integrated into practice. Thank you very much.

DR. McCABE: Thank you. Our next speaker is Tony Holtzman. While Tony comes down, I'll just mention that he co-chaired the Task Force on Genetic Testing, along with Mike Watson, which recommended, among other things, the formation of the Secretary's Advisory Committee. Tony is from Johns Hopkins University.

DR. HOLTZMAN: Thank you, Ed. I've submitted rather extensive written testimony, and I'll be very brief this afternoon. Both my written testimony and my statement today deal exclusively with the question of oversight of genetic tests, and I want to concentrate on, particularly, oversight of predictive tests for common complex disorders. So keep that in mind as I go through the rest of my comments.

The important point that we've learned through our own research is that in deciding whether or not to have a genetic test, people need information about what that test will mean to them, how good a predictor it will be of whether they will get the disease or not get the disease, and if the test is positive, what can be done to help them. Without this information, I really don't think that anybody can make informed decision making.

The problem, the difficulty with tests today, and particularly predictive tests for common disorders, is that data is not always available, and that for laboratories that market tests as services, there is no regulatory requirement to collect that data.

Of course, some of that data is there from research studies, such as linkage studies that have initiated the association between a particular gene and a disorder, but the populations or the people used in those linkage studies are not representative of the entire population, and the risk data may be considerably different, as we've learned for breast cancer in the entire population, compared to those research studies who form the basis for preliminary data.

Now, the situation is quite different for genetic tests marketed as kits, as you've already heard from previous testimony, because a manufacturer of a kit must collect data on clinical validity before the FDA allows that manufacturer to market the kit. From what I've said, I would suggest to you that from the public's point of view, there is a need to get data.

I'm not saying that a predictive value has to be of a certain level. I'm saying that one just needs to know that there is data that applies to the population that's considering being screened, and that by creating this for kits and not for genetic tests marketed as services, we've created a double standard of which the public is the victim.

I see my time is running out, so I will stop at that point. My written testimony elaborates.

DR. McCABE: Thank you. Our next speaker is Jean Jenkins from the International Society of Nurses in Genetics.

MS. JENKINS: The International Society of Nurses in Genetics, or ISONG, is pleased to have this opportunity to offer commentary on the documents prepared by the Secretary's Advisory Committee on Genetic Testing today.

Our organization is composed of nearly 300 members, representing nearly every state in the United States, Brazil, Britain, Israel, and Japan. ISONG members are involved in all aspects of delivery of genetic services, from prenatal to late-onset genetic counseling, from provision of direct care to education, research, and policy making. As such, ISONG members have seen first hand how genetic disorders and risk for inherited conditions impacts individuals, their families, and often, even their communities.

It is in the spirit of dedication to caring for people's genetic health that these comments are offered. Much more extensive information is provided in written commentary for the Advisory Committee, and I will keep my comments briefly to the recommendations at this point in time.

ISONG affirms that genetic testing should be carried out within the context of volutariness, informed consent, and confidentiality. Nurses in genetic centers, primary care, as well as other settings, have central roles in providing information and support to individuals, families, and communities in the multiphase processes of genetic testing.

The following recommendations are: oversight of laboratories should assure protections for all genetic tests, such that access to information is controlled and potential misuse and harms are minimized. Teams and representatives from public and private sector laboratories, federal oversight agencies, and consumers should be assembled to review laboratory performance, recommend new procedures and design modifications in oversight guidelines.

Unannounced surveillance should be conducted at least annually, including but not limited to review of documentation of minimum requirement for all services, qualifications of laboratory personnel, laboratory records with regards to marketing, quality assurance mechanisms and records for all laboratory activities as trend data for a minimum of five years.

Laboratories should also be expected to contribute to public health and professional education, as well as community-based research about genetic testing, counseling, and support services, and offer available resources for consumer education.

Protections should be equitably designed and applied in all cases for all sub-populations, regardless of the special nature of tests among segments of communities. Comprehensive and consistent laboratory policies also need to be designed to consider the interest of children and their families, as these are imperative.

Policies should be bolstered by regulations requiring parental informed consent forms, children's assent forms, and evidence that the family has been offered counseling with a trained health care professional.

Counseling and support services should be offered prior to, during, and after nearly all categories of genetic testing. Culturally sensitive information should be delivered in multiple formats, including different languages. Ongoing public education and access to these procedures should be available, and in addition to indices of clinical validity, a minimum set of outcome measures should be used to address short-term clinical utility and long-term utility of genetic testing, including psychological, social, family, and cost benefit outcomes.

ISONG thanks you for the opportunity, and we'll be glad to offer whatever capacity we can assist in in the future.

DR. McCABE: Why don't you come down this way.

MS. JENKINS: Sure.

DR. McCABE: For those of you who are coming down, please come around this side. There is a wire on this side. We don't want anyone to trip.

Our next speaker, then, is Barry Berger from Exact Laboratories. Again, please come around on the light side over here. Thank you.

DR. BERGER: Hi. I'm Barry Berger from Exact Laboratories. I'm a practicing pathologist, former director of the Department of Pathology and Laboratory Medicine for Harvard Pilgrim Health Care, which is still around doing not so well. My full comments have already been submitted to the committee, and I ask them to take those in their entirety.

Not to reiterate what people have said earlier, I'm just going to hit a couple of strong points for the business that we're in. We're in a business where we're looking at sporadic mutations occurring in colon and rectal carcinoma, and we feel that the documents that are coming out, and the regulations that are being promulgated specifically and explicitly look at the issue of acquired mutations as opposed to germ-line mutations, for reasons that have already been introduced.

The analytical methods that are used for looking at these single nucleotide polymorphisms, DNA integrity, standard PCR are well done in the clinical laboratory already, well regulated by CLIA and current FDA regulation.

In review of the Public Consultation on the Oversight of Genetic Tests Report, we thought that this really did thoughtfully reflect the concern of the public as I have seen in my practice, helping set up the Oncology Genetics Unit at Harvard Vanguard, and the Medical Genetics Unit there with Sue Palker (phonetic).

We believe that even in using these somatic mutations as looking for the current presence of tumor or ademona neoplastic events, that physicians have to be fully informed so they can have appropriate discussions with their patients. So education of the medical public is key in these conversations.

However, to the extent that these are screening tests and not diagnostic tests, the standards of informed consent, I'm not certain should be as rigorous as they are, and should be for dispositional testing, which should be rigorous, depending on the outcome of such tests. So on those notes, I would like to thank you for your time.

DR. McCABE: Thank you. Our next speaker is Lisa Salberg from the Hypertrophic Cardiomyopathy Association.

MS. SALBERG: Thank you for the opportunity to address this very important committee and meeting today. The Hypertrophic Cardiomyopathy Association was formed in 1996, after the death of my sister. She was 36 years old at the time of her death. Having already lost four members of my family to HCM, and three members living with it, as well as myself, it was clear that this disease required some additional representation.

HCM has a prevalence of between 1 in 500, and 1 in 1,000 in the population, which is about 360,000 Americans. HCM is an equal opportunity disease, affecting men and women, spanning all religions, nationalities and ages, yet few have heard of this disease, which is a leading cause of sudden death in young people, cardiac sudden death of young people, and young athletes, more specifically.

HCM, although it can be the leading cause of sudden death, is compatible with a normal life span and may require varying levels of medical intervention throughout life. There is no cure for HCM, nor do we expect one in my lifetime. At the current time, the HCMA has nearly 1,000 member

families and over 450 medical community people supporting us.

HCM is obviously a genetic disorder, with eight currently identified mutations, and an unknown number waiting to be discovered. We have learned a lot from quality genetic research, such as work being conducted by Dr. Christine Sidman and colleagues at Bingham Women's Hospital in Boston, Massachusetts.

I would like to share with you some of my own concerns regarding genetic screening, genetic counseling, and privacy information, as well as that that has been shared with me from the members of our association. We've heard a lot of this today and I don't mean to sound redundant.

Quality counseling, pre- and post-screening, is very important. In many cases our members have sent samples off to labs not knowing what their blood was being screened for, and not understanding what implications it might hold. Some are unwilling to participate in research due to a pure lack of understanding of what their rights are. Some people send their children's blood in for screening not understanding what the implications may be.

I'm going to jump to another issue real quick, an ethical matter that has arisen in the HCMA over the past several weeks. I'm aware of two young ladies being strong-armed into aborting wanted pregnancies, due mostly to medical providers' strong opinions that their children may have HCM. These cases are unique in that there was no mention of concern on behalf of the medical providers as to the health of the mother.

Yes, HCM is a potentially deadly disease, but it can be compatible with normal life. Genetic fear is a powerful tool. I have seen it used too often, and I am looking forward to this oversight committee putting in some guidelines that will enable providers to do that type of thing in the future.

While it is necessary to evaluate the potential socioeconomic, psychological, and medical harm that may result from genetic testing, no committee, medical provider or governmental agency can decide what is in the best interest of any particular person.

I'm going to summarize here a little bit. In the opinion of the HCMA, it is very dangerous for that attitude to persist from a medical provider or governmental agency. Patients deserve respect, information, and alternatives, as well as truth and the right to make their own decisions regarding their health care, all the while maintaining their complete confidentiality. I thank you for your time.

DR. McCABE: Thank you. Our next speaker is Alice Cornelison from Howard University. If our other speakers could move forward, what we're going to do is, we have about six speakers left, we're going to continue and complete the public comment before we move on.

MS. CORNELISON: Thank you. My name is Alice Cornelison from Howard University, Division of Nursing, Washington, D.C.

While we at Howard University are educating nursing students to care for the world's population, our mission includes a commitment to providing care to under-served communities and it is from that perspective that I make the appeal for a real, rather than token, inclusion of diverse cultures. Be assured that while you are eyeing certain groups for inclusion or exclusion, these groups are also watching you.

Continue to publicize successes and failures of human testing without violating

confidentiality and respect the individual's right to say no. It is the responsibility of health care educational institutions to keep abreast of current genetic research so that nurses, doctors, social workers, genetic counselors, to name a few, can speak from a scientific and informed base rather than a personal and uninformed bias.

Finally, communication is the key to public acceptance of genetic tests for all populations, and specifically under-served communities. Thank you.

DR. McCABE: Our next speaker is Wendy Uhlmann from the National Society of Genetic Counselors.

MS. UHLMANN: My name is Wendy Uhlmann, and I am president of the National Society of Genetic Counselors. NSGC is a leading voice, authority, and advocate for the genetic counseling profession and represents over 1,700 genetic counselors. We would like to commend the efforts of the SACGT in putting together a comprehensive and thoughtful report, one that addresses the complexities of genetic testing and raises pertinent issues to consider in developing appropriate oversight strategies.

The report identifies a key concern, that health care providers and patients often have limited knowledge of genetics and the implications of testing. Much attention has focused on the tests themselves, but just as relevant is the counseling that occurs pre- and post-testing. Genetic counseling is an important aspect of ensuring the development of safe and effective genetic testing.

Before ordering the genetic test, there needs to be an accurate assessment of the patient's risk. Complicating this assessment is the fact that a specific genetic condition can be inherited in more than one way, involving more than one gene and due to any one of a number of mutations within a gene.

Laboratories use different methods, even when testing for the same genetic condition. Each testing method has limitations and implications for the interpretation of test results. Therefore, a solid understanding of genetic principles is necessary for making these important distinctions, selecting the laboratory and figuring out who should be offered testing.

Oversight of genetic testing needs to ensure that genetic education and counseling by properly trained health care professionals is available. We agree with the SACGT that determining the degree of oversight will be a complex process, one that will require weighing the benefits and risks for each genetic test.

Genetic counselors have coordinated genetic testing and educated patients about these testing issues for more than 25 years. We strongly encourage the involvement of genetic counselors in determining oversight for different genetic tests. Given the rapid advances in genetic testing, the ability to offer genetic tests is exceeding our capabilities to fully understand the implications.

The demand for genetic tests is such that testing may be offered even as long-term data is still being collected. Informed consent is therefore an important aspect of genetic testing. It should include the limitations and implications of genetic testing from both the laboratory and clinical perspectives and address the personal and family impact of genetic testing.

In closing, genetic counseling is an integral part of genetic testing. Genetic counselors have much expertise to offer in addressing these important issues and establishing oversight criteria for genetic tests. The NSGC strongly supports the efforts of the SACGT to address the significant medical,

scientific, ethical, legal and social issues associated with genetic testing. Thank you.

DR. McCABE: Thank you. Our next speaker is Lee Brown from Howard University. Is Lee here?

(No response.)

DR. McCABE: The next speaker, then, is Benjamin Dubin from Alexander Graham Bell.

MR. DUBIN: My name is Benjamin Dubin. My wife and I are the parents of Rachel, an extraordinary, bright and energetic 23-year old woman who has a profound hearing loss from birth. Rachel has used hearing aids since her hearing impairment was diagnosed at age 3. She has a 120 DB loss. She speech reads and speaks. She is deaf, and she is oral. She chooses not to use sign. Like 90 percent of parents who have a child born with a hearing loss, my wife and I have normal hearing.

I am a member of the Executive Committee of the National Organization of the Alexander Graham Bell Association for the Deaf, headquartered in D.C. We're an organization comprised of parents of children who are deaf and hard of hearing, adults with hearing losses, and professionals who serve children with hearing loss.

Today, A.G. Bell is the largest organization in the United States focused on the needs of deaf and hard of hearing children who use auditory approaches to communicate. A.G. Bell members also address a wide range of issues of importance to people with hearing loss of all ages, but our philosophy, advocating independence through listening and talking, emphasizes giving children and adults the skills to function within the mainstream of society.

Like most people with a hearing loss and families of children and adults with hearing loss, our members do not view themselves as part of the culture of the deaf. The distinguishing characteristics of our A.G. Bell children and adults is that they have a hearing impairment that requires them to utilize certain accommodations, not that they have a different culture.

Unfortunately, pediatric hearing loss for most families, regardless of whether the child communicates auditorially or manually, presents extraordinary challenges. For those who primarily use sign language and attend state schools for the deaf, the average reading level upon graduation is fourth grade.

For families who choose to pursue the auditory approach, as we did with Rachel, learning language and learning without the benefit of normal hearing is an extraordinary challenge. At the same time, our kids are evidence that it was the right approach for them, as they have succeeded mastering oral and written english, sometimes foreign languages. Rachel is a Phi Beta Kappa at Gaucher College, where she minored in the Russian language.

It is well known that over 50 percent of hearing loss has a genetic component. Given the fact that in many instances it is important to determine the cause of one's loss, it is likely that some percentage of those who do not know what caused their hearing loss have a genetic basis, hence a high degree or percentage of childhood hearing loss can be attributable to genetic losses.

The Bell Association vigorously supports any means of overcoming hearing loss that allows children to communicate with the larger world, whether through use of technology, medical

intervention or strategies like speech reading. Thank you.

DR. McCABE: Thank you. Our next speaker is Janine Cody from the Chromosome 18 Registry and Research Society.

MS. CODY: Hello. My name is Janine Cody, and I'm here today as president of the Genetic Alliance. I would like to thank the committee and Secretary Shalala for having the wisdom to integrate the consumer perspective into these discussions.

One of our guiding principles at the Alliance is that meaningful progress in genetics is not possible without consumer involvement, and we saw today, so vividly in the public presentations, how powerful the public message is. I think everyone felt that, who was in the room today.

We look forward to being active players in the development, as well as the implementation, of preparing the public for being informed consumers of genetic technologies and services. Thank you.

DR. McCABE: Thank you. Bill Freeman will be our next speaker.

DR. FREEMAN: Thank you. I'm the director of Research in Health Service and Institutional Review Board. I want to give my assessment of today's plenary sessions in the morning, based on 21 years of working with and listening to native communities, that is, American Indian, Alaska Native, Canadian First Nations, Inoit, and Kana Maoli communities and people.

Francis Collins states that there is a halfway state of being able to diagnose and not yet treat on the benefit side of genetics. Let's look at the halfway state on the harms' side of genetics. I think there is a halfway state of minimization of harms on the panel. Especially, the comments by Sasa from Hawaii about the disease CADASIL in her family, that her family did not receive full genetic services, shows that, as well as comments by other members of the panel.

There are, for those of us who remember from health services research 30 years ago, five A's. There was limited availability of genetic services for Sasa's family due to her rural, and their rural location. There was limited affordability due to a lack of insurance. There was limited appropriateness, the cultural mismatch about wanting personal caring and the maintenance of an ongoing interest and responsibility by that family versus what was provided. There was limited acceptability, including the potential storage of specimens. And finally, a different word, there was limited quality.

CADASIL is basically similar to Huntington's. Apparently, the clinical geneticist and genetic counselor did not recognize that fact and did not offer the protocol of Huntington's. I have it on good authority that that is sometimes offered by some genetic services and not recognized by others.

Then finally, from other speakers, there is an inappropriate reliance, or over reliance, on a particular social view, that is to say, the medical model of disabilities that is frequently imbedded in, especially, prenatal screening.

In my opinion, these problems currently cause more fear and distrust and more harm and pain about genetic testing than problems with clinical validity and clinical utility, especially the lack of personal caring by us health care professionals.

Possible implications. First of all, I think there can be a longer, more full, and more

detailed section in the report by the Committee on Factors in assessing social issues. I think the committee and the report can note the state of halfway minimization of potential harms. I think there can be more concrete steps by the federal government and affected communities to promote a process of developing programs of genetic testing, of genetic research, and of genetic care taking place in those communities.

Finally, specifically ask OPRR to develop a written guidance about the use of anonymized tissue and specimens saved from clinical care or research in which the subject of the genetic research is the group itself.

I'll send these written comments to the committee, and I want to personally and publicly say thank you, Pat Barr, for your comments this morning.

DR. McCABE: Thank you and I wish to thank all those who provided public comment. Please remember, if you can turn something in in writing, we would appreciate that.

Is there anyone who had pre-registered for public comment who was perhaps not in the room?

(No response.)

DR. McCABE: Well, thank you very much.

At this time, I would like to call Mr. Vence Bonham to the front. Vence is going to be the moderator for the next section, where, we're going to review the focus groups, the breakout groups.

I want to thank all of the individuals who participated in the focus groups, the facilitators, the rapporteurs, the science advisors, but most importantly, the individuals who participated in those groups. Vence.

DR. BONHAM: Thank you. First, I would like to make a comment. I had an opportunity to be one of the facilitators this afternoon and had an opportunity to listen to everyone in the room. The goal of the discussion groups was to make sure that everyone had an opportunity to have their voices heard, and I think that was very successful.

So I just want to compliment the committee on going with that strategy to provide an opportunity for everyone to provide their perspective.

At this time, we would like to hear from the facilitators of each of the discussion groups to share their recommendations, concerns, and issues. I ask that each facilitator keep their comments brief, with the understanding that a written report will be provided to the committee for each group.

If you can please identify your name, because most of the groups have two facilitators and I do not know who is going to be presenting for each group, as well as to identify the specific issue that you discussed. We ask that you also make sure that your comments are really focused on the themes and questions presented in each of the issues.

At this time, I would like the facilitator for Groups A and B to come forward, please.

MS. WANG: Thank you. My name is Vivian Ota Wang, and the theme that we were supposed to discuss was, what criteria should be used to assess the benefits and risks of genetic tests.

Actually, we didn't stick too closely to the actual related question, but thematically ended up focusing on the clinical utility of the benefits and risks of genetic tests. The major points, the overall general one, is that knowledge is power, and that in fact we need to disseminate more accurate knowledge around genetic testing, and that one of the ways to do that is through true informed consent, which included physician/patient dialogue inclusive of community and other constituency stakeholders in the decision making process.

Also, the process of actually obtaining accurate information for making these informed decisions, including a more elaborate discussion of medical implications and interventions, as well as some psychosocial implications and interventions as well.

Part of the informed consent, it was also suggested, is an elaboration on the interpretation of test results in an understandable language that would include the medical and psychosocial ramifications of this, and within the frame work of that knowledge itself, that people have the right to know the information, while preserving, also, the right not to know the results of genetic tests.

The second major point of discussion, which ended up being a thread through our discussion, was the issue of education in terms of, there is a lot of misinformation and education around genetic testing. So different target groups were actually identified in our discussion group, including physicians, specific examples of specialists and generalists, genetic counselors, and going into the schools, looking at and teaching primary through high school students.

There was some discussion on also educating the general public, as well as specific targets. There were successful examples given through mailings, on-site visitations, radio, TV, just as a way of providing accurate information prior to actually being posed with the issue of genetic testing.

There was a lot of discussion, also, around issues of confidentiality and the pros and cons of personal versus private and public information access.

We ended up our discussion, when I was joking, with a very esoteric moment and started asking, well, what is, really, a genetic test. We left it at that, but decided that one of the general conclusions is education, education, education, with a balance of thoughtfulness, accuracy within a psychosocial aspect.

We rushed through trying to talk about some criteria for assessing benefits of genetic testing, and some of the ideas, but not necessarily in chronological order, that were mentioned were general research for cures, treatment issues so that more appropriate psychosocial planning, economic planning, and reproductive options would be available for all people, and really looking at a way to centralize accurate and reliable information around genetic testing.

Many unresolved issues. The big three are: what is a genetic test; what relative value should a test be given. In fact, it is all within the realm of the complexity of understanding genetic and environmental influences of disease within varying social/cultural contexts. Thank you.

MS. BERNHARDT: Like Vivian's group, we deviated a little bit from benefits and risk criterion, and actually deviated in exactly the same way, which was interesting.

We did focus initially on major benefits of genetic testing and we identified those as allowing patients to make informed decisions and life choices. We decided that the availability of treatment itself is not necessary for genetic testing because knowledge itself can be beneficial.

Risks of testing were discussed in terms of the limitations of the test itself, such as poor positive predictive value and low sensitivity, insurance discrimination, and lack of informed consent.

Informed consent needs to be considered, we thought, as an ongoing communication process by all parties involved, including physicians, nurses, patients, genetic counselors, instead of just simply a form. There may need to be less stringent requirements for informed consent for certain kinds of tests, such as routine diagnostic testing, like doing chromosome studies on a newborn with Down's syndrome phenotype, but that consent does need to be fully informed for predisposition and presymptomatic testing.

We thought that the education of health care providers concerning genetic testing is needed and physicians should recognize when they may need to refer patients to others who have more expertise in certain kinds of testing.

Also, the education of patients concerning genetic tests needs to be a collaborative effort between physicians, counselors, nurses, and laboratories. The responsibility of test ordering and the interpretation of those results needs to be shared between laboratories and physicians. The fact that all physicians may not be knowledgeable about all genetic tests may need to be considered, actually, a risk of genetic testing.

IRBs, we thought, need to be more knowledgeable and responsible about the risks and benefits of genetic testing and have ongoing monitoring of protocols.

And finally, a representative in our group from a minority group said that genetics, like all forms of health care, really does seem to be insensitive, in many ways, to care. She said that her people certainly would be ignoring genetics, which would really be sad because she thought that it potentially is a very good tool for promoting health.

Did you want to add anything, Adrienne?

DR. ASCH: No.

DR. BONHAM: I want to also make sure everyone is recognized. If you look at Tab 4, you can follow along and go through all the different groups and the questions that they were focusing on.

At this time, if Group C and Group D would come forward, please.

DR. HULL: My name is Sara Hull. I was one of the facilitators for Group C. We were asked to look at the issue of test categorization, whether and how tests can be categorized into high- versus low-risk categories.

There was some resistance, across the group, to actually using the terms "high-risk versus low-risk." We were able, though, to find ways in which the tests raised varying issues or the ways in which they vary and some of the factors that the group came up with. First, the difference between

germ-line and somatic conditions and the tests for those.

Much of what we talked about today focused on germ-line inherited types of mutations and the tests that correspond to those. Oversight issues would be different for germ-line versus somatic conditions.

The relevance of test validity and quality at the front end, starting out with tests with a good level, high validity, and good clinical utility are going to obviously be better than tests with low validity and low clinical utility. This was a very important issue that people in our group emphasized going into testing. Before we even introduce tests, this is where we can improve the quality and reduce risk at the outset.

Another focus of the discussion was on the individual impact of various tests, disease severity and treatment options. The group was able to, at the extremes at least, pick conditions. We heard a case from a woman this morning about Huntington's disease and the extraordinary impact that a test result had on her life. At the other extreme, we came up with things even as seemingly innocuous as tone deafness or color blindness, and even PKU, in which treatment is clearly in place. These are issues that bear on how we think about the different tests.

Also, personal values and lifestyles. We took the tone deafness example a step further and said, in a family that's very musically oriented, tone deafness might not be such a trivial thing. And so, it is very relevant to look at individual personal context values and lifestyles.

In addition to that, the cultural and familial context, and the various issues that a test can bring up, and the impact it will have on either a person in the context of their culture, or others in that culture, other members of their family, and how that gets addressed, was seen as very important.

These all speak to the issues of counseling and education. The people who are providing counseling have to take all of these issues into account. There needs to be an appropriate amount of time devoted to counseling and to give a person time to understand, appreciate, and incorporate the impact that a test result will have on their lives.

A second big issue that came up, and this seems to echo what came up in the first two groups, was the need for education, first, of consumers. The point was raised that we are actually all potential consumers of genetic services, we're all potential patients in need of medical genetic services. So that, education has to be very broad-based and more to the general public than just people who have already been identified as having genetic conditions.

In addition, all providers are in need of additional education, not just physicians, not just specialists, nurses, genetic counselors, primary care providers, people in specialized areas of care. This was also tied into determining who should be allowed to order the tests, and based on their expertise and their understanding, who ought to be implementing them, introducing them to the consumers.

So if there were conclusions from our group, I think we can summarize them the following way. Everyone, potentially, saw categorizing tests as problematic and wanted to warn against forcing tests into little boxes. There is a need for individualized counseling, the consideration of the individual factors, and also there is a risk of stigmatization based on these categories.

It is a very complex issue, and forcing them into little boxes might either undermine that or make people overlook that. It is not that easy to polarize things, or to figure out where they fit on the

spectrum.

The second bold statement was to go slow and get it right. That applied to a couple of issues, assuring the quality of tests at the front end, taking the extra time on the oversight issues on that part of the development of tests. Also, on the counseling end, giving people enough time to process information, to introduce them to support groups, to give people time to process and understand the implications of these tests in their lives.

And finally, this led us to a conclusion that oversight isn't simply regulation, it is not simply legislation, regulating labs at that end. That's an important part of it, but that leads into this bigger issue of how guidelines for providers will be developed, how education will be developed.

This led us to agreeing that the consortium approach, which was discussed earlier, was the way to go, the need to include policy makers, providers, and most importantly, consumers, in how tests are categorized and how oversight occurs.

In fact, one recommendation was that it should be the consumer groups, the support groups, who determine whether their condition falls into the high-risk or low-risk categorization. Their voice needs to be very much a part of the process.

MS. DIETRICH: Hi. I'm Kathleen Dietrich, and I was the co-facilitator with Vence Bonham on the other Group D, on test categorization.

We had several major points of discussion, the first being that all tests are not created equally, that if genetic testing was going to be stratified into categories, the things that should be considered are, first, the gravity of information and the condition that would result from the genetic testing information, the availability of treatment, potential impact on the family dynamic and lifestyle, long-term implications from these results, and the necessity for counseling. The purpose of the testing and the application of the results should also be considered.

There were people in the group that felt that we couldn't address every social issue that would result from genetic testing and that we should be very careful in prescribing genetic testing, taking a close look at what follow up would be given to the person that had been tested.

There were thoughts that possibly there were tests that didn't need oversight if they were considered to be minimal risks, and an example of this was given as male pattern baldness. However, on the other side, that clinical validity and utility of testing had to be established.

In terms of concerns for specific populations, the group was pretty much split, on one side, no, that no special care had to be given for certain populations, that we were being asked to address social issues, and that this should be answered with more education and training.

On the other hand, another part of the group felt that, yes, we absolutely should have special concerns and protections for specific populations, that we needed to pay attention to our historical experience in this country and come up with some oversights to protect these populations from discrimination, and that if oversight would evolve into specific categories of genetic testing, that rather than having small boxes for the testing, that the characteristics of the diseases could be broadly described, and that clinicians could possibly categorize their genetic testing in that way rather than having to check off a specific box, that these categories should be fluid and they should take into account changing and evolving technology and new information.

Two lastly held points on strongly held views were that, increased and more effective education of the general public and health care providers related to genetic testing should be given, and that more effective informed consent practices needed to be performed, with the general agreement that it was more than signing a piece of paper and it was a process.

DR. BONHAM: Thank you. Can we now have Groups E and F, please?

MS. BIESECKER: I'm Barb Biesecker. I was one of the co-facilitators. Unfortunately, Virginia Brown who co-facilitated data collection, evaluation, and dissemination, who actually facilitated the whole group, got sick. We made her sick as a result of this process. So she deserves credit for facilitating this group. I'm just the communicator.

Our major points of discussion were the need for large longitudinal collaborative studies where people, scientists, had access to population data on people's health. So, the complicated issues of trying to collect information on identifiable samples so that we could follow and track people's health over time.

We went on to discuss the difficulty of getting people to participate in these kinds of studies because of the potential negative social consequences, fears of discrimination, loss of insurance, loss of employment, and even some of the social stigmatization of people being wary about others knowing about their DNA sequences.

We went on to discuss that data collection seems to work well in some academic environments, that IRBs, while they can have opposing views between one another, it seems that IRBs can work effectively for the individual institution. But when we began to discuss the private sector, we felt it was another matter, that standards of review and confidentiality vary greatly and are not in anyone's hands.

We tried to brainstorm about what the ways were to support the need for the kind of longitudinal data that we were imagining would be so important and that what we all needed to do was to try and figure out strategies to remove the negative social consequences.

Several members felt that HIV testing may provide somewhat of a useful model for applying a process of pre- and post-test counseling, laboratory rigor, and an oversight body.

We began to address the question about protection against generalization about communities of people. We discussed the fact that, again, minimizing the negative consequences, such as loss of insurance, discrimination, would be useful. Finding genetic differences in all communities of people may help lessen some of the potential stigma, and entering into a time when genetic conditions may be addressed and treated, to some degree, may alleviate some of the stigmatization.

But the general feeling, overall, was a great feeling that it was difficult to control how society chose to use information. Genetic testing should be optional, and results should be handled at the discretion of the patient.

Our main theme was the issue of the identifiability of DNA and the consequences associated with breach of confidentiality. The group felt this issue must be dealt with before designing any methods for the collection, evaluation, and dissemination of genetic tests.

Other strongly held views were, in spite of the risks, that genetic testing can offer

reassurance and confirmation of diagnosis for some people, that others value information, even though it may not be associated yet with any therapies, and that information is available. People should have the option of obtaining it. Thanks very much.

MS. OLSEN: I'm Donna Olsen. I was the facilitator of the sister group of the report you just heard. My frustration was that they sound like they did a marvelous job and got a lot further than we did in terms of our struggle. I think it was perfect example of the vacuum that sometimes exists between what are the issues in genetic testing and the public's understanding of what those issues are.

For example, we were really working, or struggling, with the questions, and we took them on very ambitiously, but as we began our discussion, became a little concerned that we really need to do some more homework.

Let me give you an example. The first question was "Given that collection of data is an ongoing process, what type of system or process should be established to collect, evaluate, and disseminate data about the analytical validity, clinical validity, and clinical utility of genetic tests?"

That's quite a mouthful. It doesn't mean that it is not a good question, it just meant that from the perspective of the folks sitting in that room, who were a wide variety of folks, that, where do we begin; what's currently being done.

One of the initial comments was, we as consumers, in some cases, are very much aware of the turf issues that exist in terms of, it doesn't make sense to us why data isn't shared. For instance, like an example of the Human Genome Project. Then, somebody talked about the fact that there are issues in the private market. We looked at funders, could they possibly help us in terms of looking at data collection.

Well, undaunted, we continued to at least identify the issues, although we may not have exactly answered the questions you asked us to, and I apologize for that, but I do think it is a good example of the vacuum between what the system needs and what the public will understand. The question was not that we couldn't help, but that there was a lack of information of what currently exists and how data is currently collected and coordinated and what have you.

The key issues that we did identify, things like, who will receive the genetic tests. We also identified that the existing number identification systems used with HIV and AIDS testing seems to have had some success, and it might be extremely useful in sharing it across the board.

Informed consent is absolutely critical, but must include things like culture diversity, literacy, and, as was pointed out earlier, the personal relationship between the consumer and the genetic professionals that you're working with. That's absolutely critical.

Testing when no there is no treatment available versus testing when treatment intervention is available poses different confidentiality issues for us. One of the other questions that came up is, that, when we participate in research studies where we're just trying to just identify the gene, we don't have any guarantees how those blood samples might be used for other studies.

Here again, it goes back to informed consent. If you understood, when you participate in the study, that those samples might be used for related issues, that's one thing, but if they're used and you didn't know that they were going to be used in that way, that poses other issues.

We, too, talked about the anonymity issues, with more concern surrounding insurance companies and employers rather than for the sole purpose of research and treatment.

Lastly, we felt pretty strongly that there is a need for some kind of oversight entity. There was a lack of consensus about whether it should be public or private. Some folks said, well, the federal government seems like a natural way to look at it. Other people said, really, lots of citizens here in this country do not trust the government to take good care of some of that information they consider to be pretty personal.

Functions should include the IRB standardization, a process for complaints from the public as well as the professional sector. Is there a number that we could call if we had a concern, whether you're coming from the consumer perspective or a service perspective.

Meaningful consequences for violations of oversight policies. We hear lots about standards, but then, what are the consequences if you don't meet those standards or procedures?

Just, in closing, one of the points that was made is, that often, as consumers, we participate in a number of research activities and do not receive any feedback, even after the results of the study are published. We do not get any feedback on studies where we've given freely of our time, energy, and interest, and that maybe part of those standards, somewhere, needs to include that when you involve families in that research, that they are entitled to at least get some kind of feedback or are at least given the option if they would like to have it given back to them. Thank you.

DR. BONHAM: Thank you very much. At this point, can we have Groups G and H, Oversight Options?

DR. WILFOND: Hi. I'm Ben Wilfond. I was a facilitator for G. I'll try to be brief.

Our task was to look at oversight options. In general, there was a sense from the group that some sort of centralized oversight would be useful. There was some acknowledgement that this notion of a consortium, as mentioned this morning, including both public and private groups, might be a valuable way to do that.

There was also a concern, though, that any sort of oversight group would also have the risk of becoming the burdensome bureaucracy, which was really mentioned as one of the concerns in trying to develop some sort of oversight mechanism. What was clear was that, as best I could tell, there was no one in the group who strongly advocated that any test should become available whenever somebody personally decides it ought to be ready. There needs to be some group to think about these issues.

Additionally, there was also a discussion about the importance of a gatekeeper, i.e., a physician or genetic counselor who also would be involved in those decisions. We had some discussion about the idea of home testing, and although there were a few comments about that, I think that the general sense was that that might not be the best way to go, but the point was made about the impact and the value of preserving privacy and confidentiality that could be obtained with a home approach.

There were a number of concerns, though, about the gatekeeper issue, not only in terms of confidentiality and privacy, but also the importance of physicians and genetic counselors keeping up to date and the fact that individuals may have different values than the genetic counselors or physicians, and there needs to be some way of accommodating those views.

Additionally, the point was made that whatever oversight occurs should not just be the test itself, but the entire process, including the education and the counseling.

Then to conclude, the final two points that were made really relate to issues that were discussed in other groups, but they were emphasized over again in our group, which is, number one, the importance of gathering data about the validity and utility of the tests. The second issue was the fact that the amount of oversight really may differ, depending upon the disease and the purpose of the test. With that, I'll end.

MS. MITTMAN: Hi. We also talked about oversight options and, actually, a lot of what we came up with, I can echo what was said earlier with the other groups, although they focused on other issues.

There was a feeling that we know what needs to be and should be done in order to offer testing responsibly, but we are not sure that we are there yet. So we felt that maybe we can obtain a baseline needs assessment to evaluate existing mechanisms in genetic testing, to assess, what is the available infrastructure and how effective it is. This will help to plan for future amendments of oversight.

Also, it was suggested to develop evidence-based guidelines involving professional organizations in the field, and to see what the existing practices of offering a genetic test are, to develop guidelines for that and to actually repeat that needs assessment to see what is the impact of the development of the guidelines, to see what the efficacy was.

Education was highlighted several times, that consumer education must be done in a meaningful way with respect to the educational ethno-cultural, and social context of the information, that we need to provide genetic and cultural competency education to providers, to insurance companies, and to managed care organizations, et cetera, that the availability of professionals such as genetic counselors, as well as consumer support and advocacy organizations, must be made known to test participants.

We felt that informed consent is of crucial importance, but there are existing barriers to, actually, how possible it is to carry that out. We acknowledged that there are limited human resources to disseminate information to the public in a meaningful way, and that there is an enormous complexity of information to be communicated.

It is also crucial to make sure that consumers are aware of the limitations of a test, as well as its utility, validity, and accuracy, and also very critical that professionally trained genetic counselors are available for any suspected genetic diseases to counsel the public.

In general conclusions, we felt that oversight should be provided not only on the tests themselves and what they are made of, but the manner by which they are used. There was a feeling that existing oversight is not enough and that we do have to expand the existing mechanisms in terms of state and federal oversight and involve professional societies and consumers, as well as other stakeholders, in this new technology.

For each test it was felt that we should weigh the benefits for immediate application versus what may be lost if the test is not performed, i.e., sufficient utility to use the test as-is, or is there anything to be lost by putting off offering the test until more is known.

Relating to oversight issues of when a test is ready for general use, one must evaluate

who will perform the test and how the test results will be used in this particular case. It is important to ascertain the reasons why tests are being ordered in order to allow for a proper interpretation of the test results from the various private laboratories. So we really felt that it is important that the clinical information accompany the test samples.

Lastly, it was felt that all information pertaining to a given test, including how it is done, why it is done, potential treatment or cure, and the possible ramifications, be it social, economic, physical, benefits and limitations, must be communicated to the consumers before the test is being performed.

DR. BONHAM: Now, if we could have Groups I and J, please.

MS. AU: Groups I and J were combined because we started out initially with too few people in both groups, but then it got really big. We were the catch-all group, so we had lots of different issues. The one that we decided was a priority issue was informed consent. Before our group could get into discussing it, the group wanted to come up with the elements of informed consent.

They decided that informed consent should be an interactive process between the provider and the consumer. It should be used as a tool for provider and consumer education. It should be written in understandable terminology, and should minimize legal terms. It should clarify what the purpose of the test is for and give basic information on the research and/or the test.

It should also discuss the risks and benefits of a test. There should be no cohesion with getting consent for the testing. There may be different criteria for research versus clinical testing and information about disposing of the test sample. Whether patients will be re-contacted if the sample is used for further research should be included in the consent.

So we went on to answer the question, should health care providers be required to obtain written informed consent before all genetic tests, or only for some genetic tests. The group came up with the thought that there are different categories of genetic testing required at different levels of informed consent. They felt that routine and mandated genetic screening tests, like newborn screening, may not require informed consent and diagnostic testing to confirm clinical findings, such as someone presenting in your office with the clinical signs of Fragile X, and you ordering a blood sample to test for Fragile X may not require informed consent.

Presymptomatic testing, such as Huntington's disease testing, should have informed consent, and predictive testing, such as familial breast cancer testing, should have informed consent.

The group also tried to figure out how we would standardize informed consent procedures throughout the different states and institutions. They came up with the idea that the Health and Human Services Department would create and promote a model of best practice, and then this model be adopted on a state-by-state basis. They decided that it would not be a good idea to try to do federal legislation for the standardization because it would not be able to be adaptive.

Then we addressed the question, should laboratories be required to ensure that informed consent is obtained before they go ahead and do lab testing. The group unanimously said no, it should be the provider's responsibility.

Two other strongly held views that we had, that were not related to this, were that, considering that DNA is essentially an individual's fingerprint, is any genetic testing really anonymous in

the future, especially in the future, and that some regulation of insurance companies and employers may be necessary to make the public more willing to have genetic testing.

DR. BONHAM: Could we have Group K?

MS. PUNALES-MOREJON: Hi. I'm Diane Punales-Morejon, and I'm the facilitator for the Oversight Issues for Diverse Cultural Communities.

The major points of discussion were the following. One, that the best way to minimize potential harms and maximize potential benefits to diverse communities is through education. Concern was expressed regarding the need to have educators represent the diversity of the communities being offered testing, but equally important is the need to be humane and compassionate in how tests are offered and presented. Questions were raised about whether there are enough genetic professionals from diverse communities engaged in counseling and testing.

The second major point was, there appears to be some genetic tests which raise more ethical, legal, medical and social concerns than others. These seem to fall mainly in the category of predictive testing, specifically those for which treatment is not currently available, or those which do not predict that the disease will occur.

Additionally, concern was expressed about the generalizations or assumptions that may be made about specific communities as a result of the ability of testing for one or more disorders in a certain population.

The third major point was concern was expressed, that, as genetic testing becomes more and more mainstream, both professionals and the public will disengage themselves from the environmental contribution to disease and instead focus more on the nature aspect of the nature versus nurture debate.

The general conclusions reached were the following. The public needs to be educated that every individual carries some mutations and that no one is genetically perfect. All individuals, as well as communities, should have equal access to genetic counseling and testing. Treatment information should be given along with testing information whenever possible. And lastly, both positive and negative stories regarding testing should be made available to communities to ensure an equal balance of information.

Last, another strongly held view was this. The question was raised, that, by virtue of even offering a genetic test, are messages being communicated about the expected use of that information, and in turn, what role does genetic counseling play in this. Thank you.

DR. MURRAY: I'm Bob Murray, and our group focused on two areas under the questions for discussion, one, how do we minimize the potential harms and maximize the potential benefits to diverse communities. We spent most of our time discussing concerns about, what are the roles of the community in oversight and how can we structure the oversight and consultation process to include diverse communities.

Major points of discussion consisted of, one, the fact that diverse cultural groups are not limited only to race or ethnicity, but are defined by language, religion, familial structure, and specific geographic region, and a thorough understanding of these variables is essential before any testing program is started. It was felt that many mistakes have been made because there was a failure to

understand this kind of complexity among ethnic and cultural groups.

Two, cultural groups wish to be involved in genetic testing that will affect their group from the very beginning, and being informed and included at the earliest time during research and development stages of testing fosters a sense of trust and illustrates the caring of professionals. This is essential for the ultimate success of a testing program and for an ongoing relationship with a testing program.

In addition, commitment to and concern about the community needs to be demonstrated by investigators and testers to ensure continued trust. This echoed some of the comments made by the panel this morning.

Three, it may be necessary to recruit representatives from different cultural groups to help explain the issues that face a particular community, as well as the primary desires and concerns of that particular community. These advisors could also determine the applicability of general testing policies to their group and suggest the level and extent of information to be disseminated, and educators who can effectively present the information to the community.

Again, we are underlining the importance of communication and communication by people who are trusted by the community representatives. That is, the messenger is as important as the message.

General conclusions. One general conclusion that we came to, and perhaps the only one that we felt was not discussed by others, at least that I felt, was that an important issue to be researched is how best to enable genetic professionals, and that includes researchers, clinicians, counselors, and advocates, to become ethnically and culturally sensitive to the values and priorities of diverse cultural communities.

Developing this skill could be adopted as part of the core competency for genetic professionals during their training programs, and this again ties in with the sensitivity and ability to communicate, and for being a messenger who is accepted by the community.

DR. BONHAM: To the committee, you committed a lot of time and energy this afternoon with facilitators and scientific representatives within each of the groups, and now I urge you to take the information from the various committees and various groups, and use that as you prepare your report. Thank you.

DR. McCABE: We completed our public comment early. I thought I would take a few minutes, just if anyone has any comments about what we've just heard, we would be happy to have you entertain us. We would appreciate it if you would go to the mic. Does anyone wish to comment?

(No response.)

DR. McCABE: If not, Judy?

DR. LEWIS: Thank you all for coming, for sharing and for helping us to better understand what all of the issues are in terms of oversight, in terms of some of the special concerns that people have, and in terms of educating us so that we can better do the work that we've been asked to do by Dr. Satcher.

I want to emphasize that this is just a part of a process. It is the beginning of a process.

We're committed to continuing dialogue with the public, and in that light, just remember that if there is something you want to share with us that you didn't have a chance to share today or that you weren't comfortable standing up and saying in public, that our web site will be active through the end of the day on Monday and if you know of anybody else who wants to participate, who wants to share with us, that is yet another way to share.

We're happy to hear your concerns. We thank you very, very much for spending the time and working with us, and helping us today to better understand the issues.

Lots of people have been thanked for making this day happen. The one person who hasn't been thanked who has taken lots of our ideas and helped them become a reality is Sarah Carr who is our executive secretary. A lot of thanks goes to Sarah, to all the staff in her office, and to all the people who worked with her to make today happen because it was a lot of work to do in a very short time. So from all of us, Sarah, thank you very much.

(Applause.)

DR. LEWIS: The work that we have ahead of us, to cull through the comments that have come in here, that have come in through the other methods that we've asked for for outreach is daunting. We'll be getting back to you. We're going to be working very hard to analyze these comments, and I want to thank everyone for what they've had to say and hope that we can represent your comments and your concerns faithfully.

DR. McCABE: Thank you, Judy, and thank you to the subcommittee that worked so hard to plan today. The SACGT will be meeting again on February 24 and 25 in Washington, D.C. A major portion of that meeting will be devoted to considering the public comments we've received, both today and through the other mechanisms. We will then continue to deliberate on the questions we've been asked to address.

We are, again, enormously thankful to all of you for coming and for sharing your views and perspectives on the important issues in genetic testing. We have heard many voices today and appreciate deeply your valuable contributions.

Before adjourning, on behalf of the SACGT I would again like to thank Joann Boughman and our staff, the faculty and students of the University of Maryland, Baltimore Campus, our steering group and facilitators. I also wish to thank Sarah Carr and her staff for a wonderful job.

Once again, thank you to all of you for participating in this meeting and in the policy development process. We look forward to your continuing involvement in this process. Thank you again, and may each of you have a safe trip home. Goodbye.

(Whereupon, at 5:50 p.m., the meeting was adjourned.)

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CERTIFICATION

This is to certify that the attached proceedings

BEFORE: Secretary's A/C on Genetic Testing

HELD: January 27, 2000

were held as herein appears and that this is the official transcript thereof for the file of the Department or Commission.

DEBORAH TALLMAN, Court Reporter