SECRETARY'S ADVISORY COMMITTEE

ON GENETICS, HEALTH AND SOCIETY

TENTH MEETING

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National Institutes of Health
Bethesda, Maryland

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I N D E X

GENETIC DISCRIMINATION

P R O C E E D I N G S

OPENING REMARKS

CHAIRMAN TUCKSON: All right. It is exactly 8:30 and I appreciate everybody being on time. We have a pretty ambitious agenda again and we thank everybody. I know we're ready for a great meeting and we're just full of energy, and we're going to just be terrific, aren't we? Of course, we are. Yes, thank you. Of course, thank you.

DR. : But the game hasn't started yet.

(Laughter.)

CHAIRMAN TUCKSON: And when you hear somebody go yea, we've got to know who is rooting for who so you'll know whether you should feel good or bad. So I don't know where Julio is but—

DR. : He's on the phone.

CHAIRMAN TUCKSON: Julio is on his phone getting the last bet in, I think, with the bookie.

(Laughter.)

DR. : He's the one taking the bet.

CHAIRMAN TUCKSON: He's taking the bet. Apparently, according to Julio, there is no issue. It is already over. It's just a matter of somebody writing down the score.

Let me do one quick housekeeping thing super fast. In terms of the—where is—oh, good. Abby? In terms of the meeting and the logistics one thing, before Abby makes me forget, you've got to sign up, of course, if you want to transfer—that you need transportation. So you need to do that or else you'll be in trouble. You can't do it now but in a few minutes.

The second thing is you have to be in this room by 1:28 this afternoon from the lunch break. If you're not, you're going to get caught up in the fire drill. You don't want that to happen. So woe befalls any of you who aren't in here at 1:28. We're going to work through the fire drill. We've got special dispensation or it was determined that we're not that important.

(Laughter.)

So we were just in—we were just in a—so it's fine but—so be—you've got to be back here or else you're going to have to walk.

The last thing real quick is in terms of the meeting logistics for the next meeting, some of you have expressed to me that it probably makes more sense to just be at a hotel and just stay there and you don't have to go through all the back and forth with the dogs and the police, and the thing, and this is hard. So I thought this was good and it was exciting to be at the mother ship but maybe that's not so good for you so the next time we're going to be out in College Park.

Abby is trying to always find us good places.

Somebody was telling me in the lobby that they had—like they have a study section meeting at the Watergate and another one has got a meeting at Mayflower. But I think the issue is that you all are small meetings without the public part and I think where the challenge for Abby and the team is, it's the public part.

So I just wanted to make the committee—I mean, I'm sensitive as your representative that we're supposed to try to make this as easy and painless as possible. So apparently this isn't easy or painless so we heard that.

College Park is a little further out but I think that will be okay but it's not that bad and so we'll do that. But I just—Abby is trying to get us to the Mayflower and the Watergate, and we'll keep trying to do that.

So I just wanted—Abby, thank you, by the way, for all the effort that you—we really do appreciate it so thank you.

(Applause.)

Okay. All right. The other thing is I think we're going to try on the first night of the next

meeting—we are going to have a dinner where we all go out together. We used to do that and this curmudgeon chairman, who is not socially adept, forgot to request that or whatever. So Barbara and—it's really Barbara and Steven's fault that we're going to go to dinner because they think it's a good idea. They wanted to go to a bar and I thought—so now I knew it was time for dinner so we're going to have dinner. So anyway we'll build that into the schedule and those that can make it that will be terrific and give us a chance to bond a little bit and get to know each other.

All right. Well, welcome to the second day of the tenth meeting.

God, this is like theologian, Kevin. I mean it's like—

(Laughter.)

--the second day of the tenth meeting with the rain.

(Laughter.)

Build the ark.

We're going to be joined later, we think, by Dr. Christine Beato, which is terrific because she's pretty important as principal deputy assistant for the Secretary of Health, and she's ex officio for the HHS Office on Public Health and Science. So we'll—hopefully, she'll be here and I'll make special note when she comes.

Our first session today is on patents and access. You'll recall that in March of '03 SACGHS identified concerns about the impact of gene patents and licensing patents on access to genetic technologies as one of our high priority issues. At that time we decided to table the work until the National Academies, and this is to keep our new folks up to speed here, until they completed their work on the issue. At our March meeting we heard from David Korn on the findings and conclusions of the NAS Committee on Intellectual Property Rights in Genomic and Protein Research and Innovation. After a careful review of their report by our task force, we concluded that while the NAS committee thoroughly explored the research issues surrounding gene patents and licensing, the clinical aspects could benefit from further exploration. Before deciding whether and how to proceed with this issue, we wanted to learn more about, and hear the various perspectives on this topic so we have several experts with us today to provide us with the necessary background and to share their perspectives on this issue.

I will turn the floor over to our very capable and able Dr. Debra Leonard, Chair of the Patents Task Force, who will also be giving the first presentation on fundamentals of patents of licensing and their implications on access to clinical genetic tests.

Take it away, Debra.

PATENTS AND ACCESS SESSION

PATENTING AND LICENSING FUNDAMENTALS AND THE NATURE OF THE ACCESS PROBLEM

DR. LEONARD: Ta-da. Okay. We have Reed's attention until 10:00 o'clock and that's when the Ghana-Brazil game starts.

(Laughter.)

(Slide.)

So first I'd like to review for everyone since we have new members of the committee where we are, why we got—in case you missed what Reed said.

(Slide.)

So basically we set gene patents as a priority for SACGHS but tabled it basically because the National Academy of Sciences had been charged by the NIH, NHGRI specifically, to investigate intellectual property, not just DNA but protein—all intellectual property issues related to research and clinical practice. The NAS focused predominately on the research questions surrounding intellectual property so that report came out in November, I believe, and at the previous October meeting a task force was formed from SACGHS and charged with reviewing the NAS report to assess whether the issues that SACGHS had identified during its priority setting process were addressed by the NAS report.

So the task force reviewed the NAS report and presented at the March SACGHS meeting of this year. And basically we—at the presentation the task force and then the committee agreed that the first 12 of the 13 NAS recommendations addressed fully the research issues that SACGHS had raised as concerns for gene patents and those recommendations focus on ensuring the public investment in genomics and proteomics is optimally benefiting society.

So we were fairly satisfied that the research concerns that we had were addressed as well as we could ever address them for research issues.

The committee agreed that the clinical practice and economic issues were for the most part not addressed by the NAS recommendations and that the one NSAS recommendation relating to diagnostic testing was of questionable feasibility of whether or not that could actually be implemented in practice, and that recommendation was to establish procedures to assure that patented tests could be independently verified.

A laboratory—a clinical laboratory is not going to develop a test that the only thing they can do is second opinion testing. It's just not financially feasible and work load feasible.

(Slide.)

So at the March session there were many new members. The membership of SACGHS had changed such that the patent discussion we had back in 2003—'04—2004, not everyone was up to speed. So what we decided was that we should have an informational session basically to look at the clinical practice issues and economic issues of gene patents and decide whether or not this was something SACGHS wanted to work on.

So I want you to focus on that is what the first question is that we need to answer is gene patents and access of patients and economic issues surrounding gene patents something that SACGHS, this committee, wants to look at, investigate and eventually possibly make recommendations to the Secretary of Health and Human Services.

(Slide.)

So today we are going to have three presentations. I'm going to change hats in a moment and I will give the first talk which basically gives some basic information about gene patents and then the clinical practice issues surrounding gene patents, and some information about why we might want to care about this.

Mildred Cho from Stanford will be giving a talk on data analysis to the impact of DNA based patents on access to genetic technologies and services.

And Mark McCamish will be giving a talk on more of the industry viewpoint of gene patents.

We will then have a roundtable discussion of the committee to determine whether there are areas that warrant further exploration and/or attention by us. And "us" is going to be you soon.

So let me get my presentation up here.

(Slide.)

So now I am taking off my hat as an SACGHS member and I am putting on my hat as a molecular pathologist who does all types of DNA based testing, including genetic based testing.

(Slide.)

What I'd like to talk about is what are patents and gene patents, and then talk about patent enforcement experiences that I had at the University of Pennsylvania when I was director of the molecular pathology laboratory there, and then talk about maybe medical significance of gene patents and why we should potentially care about this issue, and then options for consideration as to ways this may be addressed.

(Slide.)

So what are patents? Patents grant the right to exclude others from making, using or selling inventions for a limited period of time. An invention is anything that is made by man that meets three criteria. It has to be new. It has to be non-obvious and it has to be useful.

This protection is granted in the U.S. Constitution and the purpose of patents as defined in the U.S. Constitution is to promote the progress of science and useful arts by securing for a limited time to inventors the exclusive right to their discoveries. As part of this protection for inventors, they have to publish or make available what the invention is to the public. And part of this rule is that you cannot patent a product of nature or a basic principle such as $e=mc^2$ or gravity.

(Slide.)

So when someone holds a patent on an invention, they have a number of options of ways that they can control the use of that information. They can completely restrict use of the patented information by anyone, including themselves if they don't want to use it. They can also create a monopoly situation in which the patent holder is the only user of this information or they can provide an exclusive license to a single user, and then that person or entity becomes the only person or entity able to use that patented information.

There can be oligopolies in which there's limited licenses granted to selected users. There can be pure competition in which there's broad licensing and use of the patented information or technology or the patent can be held for the public good in which case anyone can use the patented information. So there is a lot of different options by which this patent can be used.

(Slide.)

So what DNA is being patented? Well, DNA, RNA, messenger RNA and other gene products are being patented usually as cDNA sequences so they don't usually patent the gene sequence itself, although some do patent the gene sequence itself. Probes and markers, transgenic organisms, vectors that can be used for cloning or gene therapy, cell lines and microbial strains are being patented. Also DNA methods are being patented. Genetic diagnostic methods that can be used for diagnosis of specific gene types or SNPs and methods of using probes or test kits, et cetera.

(Slide.)

So when I talk about gene patents, this is a small and rapidly growing subset of these broader DNA patents and these gene patents claim basically an individual's genetic sequence at a disease associated gene when that sequence is determined for the diagnosis of that specific disease. Usually these gene patents cover all methods of looking at that gene or locus. And it rests on the basic discovery of a relationship between a genetic variation and a disease that is caused by the genetic variation. It's really a unique type of patent because it permits true monopolization, which patents allow, of a medical service and in many cases almost monopolization of a disease. When you sequence the single gene and when you patent the single gene that causes a disease then by patenting that gene you prevent anyone else from using that gene sequence and looking at it for diagnosis, et cetera.

(Slide.)

And these are samples. I know this is small but the list goes on and on and on. BRCA-1 and 2 for breast cancer, HNPCC for colon cancer, Alzheimer's disease, compulsive disorders, hypertension genes, Gaucher's disease, canavan disease. So the list goes on and on.

(Slide.)

So I would like to now turn to what my experiences have been as a laboratorian with patent enforcement. So I am a physician trained in medical school. I have an M.D. and I am a molecular biologist with a Ph.D. in molecular biology. I did my residency training in pathology and I understand the use, performance and interpretation of laboratory tests in general but my focus has been on the translation of genetic and genomic science into diagnostic tests for patient care.

This is my medical practice. I would like to distinguish that this is medical practice that I'm talking about and not research. Basically gene patents have limited my medical practice.

(Slide.)

So this is a letter that I received from Athena Diagnostics and Athena Diagnostics had acquired exclusive rights to U.S. Patent #5508167 that covers the ApoE allele for Alzheimer's disease. It's only

by using Athena's testing that this can be done and they are happy to do this testing for $195 per specimen. That was in 1997. At the time I received this letter, we were performing this test for $100.50. So one of the issues with a single provider of a medical service is that they can set whatever price they want for that test and no one can really argue. So we had to stop doing Alzheimer's disease testing and send this test to Athena Diagnostics when we were doing this test for Alzheimer's disease.

(Slide.)

This is a second letter that I received that covers hemochromatosis. It's from SmithKline Beecham Laboratory who had gotten exclusive rights to three different patents and these had been exclusively licensed to SmithKline Beecham and they requested that we call SmithKline Beecham to make necessary arrangements to avoid any inconvenience or interruption of services to your clients, my patients. And those necessary arrangements consisted of a $25,000 up front fee plus a fee per test when we performed hemochromatosis testing. They were also happy if we didn't want to pay the $25,000 up front fee, they were willing to bargain for any intellectual property that the University of Pennsylvania held that could be used in lieu of the $25,000 up front fee. When I told the vice chair of laboratory medicine, my boss, about the $25,000 up front fee, he was not too pleased.

(Laughter.)

In fact, he started laughing just like Steve did because the molecular pathology laboratory doesn't make a lot of money, which most of you should be familiar with from the coverage and reimbursement document that we worked on.

(Slide.)

This is another letter received in 1998 from Athena Diagnostics. This is a different one covering U.S. Patent #5741645 that covers a disease called spinocerebellar ataxia type 1. The spinocerebellar ataxias are a clinical group of diseases that cause movement disorders and the SCA or cerebella ataxias can be caused by mutations in a number of different genes. This SCA1 is one of those genes of about 12 now that have been identified that cause spinocerebellar ataxia. Again Athena has exclusively licensed this patent and it's only by using Athena's facilities that this testing can be done.

One of the issues here illustrated is that SCA since it's caused by up to 12 different genes, you have to do testing for at least the most common of these genes and SCA1 is one of the most common. So we were doing at the time testing for SCA1, 2, 3, 6 and 7. These are five different genes. If we take SCA1 out of this mix, we will not be doing any SCA1 testing or any SCA testing at all.

CHAIRMAN TUCKSON: Debra, not to take you off track but let me just make sure. Your ability as a laboratory to test for that condition, for that set of genes, you don't need Athena's kit to do it?

DR. LEONARD: No. Athena is a reference laboratory.

CHAIRMAN TUCKSON: Right.

DR. LEONARD: So Athena is not selling a test kit.

CHAIRMAN TUCKSON: So you can—you have the ability to go in and test this for a patient and deal with it.

DR. LEONARD: All of these tests that I'm talking about, we were doing at the time that we got these.

CHAIRMAN TUCKSON: Right. So all of a sudden they say, "We own this. We own this set of genes in a sense. You can't look at these genes in a patient unless you pay us money."

DR. LEONARD: Right. Well, no, in the case of Athena—so in the case of—in the previous case it was we had to pay money to SmithKline Beecham Clinical Laboratories. In the case of Athena, they have exclusive enforcement that you cannot do the test. The only way to have this testing done is to send it to Athena.

CHAIRMAN TUCKSON: Okay. I'm sorry. Just because I—you're making such a cogent coherent presentation. I just want to make sure. Your—the knowledge—so are they alleging from their statement that the knowledge basis by which you have the ability in your laboratory to study these

particular genes—

DR. LEONARD: Not study, do clinical testing.

CHAIRMAN TUCKSON: To do the clinical testing.

DR. LEONARD: I just want to be clear we're talking about medical practice here.

CHAIRMAN TUCKSON: Right. That's right. You said not research.

DR. LEONARD: Right.

CHAIRMAN TUCKSON: Your ability to actually do those testing, is it based—they're claiming they developed the intellectual—

DR. LEONARD: No, they actually didn't. They have exclusive rights to a patent that's held by someone else. So for ApoE it's Roses, I think, at Duke, who holds the patent and exclusively licensed that to Athena Diagnostics. I don't know who had SCA1 that exclusively licensed it but that's another issue is that most of these gene patents are held by academic institutions. So I don't know if Mildred will be talking about that at all but she has done some research on that with John Merz.

CHAIRMAN TUCKSON: Thank you for allowing me to interrupt you.

DR. LEONARD: Okay. So basically by controlling or limiting the testing for one gene, you basically—or the patent holder or exclusive licensee controls the testing for more genes because you aren't going to do the testing for SCA2, 3, 6 and 7 unless you can also do testing for SCA1 or no physician would send you the testing.

(Slide.)

This is a letter I received from Miami Children's Hospital Research Institute in 1999 that holds the patent—they hold the patent for canavan disease mutations, the specific patent, and they are willing to provide a license if we pay $12.50 per test, and they set volume limitations within their contract. So if we were doing 50 tests this year then when we got to the 51st patient we could not do that 51st patient. We would have to send it to another laboratory.

This particular negotiation was a little rough because when we decided that we would not take a contract because we weren't doing that many canavan tests at the time, we received an agreement that would allow us to pay the $12.50 for all the back tests that we had done since the license had been granted—since the patent had been granted. And we received a contract that basically said that we would pay the back amount of money that we owed and we would not send any testing out to any laboratory for canavan disease testing.

The lawyer had sent me this contract and I reviewed it and I said—I called my lawyer and I said, "That means we can't do any canavan testing on University of Pennsylvania patients." He said, "No, that can't be what it means." And I said, "Look. Call them and find out." He called them and, indeed, that's exactly what they meant. We could not send out—we couldn't do ourselves and we couldn't send out canavan testing on any University of Pennsylvania patients. So, of course, my lawyer said, "No, that won't work."

So they sent us a second contract that said we'll pay the back amount of money that we owe. We will notify Miami Children's Hospital Research Institute any time we are sending tests out and we will have documentation in writing that that laboratory has a license to do this testing and if the laboratory we're sending it to doesn't pay the $12.50 per test then we were responsible for paying that. My lawyer got this one by himself and said, "No, we weren't going to do that one."

So finally we got a third contract and said we will just pay the back amount of money that we owe and we will not do the testing in house. So we stopped doing canavan testing and that also had to be sent out but that illustrates the ability of a patent holder to control this medical information to any extent.

(Slide.)

So canavan disease is part of an American College of Obstetricians and Gynecologists recommended screening panel for Jewish women. It's part of a Jewish genetic panel. If you can't do canavan disease testing then you really—it's like the SCA1—you can't do the Jewish panel testing and

this Jewish panel consists of Tay Sach and canavan disease, Gaucher, Niemann Pick. There are a number of diseases that are common in the Ashkenazi Jewish population.

(Slide.)

This was a letter that—this is an enforcement I did not receive but Arupa Ganguly, who was in the Department of Medical Genetics at University of Pennsylvania, received a letter enforcing BRCA1 patents. So BRCA1 mutations increase the risk of breast cancer and mutations are spread out throughout the entire gene. If there's no common—there is no common mutation identified so there are about 17 common mutations. Then you basically have to sequence the entire gene to identify the presence of a mutation or look for a mutation. Myriad Genetics is the patent holder for the BRCA1 mutation and is the exclusive provider of full BRCA1 sequence testing.

This also captures BRCA2 testing because if you can't do BRCA1 no one is going to send you BRCA2 testing if you're not also testing for BRCA1. Myriad will license laboratories for testing of the common specific mutations, the 17 mutations, but not for gene sequencing. So the only place to have the full gene sequencing done in the United States is from Myriad Genetics so Arupa Ganguly had to stop providing BRCA1 testing.

(Slide.)

This is another letter received in 1999 from the University of Michigan that covers the cystic fibrosis Delta F508 mutation. So for cystic fibrosis about 70 percent of the disease mutations are caused—are the Delta F508 mutation which is a deletion of three nucleotides that causes cystic fibrosis, and that's covered by a patent held by the University of Michigan. They were offering nonexclusive worldwide in house diagnostic testing licenses and that was if you were providing diagnostic results to patients at cost or using one of the test kits that had a license from the University of Michigan to provide a test kit.

If every license or every patent was being licensed like this cystic fibrosis Delta F508 mutation, I probably would not be standing up here and we would not be having this discussion as to whether there was an issue that needs to be addressed.

(Slide.)

This is another. This is a draft license agreement. I left the University of Pennsylvania when this was still being negotiated. This is with Invivoscribe Technologies and basically there are two patents that cover testing that can be used for the diagnosis and monitoring of leukemias and lymphomas. So Invivoscribe was basically almost required to take an exclusive license to these patents so they're not the patent holder. They had been making test kits for doing this testing and they were enforced upon by the patent holder so they had to take a license.

(Slide.)

These patents basically cover rearrangements, testing for rearrangements of the B and T cell antigen receptor genes. So when you do this testing you can basically determine whether or not a leukemia or lymphoma is derived from one cell and more than likely, therefore, malignant or whether it's a population of many different polyclonal cells and, therefore, not likely malignant. This can be used both for diagnosis and for monitoring of disease remaining after chemotherapeutic or transplant treatment. So IVS cells the kits for B and T cell antigen receptor testing.

Interestingly, this method has been widely used for clinical testing without the use of test kits since about 1990 and the testing community was actually pleased that IVS was developing test kits because it would offer some standardization of this testing but we were not pleased when Invivoscribe had to start enforcing patent—their license.

(Slide.)

So basically there was no payment required for previous tests as that was what had been done by canavan disease patent holder, Miami Children's Hospital, but we didn't have to pay for previous tests performed. We had to have a license fee that was in the $10-100,000 is the most that I heard from talking

with colleagues, although none of them really talk to me because you're not allowed to talk about this. And then there was a per test fee from $0-60 per test. This varied depending upon whether or not you were using the Invivoscribe kit. So if you used the kit that had the license then the fee was lower and it also depended on whether or not we were doing reference testing, whether we were testing University of Pennsylvania patients or tests that we received from outside sources referred to the laboratory. If we were doing our own patients it was a lower price. So it was zero if it was a University of Pennsylvania patient using the Invivoscribe kit and it was $60 for a non-University of Pennsylvania patient not using the Invivoscribe kit.

(Slide.)

So at that time we were performing the T cell receptor testing by our own laboratory developed method and we were doing the B cell testing using the Invivoscribe kit. The cost to perform each test is approximately $300. That's not our charge. That's what it costs us. So we had no per test for University of Pennsylvania patients in which we were doing the B cell IGH testing. And $40 or $60 per test for the T cell testing, depending upon whether it was a University of Pennsylvania patient. So we would end up paying between $8-10,000 per year plus the license fee charge.

(Slide.)

Interestingly, Medicare reimburses $55.39 for this test. So the $60 per test was more than even what Medicare reimburses so you could argue that this is causing an economic burden for the laboratory.

(Slide.)

So we had to stop doing testing for CMT1a, which I did not talk about, ApoE genotyping, BRCA1 and canavan disease. We negotiated agreements for cystic fibrosis and B and T cell gene rearrangements. We had notification letters that kind of stopped midway in negotiating those for hereditary hemochromatosis and SCA1. And we're aware of potential for patent enforcement for spinal muscular atrophy, myotonic dystrophy, EGFR, Gleevek, BCRAbl mutations and the list goes on and on.

(Slide.)

So I would argue that this places constraints on medical practice. I argue that the sole provider of a medical service basically eliminates competition for pricing, reduces innovation and testing methods, dictates medical practice. So I didn't talk about CMT1a but when Athena Diagnostics had the exclusive rights to do CMT1a testing, they did not want to do prenatal testing for CMT1a. So you can have a provider who decides whether or not you can do prenatal testing for a specific disease or not, whether or not—and you could argue ethically that you may not want to do testing for CMT1a prenatally but the idea that a single provider dictates medical practice for the entire United States, I don't think is necessarily in the best interest of the public health. It places constraints on clinical scientific observation and slows the new discovery process as you basically have one person, one laboratory doing the observations that happen during normal clinical practice. It limits education of medical students and residents, and I would argue is not in the best interest of the public health. There are unreasonable licensing fees, control of one gene controls testing for many genes.

There can be royalty stacking so with the Jewish panel you would have to take a license for Delta F508, canavan disease, Gaucher. There are a number of fees that would be stacked up on top of each other in order to do that Jewish panel testing. One of the patent holders set limitations on test volumes and the IVS case limits the use of methods that are already used in clinical practice.

(Slide.)

So this is—I argued whether to do this or not. This is adapted from something that John Merz did. "The Vatican announced today that it has entered into an agreement with Miami Children's Hospital Research Institute that grants to the Vatican exclusive rights to U.S. Patent #5679635. This patent granted in 1998 to Reuben Matalon at MCHRI claims the gene responsible for canavan disease which causes brain degeneration and death by about age 20. The patent covers both diagnostic and prenatal canavan testing. MCHRI sold the patent to the Vatican for an undisclosed sum. The Vatican's statement

made clear that the church intends to enforce its exclusive patent rights and prevent further use of the test in the U.S. for prenatal diagnosis of canavan disease." This is made up but it is totally realistic that a patent holder does control the ability of how a patent can be used and I don't think that this is a good situation.

(Slide.)

So what is the—why do I care about all of this? Why am I all hyped up? So basically you could argue that it's from my economic standpoint but the molecular pathology lab doesn't make money so I don't come at it from an economic viewpoint. I really come at it from a physician's perspective.

(Slide.)

So current medical genetics are basically diseases that are caused entirely by duplication or deletion of an entire chromosome such as Down's Syndrome or alteration of a sequence of a single gene, which is cystic fibrosis, Huntington disease, spinal muscular atrophy. Current medical genetics focus on diseases due to mutations in a single gene that are inheritable so it could be passed from parent to child. These genetic diseases are very important to affected individuals and their families. However, these conditions are relatively rare. Very few people are affected. It's a relatively small part of medical practice with minimal impact on society.

(Slide.)

And health care for these genetic diseases are provided predominately by medical geneticists, genetic counselors and involvement by other medical specialists such as pediatricians and primary care physicians.

(Slide.)

We are moving toward a different type of genetic or genomic medicine which will be medical practice based on understanding the role of genetic variations in common diseases. This genetic variation information will be used for diagnostics—for diagnosis, for risk assessment of common diseases, for treatment choice, therapeutic monitoring, prognosis, prevention, potentially prenatal diagnosis, pre-implantation testing and pharmacogenetics.

(Slide.)

So if you look at the leading causes of death in the United States, basically more than nine out of ten of these are influenced by genetics. I say more than nine out of ten because if you think about accidents, hedonistic behavior, alcoholism, there are a lot of underlying causes of accidents that also have a genetic basis.

(Slide.)

So by illustration: "Jim Fixx was 5'10", 150 pounds, and a marathon runner, promoted a healthy life style and died at the age of 52 of a heart attack while running. His father had died at the age of 43 of a heart attack."

Contrast with "Winston Churchill, 5'8", 270 pounds, didn't exercise, he smoked, had an unhealthy life style, and died at age 90."

This is the impact of genetics and where we are going with the future of medical practice.

(Slide.)

So in the future we are thinking of genetic medicine more as common diseases affected by variations in many genes with both germ line and somatic variations. It includes any disease identified now by family history plus many that we don't currently take family histories for. It affects virtually every person and it will be practiced by virtually every physician.

(Slide.)

And I argue that gene patents limit this future. National practice standards will be set by one provider. There's no competition for test costs, quality or method. There are limits—it limits the advances in scientific knowledge gained through broad clinical practice and observation. It limits medical education. It limits medical practice and limits broad availability of genetic testing.

(Slide.)

So I have argued and written that a sole provider of a medical service is not in the best interest of the public health so I feel like I'm doom and gloom here but everyone has been e-mailing this last week because the Supreme Court did make a decision on LabCorp versus Metabolite Laboratories.

(Slide.)

Which is this homocysteine related to--elevated homocysteine levels related to the vitamin deficiencies case that we had talked about at the March meeting. Basically they dismissed this case as improvidently granted. So they sent it back down to the lower courts.

(Slide.)

However, I took the time to read the dissenting opinion and I would like to read you parts of this because Justice Breyer, who wrote this, and Stevens and Souter signed on to this dissenting opinion, are very relevant to our discussion today. So he wrote in four different parts and from the first part, "The relevant principle of law excludes from patent protection laws of nature, natural phenomenon and abstract ideas. The justification for the principle does not lie in any claim that laws of nature are obvious or that their discovery is easy or that they are not useful. To the contrary, research into such matters may be costly and time consuming. Monetary incentives may matter and the fruits of those incentives and that research may prove of great benefit to the human race. Rather the reason for the exclusion is that sometimes too much patent protection can impede rather than promote the progress of science and useful arts, the constitutional objective of patent and copyright protection."

From Part III, he states, "One can reduce any process to a series of steps. The question is what those steps embody. And here in this association between homocysteine levels and vitamin deficiency, aside from the unpatented test which they describe as part of this patent, the steps embody only a correlation between homocysteine and vitamin deficiency that the researchers uncovered. In my view that correlation is an unpatentable natural phenomenon and I can find nothing in claim 13 that adds anything more of significance."

(Slide.)

And from Part IV: "If I am correct in my conclusion that the patent is invalid then special public interest considerations reinforce my view that we should decide this case. To fail to do so threatens to leave the medical profession subject to the restrictions imposed by this individual patent and others of its kind. Those restrictions may inhibit doctors from using their best medical judgment and may force doctors to spend unnecessary time and energy to enter into license agreements, may divert resources from the medical task of health care to the legal task of searching patent files and may raise the cost of health care while inhibiting its effective delivery."

(Slide.)

I couldn't have said it better myself.

(Slide.)

So the are some philosophical questions which we could get embroiled in. Should gene patents be granted? So are gene patents really inventions? What has been made by man in these correlations between a genetic variation and a disease? Are gene patents really claiming a product of nature? Now that—I don't know if we want to go there. Do gene patents inhibit or promote the progress of science and useful arts? In this case medical practice. Are patent incentives even needed for discovery or clinical implementation of patented genetic information? I would argue we take this information very rapidly into clinical practice at least for diagnosis. Should exclusive licensing of fundamental medical knowledge be allowed to continue? Is sole ownership of a disease in the best interest of the public health?

(Slide.)

So there are various options to consider and SACGHS may decide that it doesn't have the purview to recommend any of these but the options basically are going to the courts, going to congress to change the laws or changing the practices of the U.S. Patent and Trademark Office.

Some specific things that have been discussed are—one possibility is to exempt medical personnel who perform genetic tests from patent infringement actions. This would basically be an extension of a 1996 law that protects physicians from patent infringement lawsuits when they are using medical process patents but pathologists and laboratorians were specifically excluded from this protection.

There was a bill introduced by Lynn Rivers in 2002. I learned all about the legislative system in that she was not—her district was redrawn. She was not elected and the bill died.

The other possibility is by some mechanism to mandate broad licensing at reasonable royalty rates to prevent the exclusive licensing for genetic tests.

(Slide.)

So I'd be happy to take questions.

Maybe, Reed, you could moderate this little bit because if people have questions for me, I want to be able to wear my laboratorian hat and not my SACGHS hat.

CHAIRMAN TUCKSON: Actually let me just ask one question before you take questions.

DR. LEONARD: No, you can't preempt Julio.

CHAIRMAN TUCKSON: I'm not going to ask a question about a question—about—do you want to take the other presentation and then do all the questions at once or do you want to take your questions now? That's a question.

DR. LEONARD: I think we can go through the presentations if that's okay.

CHAIRMAN TUCKSON: Yes. I think it might make sense because I don't want to preempt—some of the questions may come up and we'll have better questions after we listen to the other presentations.

DR. LEONARD: That's great. Okay.

CHAIRMAN TUCKSON: Then I can do that. So I didn't actually preempt Julio.

DR. LEONARD: Good.

(Laughter.)

So I'm very pleased to introduce Mildred Cho. Dr. Mildred Cho from Stanford University.

Mildred, take it away.

DATA AND ANALYSIS OF THE IMPACT OF DNA-BASED PATENS ON ACCESS TO GENETIC TECHNOLOGIES AND SERVICES

DR. CHO: Thank you.

(Slide.)

Thank you for inviting me here. It has already been very exciting even before I got here like the taxi ride getting here from Dulles but I don't think it was exciting as some of your trips here. I didn't have to ford any streams or anything like that but here I am.

So thank you for inviting me. I'm just going to go through the results of some studies that I did—that I started at the University of Pennsylvania when I was there when Deb Leonard was there and actually the reason why these studies were done was because of Deb Leonard.

When I was at the Center for Biomedical Ethics, she came over to the center to visit me and my colleague, John Merz, when we were over there. John Merz having some background in intellectual property and me having an interest in genetic testing. And she came over with one of those letters in her hand. She said, "You have to study this." So as a result—those of you who know Deb from having been on the committee with her, she didn't go away until we had gotten a grant to go to study this and she was a co-investigator on that grant.

So I'm just going to through the results of some of those studies very quickly and they have—at least the part that I'm presenting has been published. We're doing a little bit more analysis on some of the data but most of it has been published and I think you probably received those papers. So I'm just going to kind of go through the summary of those studies.

(Slide.)

So, as Deb already described to you, what we were interested in is looking at sort of the impact of the patenting activity on both the practice of clinical genetic testing as well as the research and development that went into that. I know you're interested in sort of access issues and issues of clinical genetic testing but, as you probably also know, it's hard to draw a very clear distinction between the research activities that go into developing a clinical genetic test and the actual provision of clinical genetic testing services. And the people who do those activities are often one in the same and it's very difficult to sort of say when you've moved from research to clinical activity. So in a sense we were sort of studying both of those.

(Slide.)

Some of the concerns that Deb had already described to you are what we ended up looking at, including issues about the cost and access to testing services, as well as the ability to conduct research and development to improve clinical genetic testing services. As well as possible concerns about whether intellectual property protections might actually be insufficient in some cases and perhaps provide not enough incentive for development of new genetic tests.

(Slide.)

So I'm just going to go right into describing some of the studies. There were two studies that we did which were studies of laboratories like Deb Leonard's in the United States where we were looking at the impact of patents on those laboratories and their ability to provide clinical genetic testing services. This is one of them.

(Slide.)

And one of those two was a particular case study looking at the provision of one genetic test in particular and the case was on the provision of hemochromatosis.

(Slide.)

And then finally I'll just go very briefly at the end into a couple of studies we did looking at how patents related to DNA based inventions have been licensed.

(Slide.)

So for the two surveys we had similar methods. They were both done as telephone surveys of laboratories providing clinical genetic tests in the United States as ascertained by gene tests and the membership in the Association for Molecular Pathology in the United States.

(Slide.)

And as it turns out there's actually not that many labs in the United States doing clinical genetic testing. As far as we could tell, about 200 or so. Just over 200. So we could actually try to sample the universe of that sample. And so we—for the first study where we were going to ask questions about clinical genetic tests performed by—all the clinical genetic tests performed by these laboratories, we were able to get 60 percent of the labs to respond.

And of those respondents—we included 122 laboratories who conducted clinical genetic tests. Some of them were eliminated because they did not perform the kind of tests we were interested in, not performing DNA based genetic tests. And of those 122 that we included in the sample, all but one conducted testing for clinical purposes. That one said that they were just doing testing for research purposes.

(Slide.)

So of those testing labs, the majority of them had been contacted by a patent or license holder with a letter like those that you saw from Deb. So this was back in 2000-2001. So this is a few years ago and so most of the labs had received a letter like the ones Deb showed you.

And a significant proportion of those 122 laboratories said that a patent or license holder had prevented the lab from continuing at least one test service. So that's a quarter of the labs and that again was a few years ago.

Seventeen of the 30 labs that had reported being prevented from continuing a test service had been prevented from providing one test but 12 had been prevented from providing more than one test.

And, interestingly, the for profit testing companies were more likely to report being prevented than university laboratories and that may have something to do with the volume of testing that Deb mentioned.

(Slide.)

So if we look at the tests that they said they had been stopped from being performed, you'll recognize many of these from the talk that Deb had so I think that many labs had gotten the same letters about the same kinds of genetic tests so you'll recognize BRCA1, ApoE, canavan disease, SCA, Fragile X and so there were very specific tests that were being prevented from being performed.

(Slide.)

And so when we looked—we went and decided to look a little bit more at the characteristics of those tests and how many labs were doing those particular tests because we were thinking, well, maybe these are tests that more labs do because they are of more clinical interest or there's higher volumes or more reason to do these kinds of tests. So we did look at how many tests that were being done by over 10 labs and all 11 of those tests that I had on that previous slide were being done by a large number of tests.

Many of the genetic tests that you know about are done very—on very rare conditions and so there may only be one or two clinical laboratories in the whole United States doing those tests because there's maybe only ten people in the country at any given time that have the condition that is indicated. So all the—but in contrast all the things on the list on the previous slide there were things that were done by a larger number of labs.

(Slide.)

And there were 14 patents relevant to the 11 tests that you saw on the previous slide. Most of those were held by universities, not for profit companies, and seven of those or half of them were—the patents or the inventions were made as a result of research funded by the government.

(Slide.)

So, as I said a couple of slides ago, a quarter of the labs said that they had been stopped from using—performing a test that they had previously been performing as a result of the patent enforcement. Half of those labs had decided not to develop or—well, not half of those labs but half of the labs in the sample decided not to develop or perform a clinical genetic test because of a patent. So in addition to labs stopping performance of a test they also halt their development of new tests because of the possibility of patent performance. And there was no significant difference between companies and university labs in their response to this question.

(Slide.)

We were not able to look directly at issues of cost and access on a per test basis because some of that information is very difficult to get. As you saw from Deb's presentation, sometimes or almost always the licensing agreements that are struck between patent holders and the licensees are confidential. So it's very difficult if not impossible to get the actual terms of licensing agreements because of these confidentiality restrictions. So we tried to get information as best we could from laboratory directors about how they had personally been affected in the performance of their laboratory testing both on their own ability to provide tests, develop tests and also provide those tests to their patients.

(Slide.)

So we asked about their opinions on the effects of patents on their ability to—the patient's ability to access testing, whether the costs had been—had gone up or down, whether they felt there was any impact of patents on the quality of testing, their ability to develop new tests, to share information with other laboratories on how best to do these tests, or to do research.

And, as you can see from the responses here, these are the absolute numbers of lab directors responding to these questions. Their responses were on the whole overwhelmingly on the negative side,

meaning in terms of access lower access, higher costs, lower quality. Zero in the middle here means neutral. So lab directors were more neutral on the issue of whether patents had an effect on the quality of testing but again negative in terms of their ability to develop tests, share information with other labs or do research. So we think there has been—at least on the basis of this information, it looks like lab directors are not—are not happy about the effect of patents on their ability to perform and develop new tests.

(Slide.)

And, furthermore, it looks like the patents and licenses have affected tests that are most commonly performed. At the end I'll show you a little bit of data from other people who seem to have found similar things.

(Slide.)

And some of these patented tests have resulted from government funded research, although not all, so there may be some reasons, which I'll go into after the next slide, that may impact in terms of the policy options that we might want to think of on the basis of this kind of information.

(Slide.)

The second study was looking at the patents on the—the effect of patents on the HFE gene, which is associated with hemochromatosis, and this gene was being researched by a company called Mercator Genetics, which spent a lot of money developing its own method and discovering the association between HFE mutations and hemochromatosis.

Three patents were issued to Mercator in early 1998 for genetic testing of two of the more common variants but Mercator went out of business and Progenitor merged and was with Mercator and was assigned its patents. So it took over these patents for the hemochromatosis testing.

(Slide.)

Progenitor then licensed those exclusively to SmithKline Beecham for an up front payment and this exclusivity and payment guarantees were continued until a kit became available for use by clinical laboratories.

So SmithKline Beecham began enforcing those patent rights in 1998 and you can see the terms that were offered to other labs were similar to those that were offered to Deb Leonard in her lab.

In the fall of 1999 this diagnostic test was sold to Quest and during that time and for some years afterwards there was not active enforcement of these patents.

(Slide.)

A couple of years later Bio-Rad began offering a test kit for these two mutations and was offering to license this to perform testing without its kits but at a fairly high cost. And so again up front payments and per test fees were involved if you required a license for this.

(Slide.)

So at this point we were already contacting laboratory directors to survey them so we asked them specifically about this particular set of patents and almost half the labs that we had contacted were performing the HFE testing at that time. There actually had been more labs performing the tests but some of them had discontinued that because of the possibility of patent enforcement.

As you can see, almost half the labs had received a letter of patent enforcement from SmithKline Beecham at that point.

(Slide.)

So as I said a quarter of the labs had not developed and were not performing the HFE test because of that patent enforcement and only four percent had stopped performing the test at that point but more had stopped performing it afterwards.

(Slide.)

So over half of the labs, 60 percent of the labs that were performing that HFE test had introduced performing the test before the first patent issued in 1998 but after the critical paper about the association between the mutations and the disease had been published in 1996.

So you can see that this is a very rapid adoption of this test after the publication. So almost immediately after publication and with a mean time from publication to adoption this test was adopted in an average of 14 months after publication. This is very rapid compared to if you think about drug development, for example, from the time of finding something that is a patentable invention, some kind of discovery, to go from discovery to clinical adoption. A drug would probably take more like 14 years than 14 months.

This is very rapid and very different from the sort of pharmaceutical development model where—if you think about the—when you think about the policy options, again this is something that should be taken into account as a major difference in diagnostic testing between this and drug development and the impact of patents or even the necessity for patents in that procedure.

(Slide.)

So this is just a graphic to illustrate some of the major time points in the development in the patenting and the most important things to look at are you can see where the paper was published here at this time and this line indicating the number of labs starting to use the test and where the patents were issued. So many of the labs had already adopted the test before the patents were issued.

(Slide.)

So on the basis of these studies we do think that patents and licenses have had a significant test on provision of clinical genetic testing services at least as ascertained by surveying lab directors. We are not able to get data directly on the provision of individual clinical tests as they get passed down from reference lab to reference lab. So we don't know whether the total volume of tests has decreased or the total price of those tests as experienced by patients has been increased, decreased or has prevented individual patients from getting testing because from the patient's perspective this process may not be apparent to them. They may not realize that their tests have been referred from one lab that doesn't have a license to another one that does and so forth.

But as seen from the laboratory directors' perspective, it does appear that the impacts on costs, quality, access and further research on these tests have been largely negative for patients from their perspective.

(Slide.)

At least for some tests labs don't appear to require patents as an incentive to develop findings into clinical practice on a rapid basis. Again this is in contrast to, for example, drug development.

However, patents may provide incentives to conduct research necessary to identify genes associated with disease and so, I think, in this—what this illustrates is a sort of difference in providing incentive for research to get to the invention as opposed to the necessity for patents to provide incentive to do post invention research. So if you think about sort of the finding of an association of a disease with a gene as the invention, it may be necessary to provide incentives to get to that point but for clinical genetic testing to get from that point of discovery to providing clinical services is something that does not necessarily have to require lots of investment to get to from R&D to the—to get through the R&D process.

Part of that is obviously because if you're developing a drug, the regulatory hoops that you have to jump through compared to providing a clinical genetic testing service are very different. If you're providing a kit there's more regulatory burden and more development that you have to go through and more costs but it's still quite different from drug development.

(Slide.)

I'll just talk very briefly about some of the licensing studies that we did. These were not done as a study of laboratory directors. Here what we did was identify in the patent database institutions that held patents in particular—in a particular class that was relevant to DNA tests. So what we did was select the class 435/6, which is a class of inventions that were—that are considered molecular biology inventions that involve nucleic acids. And then we selected the subset of those that had sequence identifiers

included in the claims where DNA sequence is provided.

Then we identified all the institutions that held—that were assigned three or more patents in that class and it turns out there aren't—at least at the time that we did the study there weren't that many of them. There are many more now but we identified approximately 100 institutions holding patents in this class at that time.

(Slide.)

So we interviewed 27 non-profit institutions and 19 for profit institutions of those and people at NIH.

(Slide.)

And asked them about licensing practices of the patents that they held in that class. Interestingly, when you look and analyze these institutions broken down by nonprofit and for profit institutions, the behavior of the patent holders is very different when analyzed this way. A very small proportion of the disclosures that are received by nonprofit institutions are actually filed as patents. Whereas in for profit institutions almost all of those possible inventions—inventions that are possibly patented are actually filed.

On the other hand, the behavior in terms of licensing is the reverse. So the nonprofits tend to license exclusively once they have a patent. Whereas, the for profit institutions tended not to provide exclusive licenses.

(Slide.)

There was also very little agreement among our license holders and there wasn't a difference between nonprofits and for profits about what constituted a research tool versus a target. So some of the quotes that we got in these interviews are here. One person said that a drug target or disease diagnostic is not generally considered a research tool. Another one said that genes are drug targets—that genes that are drug targets are viewed by large companies as research tools but small companies feel that they are not research tools.

So this is just a couple of quotes out of a whole number where it was clear that one person's research tool is another person's target basically. This is also a reflection again of the difficulty with creating a clear distinction between sort of clinical practice and research especially in the area of DNA diagnostics.

(Slide.)

So overall from this and other kinds of studies that we've done on patent holders of those that have DNA based patents, these inventions may not be controlled by—most DNA inventions may not be controlled by a patent and an exclusive license, especially in the nonprofit sector. So there may be many things that are inventions that could be patented but perhaps are not. But if those are—inventions are patented at a nonprofit university, for example, they are likely to be exclusively licensed.

And clinically important patents on diagnostics may be more likely to be subject to patents than those that are not and you could kind of see that from both Deb's information and from what we found in our surveys.

(Slide.)

There haven't been—as far as I can tell in the literature—other studies of the impact of patents and licenses on clinical practice per se but many others have looked at DNA based patents and the impacts of those. One recent study was looking at patents on the human genome overall. That was published in Science last year. And they found that nearly 20 percent of human genes are claimed as U.S. intellectual property.

(Slide.)

And they found that 63 percent of these are held by private firms and 28 percent by public entities but the distribution across the genome—so if you actually map the patents to the genome you could see that the distribution is, as you would expect, uneven. So, for example, of 291 cancer genes that they

located throughout the genome, 131 of those are patented. These three genes here, BRCA1, et cetera, were in the sort of highest list for number of patents. So you can see that the patents tend to cluster around things that are of clinical significance as one might expect.

(Slide.)

So those are—that's the end of my presentation. I think we're going on to other questions later.

CHAIRMAN TUCKSON: We'll get to the questions. Thank you by the way. Well done.

DR. CHO: Okay.

DR. LEONARD: So it is—thank you, Mildred.

It's a pleasure now to introduce Dr. Mark McCamish, Chief Medical Officer from Perlegen Sciences, who will give us more of an industry perspective.

Welcome.

THE ROLE AND ECONOMIC IMPACT OF GENE PATENTS IN DRUG AND DIAGNOSIS DEVELOPMENT

DR. McCAMISH: I believe I'm here representing the dark side of the force.

(Laughter.)

The only thing I was fortunate to is have the schedule rearranged so I wasn't presenting after the snacks so you guys could have food to throw at me.

(Slide.)

In reality, what I'm here to talk about is perhaps the future of using genetics as we're trying to help patient care. As Dr. Leonard mentioned, she was talking about single gene defects and a lot of work that is going on. I'll be talking almost exclusively in my presentation about multiple gene areas or polygenic contributions to disease or drug response, and the absolute need for patent protection to support this research as we go forward in really trying to enter the future of using genetics to help with patient care.

Now Perlegen is a pre-IPO company. It's a private company. Right now we don't have any products so I'm not trying to sell a diagnostic and I'm not trying to sell a drug. We've conducted a lot of research in the area of looking at polygenic contributions to various disease associations. And Francis Collins can testify to the work that we've done in contributing to the science and contributing to the HAPMAP, et cetera.

I will have to confess, however, that with our work, which has been with a lot of the big pharma companies, we've not been able to make traction to get them to move this area forward as fast as we would like, probably because in reality they see that by targeting a patient to drug treatment that the perception in the marketing arena is that you will sell less product. So we are entering some of these difficult times with our collaborators. Therefore, we have licensed in drugs because we felt that it is the way that we can push the technology forward to apply this polygenic approach to improving patient care. So those are my claims as we move forward.

(Slide.)

As you all know, genetic variation is responsible for all inherited components. The one thing I'll be talking about now is variability in drug response and that's what we'll be talking about. I'm trying to introduce the technology and a little bit about how it's used so that you can get a background into the importance of intellectual property and patents to advance this science.

(Slide.)

As you know from a standpoint of drug development, and that's my background is drug development for the past 20 years, one size fits all is not working for everyone. In terms of patients, drugs are not precise, oft times it's too long to get the right drug or the right concentration, the right dose. Many patients don't respond at all to drugs and if you're dealing with antidepressants a patient can be on an antidepressant for four months without having any benefit to that drug, and patients certainly are suffering.

Drug companies are not falling forward in terms of using the advancements in science and they're not winning enough. They are playing these billion dollar bets. And as we saw yesterdays from Janet's presentation, even half the time you enter into Phase III with a program that's costing you $800 million, half the time you fail. So the blockbuster model is dying and many stalled drugs are even better than existing drugs for treatments of a subset of people. This is an important point for patent protections. Let me just expand on this.

(Slide.)

If, for example, a company spends a lot of time working on a drug, taking it to Phase III, and then the product fails, at that point in time you have lost a substantial amount of patent protection because you've taken, let's say, 10-12 years of developing that drug. If you then have to rescue that drug, by the time you take a genetic targeting approach to taking that drug forward, when you get out in terms of launching that drug, you may only have three or four years of patent protection.

If, on the other hand, you can link that drug to a genetic test that subclassifies a specific patient population and you gain that intellectual property, you can expand the potential protection of that drug for many years and that would allow for industry to then support the further development of the targeted treatment.

(Slide.)

Why are we dealing with this area? We really are focused on improving patient care by better selection of therapies, getting the right patient on the right drug. We feel this can change the health care paradigm. We've seen this in the oncology area with herceptin. We're working in the non-oncology areas, metabolism, cardiovascular disease to try to do the same thing, and we think it can capture sustainable market value if you can have some exclusivity.

How? Identify genetically important questions where there's genetic variability in drug response. If there's no genetic variability in drug response then it's not worth pursuing.

We do this primarily by minimizing adverse events or excluding non-responders and we think this can impact the science and add science to the art of medicine. As you know, when physicians prescribe medications it's based on their past history and the mechanism of action but they still can't predict how that drug will respond in that particular patient.

(Slide.)

So what I'll talk about today are these bullet points that in a polygenic pharmacogenomic diagnostic you're really talking about a probability assessment. It's not an exact diagnostic. It's not like HIV or HCV where you have to have a 99.9 percent positive predictive value and negative predictive value. It's a probability assessment.

In our view options to care must exist. Because it is a probability assessment, if you only have one drug to treat and there's no other options, why do you want a probability of that drug working or not working because there's only that one option? However, if you're in the field of let's say diabetes and there's five different drug classes and you can give an idea to the physician that that particular patient would not respond well to a specific drug class then perhaps you have an option that you can utilize.

Therefore, the results of that diagnostic should alter patient care.

The clinical utility of the probability assessment must be valid, and that's something that FDA is working on. How do we deal with the validity of that predictive market?

What I'll get down to is reimbursement is key. The single test generates less value in this situation because it's not a multiple diagnostic test. In other words, it's not like glucose where you have a diabetic and you have to check glucose on a routine basis or hemoglobin A1C where you check on a routine basis. But a genetic diagnostic, it's a one time test. It's hard to create value on that one time test without charging a substantial amount for them.

As it turns out, the approved label is critical and I'll talk a little bit about that. It's not only the patent that you have, it's not only the information that you can publish but it's the label that you're able to

garner specifically when you're dealing with drug.

And then incorporation in the clinical practice has many barriers that we've already seen. There are labels out there with drugs that have a recommendation that the patients should be tested but it's not mandated, and those tests are not often used by clinicians to understand, let's say, drug metabolizing enzymes for particular patients. So there are barriers that we have to go through.

(Slide.)

So back to this area about probability assessment. This is just simply a Gausian distribution. If you consider this, let's say, response to an anti-diabetic agent, so on this axis this would be decreasing hemoglobin A1C, a measure of glucose control, in patients here. So a Gausian distribution and I've just plotted out two genotypes.

For those of you in the back who can't see, the yellow area here I'm calling Y genotype. This would be what we would classify as non-responders. There is-essentially the mean response is a little bit less than no change in hemoglobin A1C after treatment.

The gray is a genotype X that we would call responders.

The only point here is that there's an overlap. This is not a precise diagnostic. You will be a responder or you won't be a responder. It's a probability assessment and then it provides information to the clinician about making that judgment call on the drug that they would use.

(Slide.)

And here's an example of a probability that's in an existing label. This is Meridia currently marketed as ibutramine by Abbott Laboratories. Basically what happens is if you treat patients with this drug--it's a weight loss drug, if you treat them for four weeks and they lose four pounds of weight, they've got a 60 percent probability of going on and achieving clinically significant weight loss, which is five percent initial body weight. However, if you treat for four weeks and they do not lose four pounds, they've got an 80 percent probability of not going on to achieve clinically significant weight loss.

The point is that you have to treat the patients for four weeks before you know this probability assessment. We feel you can use pharmacogenomics in this way testing across the broad spectrum of genes to find out if a patient has a probability of responding or not. That's the benefit here is that you could get this type of a probability without treating the patient for the first four weeks and this would enhance not only patient care but it would be beneficial for sales of this particular drug.

(Slide.)

The question becomes who will order this particular test? Who pays for it? Who is interpreting the test? This is where all of your background really comes in, whether it's genetic counselors and helping individuals understand this probability assessment or in terms of ensuring that there's reimbursement.

These tests must have clinical utility. There's two publications that I'm mentioning here. One from China showing a striking association with one allele with carbamazepine induced Stevens Johnson Syndrome, a very severe dermatologic manifestation or adverse event to this drug. And they showed a very high predictive power, 93 percent positive predictive value, 100 percent negative predictive value. The problem was that there are only eight cases of Stevens Johnson Syndrome per one million patient years. So you're not going to test all of China to find a few of these patients. It's not very useful in terms of the cost of screening, et cetera. It's scientifically very relevant.

The second one is Chasman published looking at two SNPs that were significantly associated with reduced efficacy of a statin therapy. In this case patients with a single copy of the minor allele had a 22 percent smaller reduction in LDL cholesterol. It wasn't that they didn't have a reduction. They just had less of a reduction. So in this case the physician would not avoid treating the patient if they did this test. They would just have a prediction of less of a response. So what we're trying to do is get multiple genes that are predictive and then in an additive sense give the clinician advice about whether to use a particular drug or not.

(Slide.)

So how is this discovered? When I show this slide it reminds me of a trip I took to Mexico City. They've got a law there, just like in California, where you have to wear a helmet when you're riding a motorcycle. I was in Kentucky recently at the University of Louisville doing a presentation and there they don't have the law so it's not that big of an issue but in Mexico City this was actually one of the last World Cups I was driving. Everybody was crazy and screaming about this but all the people riding a motorcycle had their helmet on their elbow as they were driving around. So the law stated you had to wear a helmet but it didn't say where.

(Laughter.)

So finding these and applying this is almost that difficult. We've got to not only have the technology but we have to be able to apply it in the right way. I'm going to use genotyping as a technology to serve as an example of the importance of patents and exclusivity. There's all sorts of other technologies, proteomics, expression profiling, things of that nature, these are tools and genotyping is simply a tool to use as we go forward.

(Slide.)

The goal here in terms of genotyping is to understand that we've got 3.2 billion base pairs in a genome and the variances between individuals is less than one percent of that or .1 percent, and with that we're primarily focusing on single nucleotide polymorphisms. There can be between six and ten billion of these common single nucleotide polymorphisms. Ultimately we want to end up with a test of let's say 10 to 50 of these polymorphisms because it's polygenic that give us information about the predictive power of either the patient having a disease or responding to a drug. There's a process of getting to this that is quite onerous and many people when they look at this in terms of the numbers think that we just don't have a prayer of a chance of finding these 20 SNPs out of eight billion as we go forward. But the technology is improving and we do have some technologies necessary to find this.

(Slide.)

Let me give you an example of a risk stratifier, and this will point out again some of the importance of patent protection. If you are looking for a risk stratifier for myocardial infarction, we already know that subjects with a comorbidity such as hypertension, diabetes, hyperlipidemia are already at risk for myocardial infarction, and these patients that you treat with these types of drugs for these indications are already at high risk. But which subset of these individuals that you see in patient—are seen all day in clinic with these types of diagnoses, physicians are judging patients' care and medications and balancing it. There are many classes of medications available for treatment of these diseases and multiple drugs are often required for the treatment of any one of these. Evidence exists that optimal control in each area is associated with less events, less MIs if you have better care.

Also, multiple surveys reveal that these diseases are not adequately controlled. Hemoglobin A1C is not controlled as well as it should be. Blood pressure is not controlled as well as it should be. Can we find out what subset of the population should be optimized with currently available treatment so that those individuals at greatest risk, perhaps the clinician can spend more time with them in terms of adjusting these medications trying to get them as normal as possible.

Having a patent around that diagnostic test would be important because you don't control the treatment of the drugs or reimbursement based on those drugs.

(Slide.)

The way this is done--and the reason I'm illustrating this is simply the cost of doing some of this research. The way that we are performing this research is we take individuals that have, let's say, myocardial infarction and individuals that don't. In this case we have between two and five hundred cases of myocardial infarction, two and five hundred controls. And in this case the control for myocardial infarction is really critical. You can't just have individuals like Jim Fixx who are healthy and are running around one day but in the next day they have myocardial infarction. The control is probably more

important. You have to have people that have undergone angiography and show no coronary disease and that's your control that you're looking at. So finding those patients, five hundred of those individuals is very costly and expensive. So you get those individuals and in our hands we have a couple approaches but basically we're using either 1.5 million of these SNPs or a subset of these tag SNPs in the cases and controls, and comparing them statistically to see if there's an association between SNPs of interest and that event or that disease.

The difficulty is that the single study association gives you no value because there are so many false positives that are there. You've got to replicate it in some way or validate it in some way to then find those SNPs that are predictive. These become the diagnostic tests. All the work that we're doing in these huge wafers and arrays is exploratory and the diagnostic test can be a very simple five SNP genotyping array but that's the process of discovering these.

Just in finding some of these characterized phenotypes can be multiple millions of dollars as you go forward so you can see the cost of investment is fairly substantial.

(Slide.)

Now even after you do this and you provide this information, would that test generate value? The value of the diagnostics—they are extremely limited as I mentioned because it's a one time test and due to this fact most tests are expensive. The expense may preclude general use for guidance on aggressiveness of treatment, particularly with the genetic drugs and so reimbursement becomes key. Even who performs the test. Is it the physician that asks for the test? Is it a central lab doing the test? Is it a pharmacist that actually orders this and then uses saliva, for example? Who reimburses the genetic test? And how do you market this test once it's approved?

It can be perceived purely as a barrier to the physicians as they have to write a test before they figure out which drug that you use. So without exclusivity and patent protection, this approach really won't be pursued. People aren't going to fund this type of research without at least some basic protection.

(Slide.)

FDA, as you saw from Janet's presentation, is supportive about combining diagnostics with drugs and published this concept paper. They realize the value of having this additional information to judge the benefit and risk of treatment with this type of a drug.

(Slide.)

So let me give you an example of a drug diagnostic development approach to decrease an adverse event. So we talked about using genetics to look at predictors of disease so you know which treatment to use. This is looking at an adverse event. So let's assume that your goal was reduce a class effect adverse event by 50 percent and simultaneously introduce a new drug in that class. So this is a diagnostic drug co-development process.

In this case the adverse event was not immediately life threatening. We talked about reducing adverse events by a certain percentage but not eliminating them because genetics can't predict with 100 percent surety.

Other drugs in the class are available for treatment of this disease and outside this class so there's options.

Providing information to the physician about the increased risk of this adverse event would allow other options to be explored.

And this requires simultaneous development of a diagnostic with the drug and also requires identification of an acceptable diagnostic prior to entering in the pivotal trial. And the reason I'm going into this is also talking about the difficulty of producing these data and without patent protection, people won't be pursuing it.

(Slide.)

So this is the type of an approach. This is a very simple trial approach that one would utilize in

trying to look at both getting approval for the drug as well as for the diagnostic and, theoretically, by doing this you would create this intellectual property or patent portfolio to protect this use. Most drugs you would then—you would stratify based on treatment with a placebo or the drug itself.

Here you're doing a pharmacogenomic test. What you're trying to do is provide this clinical utility for that diagnostic test at the end. You stratify patients for high risk of the adverse event versus low risk. In each strata you then randomize to drug treatment or placebo treatment.

At the end of this type of conduct you can look at a primary efficacy analysis comparing the placebo and treatment of low risk patients which you think is what your label is going to reflect.

The safety analysis looks at all patients as it usually does and then the diagnostic clinical utility analysis compares the percent of adverse events and the group at high risk for the adverse event given the drug versus the individuals at low risk for the adverse event given the drug. The replication in this situation might require an additional Phase III program.

All of this is done to generate that intellectual property but it's also done to generate the label that is necessary to restrict the use of the drug.

(Slide.)

So the patent—the diagnostic itself is not sufficient. It's almost like a polygenic test. One gene is not sufficient to have a high probability of the disease. The patent alone is not sufficient but it's important. The clinical utility must be adequate to convince FDA to restrict use of the drug only to those people tested.

Let me give you an example of an even extending the use of drugs if you would provide this type of information. Yesterday you had a discussion about what you could recommend to the Secretary about stimulating the use of this technology. One thing you could easily recommend is something similar to the pediatric exclusivity where industry are granted an additional six months of exclusivity if they provide information about pediatric testing, pediatric labeling. You could suggest the Secretary do the same thing, the same approach where you provide an additional six months or year of exclusivity to companies that provide this type of pharmacogenomic information, subsetting of their information regarding their own drug. That's one way that industry could do that.

(Slide.)

So the IP will not predict use of the drug without use of the diagnostic in this case. Reimbursement is not likely if the test is only informative. That's the problem we're running into now. Clinicians are resonant to adopt a technology that is only informative. There are current drugs that have recommendations for drug metabolizing enzyme tests and they're not used.

The threat of litigation I put in an alternate color because I don't enjoy the threat of litigation just like Debra doesn't enjoy receiving some of the letters that are there but it may be an incentive for clinicians to adopt.

And incorporation of clinical practice has many barriers that can be overcome by a label if the label suggests or demands that you use this prior.

(Slide.)

So the genetic diagnostic targeting efficacy could also be useful and it provides that you have options that are available so this allows subjects to be assigned to beneficial treatments sooner. Instead of just getting more subjects on this same drug, more appropriate subjects are being treated and others who would not benefit can also be treated with other therapies.

(Slide.)

And due to time let me just skip through this.

(Slide.)

And talk about the benefits of genomic and proteomic research and the NAS document that was put together. The recommendations by the committee on IP, again from my viewpoint, were excellent. They're informative overall, concurrence with most of the recommendations. I have additional

suggestions.

Recommendation 7, I would suggest that they add "industry scientists" in developing these technologies to the Patent Trademark Advisory Committee. That we also endorse the utility of a standard that patent applicants show specific benefit in currently available form so it's not just patenting a gene or a protein but what does that gene do. What does it predict?

And then recommendations 10 through 12 on the validity, features, properties, inherent characteristics of the invention or the diagnostic, what they were suggesting is a way of then independently validating. I guess I struggle with that from the perspective of when we're looking at these and trying to validate them clinically and getting a label approved for its use that's usually under the FDA domain right now when you're using a pharmacogenomic marker to use or not use a drug.

We don't often ask for independent verification of drug efficacy. If the drug is approved there's not another independent board doing a verification of that so I struggle with that recommendation.

(Slide.)

So my view on this is how do we lower the barrier to routine use of these types of activities, of these types of tests?

FDA support and the Critical Path Initiative are critical.

Finalization of this co-development guidance would help industry as they move forward and patent protection of discovery of validated genetic and proteomics is really critical to provide protection for the investment in the research necessary to go through the multiple steps of getting these things out in the clinic.

Education of the patent office on this emerging science.

Continued NIH support of basic clinical science. The new translational medicine efforts now, I think, are critical.

Also, supporting anonymous access to samples for exploratory research. The guidance document we talked about yesterday for consent of iv diagnostic device studies.

And then also continue to focus on reimbursement, which you guys have already discussed. How do we improve reimbursement for these tests? So Debra is now having difficulties getting the tests done because of reimbursement. They reimburse an adequate and validated diagnostic as we go forward.

So those are my comments in terms of focusing on these particular areas and, hopefully, that will contribute to the discussion we have.

Thank you.

DR. LEONARD: Thanks, Mark.

Mildred, Mark and I are going to sit down there and I'm going to be a panel member for this next panel discussion and Reed is going to head up the discussion. I'm going to take my nametag and go down there.

FULL PANEL ROUNDTABLE DISCUSSION

CHAIRMAN TUCKSON: I want to thank her for that and I want to make sure it's very clear. I'm really urging Debra to have the freedom to present her thoughts and ideas not constrained under the role of panelist but in her role as expert on this topic. So she is clearing changing roles and I want her to do that.

Julio was first from a way long time ago and then after that Francis, and then we'll do Cindy and then Kevin.

DR. LICINIO: I had my initial question followed by another one, which is that the use of the testing is very important and the three of you gave wonderful presentations. One thing that I think is even more of a problem than what has been discussed is the technology has evolved and will continue to evolve very fast so let's say some of the things that Francis was doing in the lab like 30 years ago nobody would be doing today. We are doing things much more efficiently. So this idea of doing like one genetic test and one by one for each disease separately and charging for them as individual tests is technically in

the process of becoming obsolete. So let's say you could put all of the tests on a chip or let's say at least all tests for a whole—like for all neurological—neuropsychiatric disease or for all heart, metabolic, endocrine diseases in one chip, and that would be much easier to do and much cheaper to do.

But I see that what you guys presented as roadblocks in terms of the patent holding is not only a problem for the present but it's going to be a major roadblock for kind of technology development and making these things available in the same way that you would have for other types of genetic testing for research. How can the technology evolve with this roadblock in the middle?

I understand that the company is going to like invest so many million to develop something but what you said towards the end, Mark, let's say that you come up with these five markers for one disease or for one condition. It's kind of—now the Amplichip is like testing for two genes. It's kind of almost stupid to put like an Affymetrix chip testing for two things so you could put 200—2,000 tests there.

So if everybody is charging then I think it's going to become completely prohibitive and how do you handle—what's going to happen in the future?

DR. MCCAMISH: Thank you.

(Laughter.)

It's a great question, Julio. Yes, multiplexing is obviously the future. One way right now we're looking at 160 million tests so it will be unlimited in terms of what things can do as the technology advances. I think as we move forward you have to provide some flexibility in both areas. How do you provide incentives for research to move forward and how do you provide for adequate health care and the use of the diagnostic?

Right now the big issue is showing these polygenic associations with the disease. Those are hard to do in finding sufficient SNPs that give you enough clinical utility. I mean for us to find a single gene associated with one of the phenotypes we've been talking about is pretty straight forward. To find enough genes and a polygenic trait to be useful is difficult but all of those would be for one particular.

So let's say that you then had a predictor of diabetes and a predictor of let's say cardiovascular disease and you wanted to use that on a single patient, your question is, well, if two people own that patent, how do you deal with it. It's just something that we'll have to evolve with and if there's adequate use of the test and the cost of the test can be lower so that anyone who spends money on research can allow that to happen, and to me this is not real new.

I mean being as part of the industry and part of research the whole time—I've never been in a marketing or sales position—it always drove me nuts when you would finish this 14 year program in developing a drug and you hand it over to marketing, and the pricing is not based on the most people you can treat. The pricing is based on what the market will bear. What's the most money you can make with the drug? I'm not here to say that's right. I'm just saying that's what's done.

There's a balance and how do you make that balance of doing the research, getting treatment out there but then expanding it to the most patients is a question beyond that.

CHAIRMAN TUCKSON: Let me just make sure that we—right now the order is Francis, Cindy, Kevin, James and Emily but I want to make sure, also, that Debra and Mildred have an opportunity also to dialogue with each other. So would you please feel free to interrupt each other if you have a comment that's relevant to the comments that are made. Please do that without permission.

DR. LEONARD: Well, I would like to respond to Julio's comment/question. It's one thing if a company has genetic information and makes an <u>in vitro</u> diagnostic test kit and sells that to laboratories to be able to do testing. I don't know what your plans are, Mark, for these five to ten markers that you find, whether you're planning on being a reference laboratory or making <u>in vitro</u> diagnostic test kits that will go through the FDA and then be sold to laboratories to be performed.

We don't really have a problem as laboratorians with that approach to the diagnostic testing and probably then that information will be proprietary. We'd have a black box test which doesn't always make us comfortable because we're used to be able to know how it works and that kind of thing. But

then that test can be broadly provided by a number of laboratories. There can be competition for pricing and you would set the price or a company would set the price of that testing but that's much more palatable than a single provider of a laboratory service.

We have test kits that are provided for our chemistry tests, for our hematology tests, and we—there's competition for pricing, et cetera, and we use those test kits.

So I would imagine that much of the genetic testing like Julio was imagining would be in the form of in vitro diagnostic test kits developed by companies and sold broadly to laboratories which doesn't raise as much concern in my mind, although I wonder if the companies would have the problem with the cross licensing issues and whether it puts limits on a company's ability to do more broad diagnostics than the single gene or whatever they can get the patent rights to use.

DR. MCCAMISH: Let me just respond in terms of that. For our plan what we've determined, bad or good, is that it's hard to make money with a diagnostic. With all the investment we're putting in—

DR. LEONARD: We have the same problem.

DR. MCCAMISH: --it's—

(Laughter.)

DR. MCCAMISH: --I mean I feel for diagnostic companies in this term. The only way that we think we can make a profit is to, in fact, support the use of the—pay for the diagnostic so that more patients are screened and more could theoretically be exposed to the drug. So the revenue we would get would theoretically be through the sales of the drug and not through the diagnostic itself. We'd be supporting the diagnostic.

But let me get to one point and you brought this up a couple of times, and that is price competition for you and other labs doing a different test that may be patented and that you could do it cheaper and, therefore, it's better. I mean, to me, that's almost like if you take Lipitor—I mean there are a lot of companies that can make Lipitor cheaper and there are pharmacies that can compound it and there are people that can tablet it but that's inherently against, I think, having that proprietary position with that exclusivity.

So providing it cheaper with various labs to me does not necessarily suggest that we should change patent law for that issue because you can take a drug like Lipitor and make it cheaper and make it available through various generic houses but that's not allowed simply from a price perspective.

CHAIRMAN TUCKSON: Francis?

DR. LEONARD: In other parts of my talks—I give a lot of gene patent talks, you might have assumed that—I talk about the difference between diagnostics and drugs, and I know that patent protection is needed for drug development because it's—but you don't need the patent protections and incentives, as Mildred showed, with the HFE gene patent and hemochromatosis testing. That incentive is not needed for the diagnostic development in clinical laboratories.

So to talk about drugs, yes, I agree that patent protections are needed and I've never argued that you should get rid of patent protections. It's really the licensing and enforcement that needs to be changed.

DR. COLLINS: So I want to thank Debra for organizing this session and all three speakers for very thoughtful contributions to what has been a discussion that has been going on for a couple of decades.

I think we are at a critical juncture. I agree that the National Academy panel, while they came up with some very useful recommendations for research, they did not get into this territory as deeply as we are this morning. Obviously it is a thorny set of issues.

Certainly from my perspective having been here now for 13 years, this issue of intellectual property and genomic discovery is practically never off the table. It's always there either explicitly or implicitly. I think the strategy that NIH has tried to take from the beginning is to always ask the question what is going to give rise to the maximum public benefit. It really seems like that is the question one

ought to consider in making a decision about what kind of patenting and licensing policies ought to be followed for genomic discoveries.

That led, of course, in the sequencing of the human genome to this fairly dramatic and unprecedented decision to release all of the data every 24 hours without filing any intellectual property claims on any of that sequence beginning in 1996 and continuing right up to the present moment, a strategy that we will continue to follow. That same strategy which was formalized in the so-called Bermuda principles and later on somewhat expanded to other types of genomic data--we had a meeting in Fort Lauderdale—has guided our efforts in other projects like HAPMAP, which also placed all of the information about human genetic variation in the public domain where it could be maximally utilized by anybody who was interested.

But, of course, now what we're talking about is moving one step closer towards a utility which is connecting that genetic variation with phenotypes and particularly with disease phenotypes.

I think traditionally that has been an area where such discoveries generally have led to patent applications, whether the discoveries were made in academia or in the private sector. Certainly I don't think too many people would question, just in terms of the grounds of novelty, utility and non-obviousness, that the patent office is probably not likely to change their perspective that a discovery of a gene variant that's connected to a disease risk phenotype is probably going to meet their standard and they would probably consider that a patentable discovery, whether or not we like it or not. I think that's probably the case just based upon the way the patent law is interpreted.

So unless one wants to try to change the law, I think it will be difficult to try to lobby the patent office to get them to stop allowing such issuances. That probably is not a viable solution if your goal is to try to make these more broadly accessible.

Instead it seems the solution really has to be the actions of those who are doing the science. In that regard I think everybody is aware that way back almost 10 years ago the NIH Guidelines on Research Tools made it fairly explicit that this goal of public benefit ought to guide what happens if you're getting NIH funds, and that has been implemented fairly explicitly for intramural research.

One consequence of that is that gene discoveries of this sort we advocate ought to be licensed non-exclusively for diagnostics, although potentially exclusively for therapeutics if you can make the argument that that's necessary for the investment to occur that would be required to bring a therapeutic to market, which as we all know can be a very large expenditure and for which I think one can in many instances make the case that patenting really has benefited the public by allowing that kind of investment to be made by an organization that then will enjoy a limited monopoly to recoup their investment.

For diagnostics I have to agree with the conclusions that Mildred's study documented and that Debra has also mentioned but I don't think the data is really there to suggest that in most instances, maybe in all instances, that you require that kind of exclusive licensing capability in order to inspire the development of a diagnostic because developing diagnostics these days, while it's not trivial, it is not a heavy investment requiring kind of activity. There are all kinds of wonderful platforms that will allow you to do genotyping for incredibly low cost and most of those are fairly generalizable so it's not as if you have to come up with a new technology for each gene that you discover a variant in. It's the same technology.

So more recently NIH issued a document which I think has been well received, although there were some objections raised to it, called Best Practices for Licensing of Genomic Tools, again getting into territory where we don't have legal authority to enforce actions but we do have the bully pulpit and this was an effort to use it basically to say to NIH grantee institutions that when it comes to licensing if you have now gotten a patent on a genomic tool, and this specifically included this kind of discovery of variants in genes that are associated with disease risk, we would urge fairly strongly that that not be licensed exclusively in order to, therefore, avoid the kind of outcomes that Debra outlined for us where a monopoly situation appears to both keep prices high and potentially limit access and maybe even do some

damage ultimately to quality because there's no incentive for competition and, therefore, to drive the new platforms into perhaps even higher efficiency and better quality kinds of territory.

But we are now in an interesting time. As Mark outlined, the real exciting research agenda right now, and it's one that's coming to pass very quickly, I think more quickly than most of us really had quite expected, is the use of the HAPMAP approach to enable us to discover gene variants that are associated not with rare diseases but with common diseases, with hypertension, with heart disease, with schizophrenia and bipolar illness, with asthma, with diabetes, with obesity. You can go right down that list of the diseases that are most common and that fill up our hospitals and our clinics, and we are going to discover, folks, in the next two or three years the major genetic contributions to those conditions.

Now I say "major" in that we all know there are hereditary factors but no single gene variant that gets discovered for any of those diseases is going to be definitive, of course. There are going to be a long list of gene variants to contribute to something like diabetes and each individual variant maybe will only increase your risk by 20 or 30 percent but you put them all together and you have a pretty interesting circumstance where perhaps in two or three or four years the ability to make predictions about who is at highest risk for what disease or what reaction to what drug will start to get pretty reasonable and then get better as more and more of these discoveries come along.

So how do we want that to play out in terms of the availability of those kinds of diagnostics? I have to say if we end up in a circumstance where what you really want to do is offer a multiplex test that covers the possibility of more than one disorder and lots of variants for each disorder, it's going to be a really colossal mess if in order for any provider of laboratory services to be able to put together such a multiplex testing panel they have to do two years worth of legal work and pay all kinds of royalties on each one of these individual discoveries that is owned separately. If some of them are exclusively licensed to one entity then we're even in a bigger mess.

So if there was ever a time, it seems to me, to try to have these sorts of discoveries not constrained in that way, this is it.

So what are we doing about that? Mark described to you some of the work that's going on in Perlegen, which is a remarkably effective platform that they've developed and it was a major contributor to HAPMAP in terms of putting together the catalogue of human genetic variation. And, of course, they are now a major player in applying that for discovering variations associated with drug response or disease risk.

But there are lots of players and, in fact, NIH intends to support a lot of this research in they course of the next couple of years.

Now, interestingly, when you go and talk to big pharma about this issue of how should we handle intellectual property for discovery of gene variants that are associated with common disease, my conversations with quite a number of those companies is they would really much prefer for that information to be considered pre-competitive and placed in the public domain. They're not worried for the therapeutic consequences of these discoveries about having intellectual property protection.

They think this is a great way to identify attractive targets but they're confident enough that their ability to actually capitalize on that will depend upon their ability to find a small molecule that goes after that target, and they don't think the target itself needs to be claimed or owned by anybody.

Now that may sound surprising but it's backed up in a specific instance by Pfizer deciding to make a major donation of funds, actually genotypes, for this project called GAIN, which we have talked about around this table before, the Genetic Association Information Network, which is a public-private partnership between NIH and the private sector, notably Pfizer contributing the genotypes, which are being done by Perlegen, and also additional funds from Abbott and Affymetrix also contributing chips to enable this to go further.

So out of that project which is now under review, applications received as of May 9th, seven studies of common diseases will get underway come this fall and the first data from this should come out

in early 2007. The intellectual property policy which you can read about on the website for GAIN, which is run by the Foundation for NIH—they are the organizer of this partnership—explicitly states that the intention is that all of the data from this association effort will be placed into a database where anybody with a valid sort of interest in the data can see it and they'll see it at the same time as the investigators who submitted the DNA samples in the first place and there will be pre-computed associations of which SNPs showed association with which phenotypes.

There will be also an explicit statement, there is already, in that set of policies that in the view of this public-private partnership it would be better for these associations to be donated to the public domain and not constricted in terms of intellectual property claims.

The pre-computed associations are an explicit intention to try to make that obvious and to put that data in the public domain as prior art so that third parties will not be tempted to jump in and try to claim such associations. They will be publicly disclosed from the very first moment.

That's a very concrete example of how a major company, a couple of biotechs, and the NIH an the Foundation for NIH are all trying to influence the circumstance to inhibit the likelihood of large numbers of patents being filed on individual variants that are going to be associated with disease risk or drug response.

The NIH has at this very moment a very intense discussion going on led by Betsy Nabel, the Director of NHLBI, about how we should handle other examples of whole genome association studies for common disease that NIH is going to be funding because GAIN is just covering seven studies. There's a whole new initiative which, if the congress approves it, will kick in FY07 called the Genes and Environment Initiative, which you've heard about before and David Schwartz mentioned yesterday, which will fund additional studies of this sort. I think there's a strong sense so far in that discussion that in those instances as well we should strive for public disclosure at the earliest moment to try to discourage constraints on the use of that data in terms of further downstream applications for diagnostics.

So that's a bit of a long statement and I'm sorry it's not really a question. It's really a little bit of a speech but I thought for this discussion it would be very relevant to hear what the context is here at NIH where we're likely to be funding very large numbers of these studies even though they are expensive over the course of the next two or three years, and we do see this as really a historic moment and one where if we do it right we should achieve really remarkable public benefit but if we do it wrong it will be tangled up in all kinds of constraints for a much longer period of time than it should be.

CHAIRMAN TUCKSON: Well, first of all, thank you, Francis. I think that kind of perspective is exceedingly important and useful.

What we're going to do then is, as we take the rest of these questions, there's a two step process that the committee has to engage. With that very important background and the other presentations, you should now be asking the questions that you need answers to, to be able to participate more effectively in a discussion after the question and answer period with just the committee among ourselves to try to determine what, if any, next steps you think you want to proceed.

So just understand where we're at. So right now you have a chance to query the speakers to get information that you need to better participate in a discussion around what, if any, actions you want to take as a committee.

Cindy, you're next.

MS. BERRY: I agree completely with what Francis, of course, was saying about the realities of the patent and trademark office and what they deem patentable and what not but, just suspending reality for a moment, how useful would it be or could it be to make a distinction between a gene, discovery of a gene, and a genetic variant versus development of a test to locate that or identify it? I mean would that—

DR. LEONARD: It would solve the problem.

MS. BERRY: Would that—

DR. LEONARD: It would basically solve the problem. If you consider that the gene-disease

association is a natural phenomenon, we're just identify that it exists like gravity, then that's in the public domain. We use test kits all the time that are patented but we have the ability to also use that basic information if there isn't a test kit available. It's not controlled by one person. That distinction is exactly what's needed in my mind.

CHAIRMAN TUCKSON: Thank you.

Kevin?

DR. FITZGERALD: Two quick questions, one perhaps for Debra specifically and the other one for all three.

The specific one is what—do you know what the basis was for the writ being dismissed as improvidently granted in the metabolite case? You had the other—the minority opinion was interesting.

DR. LEONARD: Well, that's all that was written but—

DR. FITZGERALD: That's all that was said?

DR. LEONARD: --it's my understanding that the product of nature argument was not fully argued in the lower courts.

DR. FITZGERALD: Right.

DR. LEONARD: And that's the major point of the presentation to the Supreme Court.

DR. FITZGERALD: Right.

DR. LEONARD: So the Supreme Court basically sent it back down.

DR. FITZGERALD: So that they would reargue product of nature in the lower courts.

DR. LEONARD: If it gets there.

DR. FITZGERALD: Got it.

DR. LEONARD: I mean if that's done.

DR. FITZGERALD: Right.

DR. LEONARD: It's not clear that that will be done--

DR. FITZGERALD: Okay.

DR. LEONARD: --and that it will go back up to the Supreme Court.

DR. FITZGERALD: Okay. The other question I have for the three of you, if you have any input on this, again I understand the U.S. situation is somewhat unique. We have our own patenting questions but I always like to know a little compare and contrast what's going on elsewhere and what their experiences are, particularly in Europe where they have a different sort of patenting arena.

So what are the experiences of the diagnostic labs there with this patenting issue since it's a much different sort of landscape?

DR. LEONARD: They don't have this problem as far as I know. There is—in talking to David Korn there was a group from NAS that went to Europe and explored the European experience. It was only half of the NAS committee, though, that went. They were very—I don't know what it is but it's something that we—that you, as a committee, could explore in future deliberations to see what the differences are between the European patent system. But there is some basic difference that allows these things either not to be patented or not to be enforced for medical use and I don't know the details of that but it is something that could be explored.

CHAIRMAN TUCKSON: Thank you.

James?

DR. EVANS: I'll save my comments for the discussion.

CHAIRMAN TUCKSON: Emily?

DR. WINN-DEEN: I guess I wanted to go back a little bit to your comments about kits being okay. Do you have concerns about a situation where a gene is exclusively licensed to one manufacturer and manufacturers have problems. What happens if even if they make a good kit and you're happy with it if they go on back order in the case of the HFE, an earthquake hits California and there's no production for some months? I mean what's your opinion about sole source even for a kit?

DR. LEONARD: It's bad. I have two examples. One is when Biorad was selling the HFE kit and enforcing that against laboratories, there were two major mutations that it is detecting but just adjacent to one of them, H63D, there is another S65C. So 63 versus 65 is not very far away. In fact, the S65C was not taken into account in the original design of the kit and it created problems for incorrect results for H63D. Yet that could be the kit that everyone is forced to use.

Also with Invivoscribe, there were technical problems with some of the Invivoscribe kits such that you would get false peaks where you weren't supposed to get them and they could be interpreted as false positives. This wasn't occurring with laboratory developed methods or other reagents that were being used and yet we're being forced to use this kit.

So I was a little bit trying to give a shorter answer. Given a sole provider of a test where you send the test to a reference laboratory that's the sole provider of that test versus having a test kit that's sold broadly that's better versus being able to choose the way you want to do the test that's the best quality test that you can provide to the patient either using that kit that's available or your own methods or tweaking that kit.

So not to go on and on but Invivoscribe, also as part of their license agreement, you had to use their kit as they specified it with the reagent concentration that they specified. If you used half the reagents because you could do the 25 microliter reaction volume instead of 50 microliter reaction volume and get the same answer, they charged you more.

So there are complications with even having <u>in vitro</u> diagnostic test kits but on a scale of things it's all relative.

DR. MCCAMISH: It would be really interesting maybe to get Joe Hackett's response in here. I was thinking more again in the polygenic and predictors of drug response. So let's say—and from our perspective you've asked how we're going to do it. I really don't care how the diagnostic gets out there from my perspective. I'd like as much broad coverage as possible in terms of doing it. But from an FDA perspective, if a company proceeds and develops a co-product so it's a diagnostic predictive of an adverse event to a specific drug, and the label comes out that says you need to test patients and exclude them if they're at high risk for this adverse event.

Joe, how would FDA handle that? I mean, let's say if we discovered that and then we just broadly made that available. As Francis mentioned, the work we've done—we've put all of our SNPs in a public database so that has not been an issue. So let's say we make that broadly available. How would FDA handle that because it is being used as a diagnostic test for use of a drug? Would you allow labs to generate their own tests or would it be required that it would be handled by a sponsor or manufacturer?

DR. HACKETT: The answer is yes and no. If the drug manufacturer says you have to use the test to eliminate adverse reactions then they'd have to use the test. Preferably a diagnostic test but it could be a home brew. On the other hand, if you use a test exclusively to develop the drug itself, you could use that just about any way you wanted to. It would not have to be FDA approved. So there's two uses. You develop a drug and you use the test once the drug is marketed. Once it's marketed it could be a licensed—approved diagnostic test or it could be a home brew. Our preference, of course, would be approved test.

CHAIRMAN TUCKSON: Very good.

DR. MCCAMISH: So your preference was an approved test versus a—

CHAIRMAN TUCKSON: One of the things, by the way, we're going to do on—Francis, you wanted to comment on a particular point?

DR. COLLINS: I just want to clarify. So you would not, therefore, expect that it had to be a test that was exclusively licensed and contributed by a single laboratory as long as it was a test that was validated. I'm trying to understand what you're saying about the specific situation where the test is attached to a drug and basically the test needs to be done according to the labeling before the drug can be prescribed. Does it matter to FDA whether that test, once the data has been generated to show its value, is

conducted by a single laboratory source or whether it's non-exclusively licensed and is available from multiple sources?

DR. HACKETT: Probably would not matter whether it was exclusively licensed or not because the labeling could say that you should test where there is a test available for such and such without identifying whether it's licensed or not.

CHAIRMAN TUCKSON: Julio?

DR. LICINIO: I had a question on the point about the testing that's not for diseases. So let's say if you have a gene for all the tests that Deb described so well before for canavan disease, for the other ones, for cystic fibrosis, et cetera. If you have the gene or the breast cancer genes, if you have those you have a certain likelihood of having disease, they are like a disease causing gene. For the complex diseases and for pharmacogenomics to some degree it can be a susceptibility gene. In other words, in some cases, let's say if you have the CYP2D gene duplicated, and you have ten copies, you are going to metabolize a drug faster than if you have only one copy.

But in terms of drug response, sometimes what you see is that there is more contribution by one gene in the end to have the full response of the drug and these drugs—some of them are kind of dirty and act at multiple targets. You have to have a certain number of variants at a certain number of genes. Different populations even can have different variations in that so that we frequently see as we edit papers and our review of them that sometimes what's published in one population is not replicated in the other. It's not because the result of the first one were like false or the science was bad but because the genetic contributions for the other one may be different.

So when you're talking about genes that have like a 5-10 percent or even less, 2-3 percent effect in terms of causing a susceptibility to a disease that's also aggravated by environmental factors, you can have all the genes and if you have a different type of environment you may not even have the disease to begin with.

So how do you deal with that kind of testing because you're not testing for—usually when we talk about the diagnostic testing for like a diagnosis you're telling someone like something that's likely to happen. But if you have a two percent susceptibility of something because of a variant, how do you deal with that in a certain population, maybe not even in the other?

DR. CHO: Can I respond to that? It depends on how the patent claims are framed in the patents that are actually issued, which varies widely. So it depends on what is specified in the actual patent. The way the patent language goes is not—does not really track with the way scientists think about how the—how effective the tests are or whether they are diagnostic or not.

So, for example, some kinds of these patents claim the association between gene or a certain variant of the gene and maybe particular variants that are specified where the actual sequences of the variants are given in a particular disease. Some of them claim the gene in general and don't provide a lot of detail on the variants. Some of them actually claim the act of analyzing the gene, meaning sequencing it and looking for haplotype in a very vague way not specified.

So whether it's the predictive value or the diagnostic value is irrelevant to the way the patent law works.

To the issue of multiplex testing, I think the response that we have seen from laboratories so far is that the laboratories that are moving towards multiplex testing and even some of the tests that may have 800 or more genetic markers on them, on chips, have basically been ignoring the patents at this point. Partly because you can't even keep track of how many—and the specific language of each particular patent for each particular genetic variant or gene or whatever, and there has not been a lot of enforcement on the multiplex tests for these massive numbers of kits.

But having said that, I think you probably are familiar with the situation with triple tests where a patent was enforced on one of—on that and there was sort of a revolt from the medical community about that enforcement and so that may be sort of an indicator if patents are enforced on high volume tests what

will happen.

CHAIRMAN TUCKSON: Okay. Let me do a process check. We have seven to eight minutes of more time for questions and we have three people in the queue so we're going to do Sherrie, Andrea and then Barbara.

DR. HANS: Thanks. I just have a quick clarification to make sure that I've understood the implications of some of the discussion this morning.

Dr. Leonard has suggested one mechanism to fix some of the issues that she has raised, which is to exempt medical personnel who perform genetic tests from patent infringement actions, specifically for clinical purposes.

Would that have any impact, Dr. McCamish, on your business model, particularly as you've said you don't believe you can make money from the diagnostic tests alone if that suggestion from Dr. Leonard were put into effect?

DR. MCCAMISH: Again I'm not here as a diagnostic manufacturer. I think as we have looked at the business models it's difficult to justify the investment necessary in to a genetic diagnostic predictive of disease, for example. It doesn't make a lot of sense as you go forward.

Now Francis mentioned that it's not very costly to do some of the testing but to gather the information and get the phenotyping and the samples necessary for the things that we do is quite costly in that situation. So I would say by exempting medical practitioners and labs from patent enforcement would be problematic in terms of developing diagnostics of clinical utility as we go forward particularly in the polygenic area.

In the monogenic area that's a difficult thing to deal with. I would say, from my opinion, yes, that would be difficult.

DR. HANS: Yes. We probably don't have time but I have to say that I don't entirely understand the argument.

DR. MCCAMISH: You don't understand the argument of research—

DR. LEONARD: If you're not going to make money on the diagnostic, why is it a problem if we can do the diagnostic for you and you make the money off the drug?

DR. MCCAMISH: Well, from my perspective, I think that's fine. All I'm trying to do is represent adequately a diagnostic company that's purely investing in the diagnostic itself and they've been doing it for years. When you look at this again—when you do an SMA20, for example, and you come up with ways of doing 20 different tests and making money on those particular tests because they're used time and time again all the time, this is a genetic test and even BRCA1 and BRCA2—I mean the cost for these are like two or three grand for doing the test. And that's because again I'm trying to get some return on investment for the development.

If it's in the public domain and you have this information that comes from an academic community and it's out there in the public domain and anyone can use it that's fine. All I'm suggesting is when it gets into the complex polygenic markers of disease there's fairly substantial investments involved with that. And if you can't recoup that then individuals aren't necessarily going to be investing in it.

DR. HANS: I think the actual cost of a laboratory like Dr. Leonard's doing such a panel of 200 genes is going to be prohibitive on an individual basis. Then you really are talking about developing a kit. I mean it seems like the economics are completely different when you're talking about a small handful versus a very large—

DR. MCCAMISH: No, I think in my example it was between SNPs or something of that nature. It would not be difficult for a lab to set up a test for 20 SNPs. The research process of screening for 1.5 million SNPs is very costly. The lab itself is not that costly.

CHAIRMAN TUCKSON: Mildred, do you have a quick comment?

DR. CHO: Yes. Just on that point about recouping the investment. To the extent that many of the tests that have been—the research to find the associations were government funded so there wasn't

really a lot of private investment. Now on certain specific examples like the HFE example, I think from Mercator's point of view, they basically lost their investment but the patents didn't save Mercator in that case anyway.

So I think what Francis said is every important. The more—as we move towards multiplex testing the more that the associations are in the public domain, the more the investments won't be needed. And then, as you saw from the data, the post invention resources are sometimes minimal.

CHAIRMAN TUCKSON: This is a key point, I think. I think it's a very important point to underscore what's in the public domain and clearly how much the nation has invested in this, and then who takes benefit, and I think we need to be clear about that.

Very quickly, Andrea.

DR. FERRIERA-GONZALEZ: A comment on being in the public domain but also when you have a company that has a patent on a limited number of SNPs for a specific application and you have a different manufacturer, a different company working and adding two different SNPs that will add value to the testing, how do you come up to working together or you have to start licensing these increasing the cost of the other one or not having that benefit to the public domain. So there are other issues also to consider.

DR. MCCAMISH: It gets into patent law on that issue and again I'm not a lawyer but if you add something to it, it's really different. So if you can add additional value by doing two additional SNPs that could be additional intellectual property that's there.

CHAIRMAN TUCKSON: Barbara?

DR. McGRATH: This is just a question of information. Mildred, your research that you reported on, you've mentioned a couple of times that it was two to four years old or something. I'm just wondering if you can update us whether anything has changed in the environment now that we're getting more towards complex diseases? A lot of the examples were single gene diseases. Has anything changed that we should know about?

CHAIRMAN TUCKSON: Do you want to comment on that specifically?

DR. FERRIERA-GONZALEZ: When Mildred did the study we only—on the period that she did the study, we decided not to offer hemochromatosis. That was the only test that we were looking in my laboratory to look at introducing. In the last six months we have decided not to introduce four different tests due to being informed of different patents that are being in the process of being formed. So I think an update of this study may be something that we want the—

CHAIRMAN TUCKSON: Yes.

DR. FERRIERA-GONZALEZ: --because things have changed and there's a lot more things that are being patent even that we are not aware.

CHAIRMAN TUCKSON: Good.

DR. FERRIERA-GONZALEZ: For example, for the—

CHAIRMAN TUCKSON: Why don't we save that for the discussion?

DR. FERRIERA-GONZALEZ: Okay.

CHAIRMAN TUCKSON: But I think you've made the point and I think you may be moving into the area of what might be recommendations.

Barbara?

MS. McGRATH: That was the question.

CHAIRMAN TUCKSON: Joe?

DR. EVANS: I'll wait until the discussion.

CHAIRMAN TUCKSON: All right. Let me just ask a couple of dumb questions at the end here, just a really fundamental basic dumb question. Debra, can you take us through again—I'm trying to come back to the licensing thing with what FDA licenses in the diagnostic tests and so forth. When you do a diagnostic test that does not require the use of somebody's kit, so you're not using anybody else's

deal, you're doing it on your own, you are using the knowledge that allows you to do that, the ability to do that test comes from—where do you get the knowledge to be able to do that test?

DR. LEONARD: So, for example, with hemochromatosis?

CHAIRMAN TUCKSON: Right.

DR. LEONARD: So, first of all, my knowledge comes from being an M.D., having a Ph.D. in molecular biology and having done Ph.D. and post-doc, and I know how to do molecular biology methods. And then I know how to use those molecular biology methods in a clinical setting meeting all the regulatory and quality standards because of my M.D. training and pathology training. So that when a paper is published like the Mercator paper, and it says that there is a mutation at this point in the gene, I can design primers or use their primers that were published to be able to amplify that region, cut it with a restriction enzyme, run it on a gel and say that that variant is there or not there. That's basically exactly what was done.

So we take samples. We basically took samples from patients who were being—with consent—who were being phlebotomized because of hemochromatosis, and took some random blood samples from just blood donors, and were able to validate that this mutation was correlated with the presence of hemochromatosis, and then start offering it as a clinical diagnostic test.

CHAIRMAN TUCKSON: Now the knowledge that is—the ownership of this intellectually, what you've just described—it sounds like ultimately the fundamental thing that you benefited from was a paper produced in the literature that said here is how you do this thing.

DR. LEONARD: No. This is the genetic variant. This is the genetic variant. I would have the ability—I mean, you use—in fact, most laboratories used the published Mercator primers and it was a problem that eventually came out because one of the primers was sitting on a site that had a polymorphism. And so—I mean sometimes using the published primers aren't even the way to go and I have the ability to design PCR primers for any variant region. You have to have enough molecular biology and genetic knowledge that you know that there may be pseudogenes, that there may be—I mean, you have to have all the molecular biology knowledge to be able to make sure that what you're doing is producing what you think you're producing.

CHAIRMAN TUCKSON: So at the end of the day again the thing—I just want to keep coming down to can you just be really explicit then about what it is that somebody who has this license—this patent says if it were not for me, my company, what we did, you could not have done what you did and it's because of my genius or my something that you are now able to do it.

DR. LEONARD: Well, actually in the case of Mercator it was genius because they were able to discover a gene in a region that does not have much recombination and makes it very hard to find that mutation and the variants.

CHAIRMAN TUCKSON: Okay.

DR. LEONARD: But the question is it's probably also hard to figure out $e=mc^2$ or figure out gravity.

CHAIRMAN TUCKSON: Right.

DR. LEONARD: And so the question is when there's a disease variant that's in people with a disease and you make that discovery of what that specific disease variant is and it's associated with the disease—I mean should that be patentable? Well, that—then you get into USPTO and everything that Francis was talking about.

CHAIRMAN TUCKSON: Right.

DR. LEONARD: And you probably don't want to go there. I would love to go there because I don't think it's really reasonable. Basically that's what Francis Collins is saying. I won't get excited about this but, I mean, that's exactly what Francis Collins and the NIH are trying to prevent.

CHAIRMAN TUCKSON: Right.

DR. LEONARD: They think that that basic information should be in the public domain. So why

not go at what the USPTO is doing?

CHAIRMAN TUCKSON: Right.

DR. LEONARD: So that genetic variant disease-association is the remarkable thing. Once you know that information using what is called prior art you can make a test to discover—to test for that genetic variant in any patient you want for that purpose of diagnosing the disease.

CHAIRMAN TUCKSON: Joe, do you in FDA with that—I mean so you—again, you've got one company who has like a real fancy kit and they get—they go through processes. You can have Debra who is doing the same work. She doesn't have a fancy brand name associated with her activity. She's brilliant Debra doing the work in the academy. She comes—

(Simultaneous discussion.)

CHAIRMAN TUCKSON: No, we're not using that word. Now she is coming to an answer, a conclusion, using the same methodology. Now which one is regulated? Which one do you sort of say we pass the seal of FDA-ness over this—what's happening?

DR. HACKETT: If she boxes up her test and sells it to another laboratory, we exert control.

CHAIRMAN TUCKSON: Right.

DR. HACKETT: If she doesn't, we don't.

CHAIRMAN TUCKSON: Okay.

DR. HACKETT: So if she offered a service, we don't.

DR. LEONARD: But I'm regulated by CLIA.

CHAIRMAN TUCKSON: That comes back—I just wanted to make that explicit link back to the earlier discussion yesterday. So it's back to CLIA and that regulation. That's where these two connect. All right.

Lastly from—

(Simultaneous discussion.)

DR. MCCAMISH: FDA doesn't give you patent coverage or things of that nature so you're really talking about what they regulate, which is different from the patent trademark office.

CHAIRMAN TUCKSON: Right. Now, we're going to go to this break and then come back and have this discussion but let me ask Mark—oh, I'm sorry.

DR. CHO: Can I just ask a question along those lines?

CHAIRMAN TUCKSON: Please. Yes, please.

DR. CHO: Because I'd like to get clarification on sort of the FDA role here. Let's say that I am working in a company and I find—discover an association between red hair and melanoma. Can I box that and sell it as a kit? A little camera that measures red hairness or something?

DR. LEONARD: It determines whether it's dye or original?

DR. CHO: Right.

(Laughter.)

CHAIRMAN TUCKSON: So that's the question.

DR. HACKETT: If you box that and sell it then we would control it. If you just offered a test from your facility, we would not.

CHAIRMAN TUCKSON: Okay. Mildred, I think part of your question though is back to what Debra is saying about Francis' comment, I think. Let's say that you have the ability to know that variant and discover it based upon a bazillion dollars worth of public research that comes out of money that went from the NIH extramural program to academic center Z on a federal grant that allowed those people to figure that out. Then the question, I think, that's on the table, if I understand it, and not resolved, is do you now have the right to then take that knowledge, box it, patent it and then charge the nation back another fee that says look how smart I am and what I did on your money?

DR. LEONARD: Yes.

DR. MCCAMISH: Yes, you do.

CHAIRMAN TUCKSON: Okay.

DR. MCCAMISH: And you'd be surprised that most—I mean not most but a lot of the patents that are obtained—

CHAIRMAN TUCKSON: Okay. That's the way it works.

DR. MCCAMISH: --are funded eventually through NIH.

CHAIRMAN TUCKSON: Mark, the last thing is you—I don't think you can answer this but I'm just going to ask you and see if you have any information on it. From the point of view of the industry—I mean you're not—you're one company, you can't speak for everybody and I don't know if there's a trade association that gets into this. Clearly this is a big issue and a fundamental social conundrum for the nation. This cannot be the first time that you and your colleagues have heard these discussions.

Is there some private sector activity that we should know about that is trying to find a solution to this such that the interests of commerce and the interests of health are addressed? Is this on the agenda somewhere or basically is it that it's left to organizations and committees like ours to try to figure out a way to move through this?

DR. MCCAMISH: I'm not aware of any private associations trying to resolve these issues. I think from my perspective what I'm trying to do is foster the use of this science to better patient care. What I'm seeing is that it's not being pursued by big pharma. It's not being pursued by the classic diagnostic companies because of the return on investment issue that's there.

CHAIRMAN TUCKSON: But as you make that comment, are you making that comment on both the diagnostic side of the equation and the therapeutic side of the equation or are you segregating that comment?

DR. MCCAMISH: No. I'm making that primarily on the polygenic. This new pharmacogenomic technology arena that is—we're attempting to foster and pursue. The pharma companies are not necessarily pursuing this aggressively because they see it, as I mentioned, as a way of subsetting and getting less potential penetrance for the market. On the diagnostic side, diagnostic companies are always looking for this information. They are just not willing to sponsor the research to discover it.

Once you discover it—that's why the academicians are patenting as they go forward because once they discover it then the diagnostic companies are willing to come in.

CHAIRMAN TUCKSON: All right. I want to really—Mildred, before we lose you because your comments are so important, Andrea sort of got to a question that was put out and that is the sense as a researcher in terms of do we need to resurvey. You've had a chance to look at it. You're proud of what you have done already. How—do you think there is another set of study survey analysis that needs to be done with more resources perhaps even than were available to you? Do you have a sense, if so, of what that exploration--how it might be defined?

DR. CHO: Yes. I think that there would be reason to re-analyze those kinds of—the sort of things that we did five years ago because things have changed a lot, especially in this multiplex testing arena. Again, what we and others have found indicating that there isn't much patent enforcement is probably partly because of the time window. So things will change and things probably have changed. I think it would be useful to look in more depth although it's difficult at the actual sort of test by test impact as opposed to on laboratories and look at the economic impact on actual costs.

CHAIRMAN TUCKSON: How much money did your—ball park. I mean how much—what is the resource expenditure necessary for you to have done this survey that you did, the study that you did?

DR. CHO: Yes. So we had a grant from NIH and I think the program officer is here, too, and she could probably give you the exact dollar figure but ball park was a three year NIH study probably in the ball park of—I don't know—a few hundred thousand dollars.

CHAIRMAN TUCKSON: Okay. A few hundred thousand. Okay. Good. Just to get a sense of—just trying to get a sense of scale here.

Here's what we're going to do. We're going to take a break. It's 11:05. You need to really be sharp for this discussion so we're going to give you a full ten minutes.

(Laughter.)

But here's the deal: When we come back we are—I want you to be disciplined about this discussion. You really need to focus in. Do you want to do something in this area going forward? Is this something that you want to get involved in? And is it important enough to move forward?

Secondly, what is it that you want? What are the questions that you want to have addressed? The part of this that you want to get—you've got to phrase what you want to do and then you've got to define what it is you want to do. You've got to be very precise about that in this discussion. Otherwise this will go all over God's green earth and get nowhere. So you've really got to lock in on those three.

When you speak in the discussion you need to tell us where you're speaking to. What part of this you're speaking to. Do you want to do something? What parts of this thing do you want to do something in? And then what is it that you actually want us to do? And then the committee will be able to—the subcommittee will take that and they will run with it or they will disband depending on what you say.

All right. See you all in ten minutes.

(Whereupon, at 11:05 a.m., a break was taken.)

FULL COMMITTEE DISCUSSION AND NEXT STEPS

CHAIRMAN TUCKSON: So like—where is Julio? Okay.

Well, like if you were on an airplane and you were like 4,000 miles in the sky and the pilot comes on and says, "Ladies and gentlemen, for those of you interested in the score of the game, it is one to nil, Brazil."

(Laughter.)

"We expect to be landing appropriately."

All right. So here we go. You've got your marching orders. What I'm going to do is I'm going to—sometimes you will notice that I will disrespect the order whenever I see Debra's hand because I want to get Debra to be an active—to get her points in as a member of the committee before she has to segue into being the chair of the discussion. So she's free and unencumbered until like 10 of 12:00. So with that we've got Joe and then James in the queue and then we've got Emily, and then we've got Kevin, and then we have Sylvia.

Take it away, Joe.

DR. TELFAIR: My question is sort of—because you—of your marching orders, you'll probably laugh, which is what to do. I think what I would like to see is address the question related to more of a public health type of question on this in order to be able to—for this group because I think—and at least a part of what we can actually do is make recommendations but I think the arena to make recommendations in are really similar to what Francis was saying earlier.

So my question having to do with the real public health question of balance on the other end is when someone who is a provider needs one of the tests done and is real concerned mostly about the person on that—their person and who they need to serve to be able to help with this, what is it that we need to consider in terms of the benefit to public health because I heard—and then—and, please, both of you all correct me if I'm wrong on this, but that there's a benefit on both ends and there's an argument on both ends that there's the focus on public health.

One being that there is—by having some controls over that you can best streamline something or assure—actually assurance is a term that I actually heard—saying about work being done and making sure it gets done.

On the other hand, by having the opportunity to carry a number of the tests out without having the restrictions placed on it by the patents you can also benefit the person on the other end.

I heard both these arguments being made. So I guess for myself if, one, I can get clarity on sort of the balance here between the two and then, secondly, is it—can we be able to make some

recommendations that would really push more the model that was being recommended here and of being able to come to some middle ground and can we make recommendation that whatever is done be done such that there is some way that we can look at both sides because both sides are very much in the real domain?

So that's what I'm asking a question about and that's where I'm at.

CHAIRMAN TUCKSON: Debra, do you have an answer to that?

DR. LEONARD: Well, I don't mean to speak for Mark because Mark is still there but I think Mark made the point repeatedly that the diagnostic doesn't make money but you need the patent incentives for the whole discovery process.

DR. TELFAIR: Yes.

DR. LEONARD: However, Francis and now Tim—you can't read your papers, Tim, you have to pay attention.

(Laughter.)

--was shaking his head when Mark was making statements about this research will not be done unless you have the patent incentives because the research is being funded by the NIH. I think in the private sector that research might not be done because the basis may be the wanting to help patients but there's an underlying financial aspect to the private sector research that's being done because if the company doesn't make money they don't stay in business. So there is this financial incentive that's needed in the private sector but to say that the research won't be done without the patent incentives, I think, is incorrect. Will it be done as quickly? Will it be done in the private sector? Those are questions that we could look at and potentially address.

CHAIRMAN TUCKSON: Good.

DR. TELFAIR: I guess me and my questions have to do more with if I was—not being an M.D. but coming at it from the perspective of receipt—those at the—who is the point of receipt of this effort.

DR. LEONARD: Well, that's the other point.

DR. TELFAIR: That's the other point I was trying to make.

DR. LEONARD: So the laboratory analysis that Mildred did is a proxy. It's a proxy for patient access. So all we know is that the tests are not as broadly performed. But Jim and Barbara and I were talking at the break and Jim at least has some evidence from his testing laboratory that being able to provide testing for free, which a company or a sole provider of a service may not be willing to do, gets more people having a test than when you have to pay a large sum of money, and that's something else that we could explore as a committee.

I don't think we have to have the answers now as to what will be our recommendations. I think there's a lot of exploratory process that this committee could do like you've done with large population, like with coverage and reimbursement, like with other issues that we've worked on to explore exactly these kinds of questions so that we do—we, you, come up with a measured response and recommendations that are balanced and don't do harm.

CHAIRMAN TUCKSON: Thank you.

DR. TELFAIR: Thank you.

CHAIRMAN TUCKSON: James?

DR. EVANS: Yes. I want to amplify something Debra just brought up. The studies that Mildred and Debra and all have done are landmark studies that are really important. They are a proxy though for what we all know is the most critical thing and that is what is the impact on patients. What we really want to know is, is the patent situation that exists today, is it having a deleterious impact on the access of patients to care?

I can speak to that to some extent because we have a unique relationship with Myriad in the sense that we are allowed to do BRCA1 and 2 testing for free if a patient can't afford it and if we don't charge them. Okay. So you can imagine it's a very expensive thing. BRCA1 and 2 testing right now is $3,150.

Every year perhaps I have one or two people who whip out their American Express card but or almost everybody else that is a formidable barrier to testing.

We're writing up data now that shows that over the last six years in our experience just about 50 percent of individuals had to avail themselves of free testing or would not have had testing done.

As you can imagine, there's a statistically significant discrepancy between African Americans who needed to avail themselves of this service more frequently than did Caucasians. Physicians are used to giving people bad news but it makes you feel even worse when the bad news you're telling somebody is you can't have a medical service because you can't afford it because you don't have enough money.

I think that this committee needs to take up this issue. I think it's an absolutely crucial issue for the future. There are no easy fixes and I think that there's important—there is obviously very important aspects to the incentive that patents give.

But there are significant downsides that we're all going to have to grapple with so I think we should take it up. I think we need a number of things. We need updated information from, for example, Dr. Cho's study. The landscape is changing.

DR. LEONARD: Can I ask updated before we—

DR. EVANS: No, no, no. I think we should—

DR. LEONARD: Because that could take five years.

DR. EVANS: --move on. Absolutely. I think one of the things we should recommend to the Secretary is that this needs to be looked at in the changing context.

DR. LEONARD: Is that really going to be valuable we're going to find out any more that more laboratories can't—

DR. EVANS: Well—

DR. LEONARD: I think what needs to be done is the patient access--

DR. EVANS: Yes. Don't get me wrong.

DR. LEONARD: --piece of this.

DR. EVANS: I don't think that that should be necessary before we move on. I think it should be one part. I think what is most important—and it's a very hard issue to get to—is we do need to look at how this is all affecting patient access.

And then, finally, I think we need to, with the right information and guidance from all kinds of groups, try to come up with reasonable recommendations. I'm not interested in a quixotic pursuit here that puts forth things that are completely unfeasible.

On the other hand, I think that this is a really important issue and I think that our committee needs to take a stand on it and render some advice.

DR. TELFAIR: Just to the last part—I mean could I just add—

CHAIRMAN TUCKSON: Mm-hum.

DR. TELFAIR: I appreciate this because this is the question that I had but in terms of the access issue I would just say that I would recommend that whatever the committee is coming about, if it can just—if the—if at the end there is the short and long term. There needs to be some way to—whatever decision is made, whatever or however we arrive to it, whether or not it is an absolute decision or is a decision that is in flux, that it still be something that can be maintained.

Because one of the—as I've heard—learned actually a lot from the discussion here, this is a—being that it's an ongoing discussion, being that it is an in flux changing the dynamic environment and because of that, whatever decision is made today, the level of relevance to that decision for years may change because of the flux here that there needs to be some idea of a balance but balance with a view that there may need to be—we may need to revisit this.

DR. EVANS: Well, sure, but I don't think we can let the changing—the rapidly changing landscape keep us from addressing it.

DR. TELFAIR: I'm not saying that. I'm just saying that when you go about this that you do it in

a deliberate way such that you take into account that the—

CHAIRMAN TUCKSON: So let me be clear as we get ready for Emily's comments that, James, I want to give you a chance to precisely state what your recommendation is. You said three things. One, we need to go forward in this domain. Number two, you're saying that there should be a recommendation of some sort and we don't need to be fine about it now.

DR. TELFAIR: We need to keep a focus.

CHAIRMAN TUCKSON: But there should be something that starts to look at collecting or encouraging the collection of a database of surveying of what is going on out there similar to the—

DR. TELFAIR: At the level of the patient.

CHAIRMAN TUCKSON: And then, third, was—

DR. TELFAIR: If possible.

CHAIRMAN TUCKSON: And I think third you were saying let's really focus in on what it means in terms of the access for patients and being able to get a sense of is this having a chilly effect on access—for patient access.

DR. TELFAIR: And fourth I think that probably the major charge would be for us to try to come up with recommendations and solutions to this. It's not enough to say to the Secretary why this is a real mess.

CHAIRMAN TUCKSON: Right.

DR. TELFAIR: We need to try to identify—

CHAIRMAN TUCKSON: Recommendations and solutions.

DR. TELFAIR: --reasonable solutions.

CHAIRMAN TUCKSON: All right. I want to make sure our crack staff team, who helps us so much, has got those four down on a piece of paper and feel good about it for the moment and that they capture that.

We now need to move to Emily.

DR. LEONARD: Reed, can I just make a suggestion?

CHAIRMAN TUCKSON: Yes.

DR. LEONARD: Also, one of the ways to look at the access for patients would be in a public forum discussion like we did for genetic non-discrimination legislation and looking at genetic discrimination. One of the things this committee could do would be to put a question out there to the public, to genetic counselors, to physicians, and see what data we could collect. Could we make another phone book that says, "Yes, there really is an access problem or, no, there isn't."

CHAIRMAN TUCKSON: All right. So taking the work obviously and the suggestion, and you'll come back and approve all this at some point, but the suggestion has been amended to include to define some of the people that—to include a public forum and we've even defined some of the people—the categories of people who would participate. Patients, clinicians—and you had another one?

DR. LEONARD: Genetic counselors.

CHAIRMAN TUCKSON: Genetic counselors. Patients, clinicians, genetic counselors would be invited to that forum.

DR. McGRATH: Nurses.

CHAIRMAN TUCKSON: Genetic counselors/nurses—and nurses. I'm going to get nervous about the politics. All right.

So we've gotten very specific. People will have—people who don't like that suggestion or want to modify it should speak to it when their turn comes up because I think you can see that there's a consensus getting around that and if you don't like that consensus you're going to have to do something about it in a hurry.

Go.

DR. WINN-DEEN: Okay. So I want to just expand a little bit on the diagnostic company

perspective on this. As someone who—every new test that we think about bringing out as a product, the first thing that we ask is do we have freedom to operate. So this is a barrier to commercialization for sure. From a kit manufacturer point of view, if a license is available at reasonable terms then you would consider going forward. If a license is not available then that's a killer right at the start.

My experience in dealing with—so the people I deal with are quite different. I deal with tech transfer offices at universities who don't seem to have any connection to this concept of patient care. I've had experience where I went in and tried to get a license on a non-exclusive basis and was told by the tech transfer office that it was easier to just do an exclusive and they had already selected their exclusive licensee.

I sent them a copy of the NIH Best Practices and said, "This was research funded by NIH and here is the NIH guidance." And they said, "Sorry. It's easier for us to just do an exclusive license."

So I think there's a major disconnect and we have to deal with the fact that the people who are controlling these licenses are not the physicians. They are not the researchers. They're the tech transfer officers and they are a very important stakeholder that I think have to be brought into this discussion.

CHAIRMAN TUCKSON: Let me propose—

DR. WINN-DEEN: So that was my one point.

CHAIRMAN TUCKSON: Let me propose on this point specifically that—and I want to see if there is a consensus on this or not—is that we need to hear legitimately an organized perspective from two groups. One is industry. The industry association. That's why I was trying to push whatchamajigger about that.

DR. LEONARD: You have to be careful about lumping industry together because there's a lot of different components of industry.

CHAIRMAN TUCKSON: Good. So let me—

DR. LEONARD: There's the IVD industry. There's the drug industry. There's the reference laboratory industry.

CHAIRMAN TUCKSON: Okay. Let me just—and we're going to pause for a minute. You've still got the floor in a moment but we're going to work this one out. So I was going to say with my limited knowledge industry and the university—

DR. WINN-DEEN: Tech transfer.

CHAIRMAN TUCKSON: --tech transfer offices, which is what provoked me to put those two thoughts together.

Now Debra is becoming even more specific and let me just ask Debra for the sake of the people keeping notes so we've got—so again you've got a bunch of stuff now. We've got the conference, the public people. We've defined the public that's coming—going to be invited to the table. Now we're talking about a separate session as part of that—that public meeting that's going to have industry and the academy tech transfer offices.

Now Debra is going to detail a little bit more about what kind of people we may want to consider. We're not going to write the conference today but the kind of people that would be on the menu for consideration would be from industry.

DR. LEONARD: Emily, you can comment as well.

CHAIRMAN TUCKSON: What sub-segments?

DR. LEONARD: But industry—there's the in vitro diagnostic test company industry.

CHAIRMAN TUCKSON: Okay.

DR. LEONARD: There is the pharmaceutical industry.

CHAIRMAN TUCKSON: Okay.

DR. LEONARD: And there is a reference laboratory industry. They are part of bio actually. The biotechnology industry organization has Athena Diagnostics at least as a member so bio in a sense.

CHAIRMAN TUCKSON: Okay. Good.

DR. WINN-DEEN: Well, there is pharma and bio.

DR. LEONARD: Yes.

CHAIRMAN TUCKSON: So I think I want to be careful that I don't try to micromanage a meeting inside of a meeting. So I think what we've kind of got is a sense of guidance for our subcommittee about what we mean by having industry at the table. They'll work through the right people and the right sub-divisions.

Emily, you can move to your next point.

DR. WINN-DEEN: Okay. So I think I just wanted to get that in that that's an important stakeholder but within that is the NIH guidance on best practices and potentially what we could recommend to the Secretary is some method of turning best practices into something with a little more teeth to it which basically says if you get a grant you must follow these practices, not you may or we'd like it if you would. So there's the possibility to give the NIH more teeth.

DR. LEONARD: You can say anything you want because you're going to be gone in three days.

(Laughter.)

CHAIRMAN TUCKSON: Okay. Hold on. Discipline here for a second. What we're going to do—now don't forget, by the way, Kevin, Sylvia and Steve, don't get nervous—you're in the queue for your points. We're just going to nail down Emily's points real quick.

MR. LESHAN: Can I just—

CHAIRMAN TUCKSON: Tim, you're going to comment on this point?

MR. LESHAN: Very quickly. One is that while that might be an interesting recommendation, there are some limitations on what the NIH can and can't do in terms of requiring grantees to follow certain practices. Not that you couldn't recommend it. I'm just saying that it's going to be—

DR. WINN-DEEN: But you do require them to put all sequence data in the public domain, for example.

MR. LESHAN: Right. No, I'm just telling you because of the Bayh-Dole Act it's going to be more tricky in this arena.

But the other point that I just want to get on the table is that given your discussion it might be a good idea to have the Office of Technology Transfer here at the NIH at this discussion.

CHAIRMAN TUCKSON: Good for you.

MR. LESHAN: Okay.

CHAIRMAN TUCKSON: Let me just sort of say, though, Emily, I think what you may—and let me just ask if this would be useful—is that either—through some mechanism from the subcommittee that we would be able to pull together at least a definitive definition of a description of what science is being put into the public domain so we understand at least what those efforts are and what they're trying to achieve.

And then, secondly, that we at least describe for everyone in an accurate way the meaning—the functional import of science being put in the public domain and what relevance, if any, that will have on this issue. I think we just need to be clear about the efforts to put it in the public domain and what the significance of putting it in the public domain mean. It may not mean anything.

DR. LEONARD: No. It means that that information then cannot be patented and controlled.

CHAIRMAN TUCKSON: Right.

DR. LEONARD: Once it's in the public domain it can't then be patented.

DR. WINN-DEEN: Well, it can be patented and then put in the public domain.

DR. LEONARD: Right, but if it's put in the public domain before it's patented then that putting it in the public domain basically precludes it being patented.

CHAIRMAN TUCKSON: Right. So unless there is violent opposition, I think I'd like to sort of put that as part of the task of the committee to consider whether we can put something like that together so we describe this because I think people need to understand this issue pretty clearly going forward.

What's going on and what is the meaning of what's going on and whether or not that—of course, then the third step from that is whether or not that—we will have to assess it once we learn—whether or not that becomes part of the solution as it were to the conundrum.

DR. WINN-DEEN: Okay. So I just had one other comment that I wanted to make which is really to echo what we heard this morning about common complex disease and the role of genetics in those diseases. There will be significant royalty stacking issues that will prevent commercialization either at the reference laboratory or the commercial kit manufacturer level. If we don't—I mean I would urge us to consider whether there is some way to bring together stakeholders and to have—to encourage a patent pooling strategy so all patents related to cardiovascular risk get pooled and then all the different stakeholders that want to license can go to a single entity for licensing interaction but without having to go to 20 different companies, each of which hold one gene or one SNP in one gene. It's just going to—it's going to provide a huge hurdle at every level of laboratory testing. I think that's going to affect academic laboratory developed tests as well as kits.

So somehow we're going to have to, I think, bring that issue forward that as panels speak—realistic diagnostic panels that have meaning for an individual's patient care, as those panels get larger, this issue is going to have to be dealt with in a different way than going and getting individual licenses to individual genes.

CHAIRMAN TUCKSON: Is this a—is what you're calling for a part of the definition of the problem analysis or are you calling for something that—I mean is this more definitional or is it more action for us?

DR. WINN-DEEN: Well, I think for me it's—I think the group—if this committee elects to work on patents that it should broaden its scope beyond monogenic disorders to thinking about the polygenic issue and to consider trying to make some recommendations about mechanisms, potential mechanisms that could be put in place to overcome this issue of multiple patent holders and multiple licenses being required.

CHAIRMAN TUCKSON: Great. So I would urge then as we think about this—I think this is a—I think she is advancing important thoughts on the definition of what it is that we consider that we are looking at, what the issue is. The statement of the problem.

DR. LEONARD: But, Reed, one thing to consider is that recommendation 11 from the NAS report is exactly NIH should undertake a study of potential university, government, industry arrangements for the pooling and cross licensing of genomic and proteomic patents as well as research tools.

So that at least—it's not targeted at the clinical diagnostics but it would be easy to take that recommendation and broaden it to—I mean so—

CHAIRMAN TUCKSON: Right.

DR. LEONARD: _--there is already this recommendation out there.

CHAIRMAN TUCKSON: Right. But I think the key thing here is that I think—I want to make sure, Debra—is that you could if you wanted perhaps look at this through the narrow prism of single genes as opposed to looking at combinations. If you did it, depending on your assumptions of how you walk down the road, it could lead you in different directions, more or less thoroughness, more or less completeness in terms of the problem, more or less definition of some of the conundrums.

So I think we're just simply being encouraged to look at it in its more complexity than opposed to just more simplicity. I think that's a challenge that we would give to the subcommittee to take through. So I think that's a legitimate issue for the subcommittee to grapple with.

Kevin?

DR. FITZGERALD: Just to get on the bandwagon before there's no more room—

(Laughter.)

--I would also very much recommend exploring this issue and leading to the possibility of specific recommendations for the Secretary.

A couple other people I'd like to see or groups I would like to see involved in our data gathering: I'd like to get more on the legal on this. I'm not—I mean, we've had enough presentations on patenting and Debra did another good one on just basic patenting but maybe someone from the USPTO for a Q&A session on some of these specific issues.

Now I know often times we say no change is possible there. However, I believe that there is the possibility of change. There is progress or development going on internally.

CHAIRMAN TUCKSON: Right.

DR. FITZGERALD: They are looking at these issues so it would be good to know what they're thinking.

CHAIRMAN TUCKSON: Let me push you a little bit on that.

DR. FITZGERALD: Sure.

CHAIRMAN TUCKSON: And just sort of say—ask you in terms of the legal analysis—I mean legal regarding the answer to—I mean I'm trying to get why—what you want.

DR. FITZGERALD: That's one. The PTO. And then the second would be—

CHAIRMAN TUCKSON: On the PTO?

DR. FITZGERALD: Right. That's one. And then the second would be somebody—and the person who comes to mind just because I know her is Laurie Andrews, who I know argued in front of the Supreme Court the metabolite case and then some of the other cases.

DR. LEONARD: She did the canavan case.

DR. FITZGERALD: Yes. She also did the canavan case.

DR. LEONARD: Right.

DR. FITZGERALD: But she also did the metabolite case and so she could give us some insight into some of the legal wranglings that are going on particularly in the courts and some of the discrepancies there on some of the ruling on these issues.

CHAIRMAN TUCKSON: All right. So I think—that's what I was trying to get to, Kevin.

DR. FITZGERALD: Yes.

CHAIRMAN TUCKSON: I think what you're—I want to make sure that I'm not putting words in your mouth. What you want is to make sure that we understand more thoroughly the legal certainties and uncertainties that govern this field.

DR. FITZGERALD: Right.

CHAIRMAN TUCKSON: That's what I think you're saying.

DR. FITZGERALD: Certainly the ambiguities at this point or even the—

CHAIRMAN TUCKSON: Because you're asking those things because it may be that there is a role and obviously you can't predict it until you study it a little bit more but a role for recommendations from us that may attempt to try to deal with that reality. So I think that's what you're getting.

DR. FITZGERALD: Right.

DR. LEONARD: One of the things to think about with the USPTO if they do come is a history of how we got to this point of patenting because everybody always refers to Chaklobardy (ph) but Chaklobardy was patenting a bacterium that was actually created by man because the genetic make up of that bacterium was altered by man.

CHAIRMAN TUCKSON: Right.

DR. LEONARD: It wasn't discovered in nature. So how did we get from that to patenting—allowing patents on human genetic variation disease associations?

CHAIRMAN TUCKSON: So again we are—just again to keep—I'm just trying to make sure that we—because you can tell my anxiety is not to have the subcommittee having to go off into 18,000 different directions. I want to make sure that—because we could chew up a lot of time. So what I think we're doing simultaneously, and this is not right so you're going to keep thinking about it as you make your suggestions, is we're sort of saying do we have a problem. Why do we have a problem and what

are—what may be the available tools to help resolve the problem? One of which Kevin is saying are legal issues.

So what we're sort of saying is if we determine we have a problem, are there—what is the certainty or uncertainty or the status of the legality of how we got here and what's possible and then maybe that might lead us to some recommendation that is appropriate for us to recommend? We don't know that but you're putting that in the differential.

DR. FITZGERALD: And then one last group I would like to hear from--not necessarily the raw data on the patient access and things but the patient advocacy groups. Some of which are actually actively pursuing patents for control of how the disease is researched and how the treatments are developed. That would be a really interesting perspective to get, too.

DR. LEONARD: In fact, one of the ways that disease organizations are fighting back against the patents is to—

DR. FITZGERALD: Yes, exactly.

DR. LEONARD: --if they are going to have their members participate in research then that organization has to be named as part one of the patent holders so they help control—

DR. FITZGERALD: Right.

DR. LEONARD: --the patent and you could ask why and what had been the nexus.

DR. FITZGERALD: Or the directors actually get their names on the patent like Sharon and Patrick Terry. Sharon is here this afternoon, isn't she--from my understanding?

CHAIRMAN TUCKSON: Right.

DR. LEONARD: Yes. And I don't mean to put words in your mouth, Kevin, but at the earlier discussion you had also suggested hearing from the European and maybe Canadian perspective—

DR. FITZGERALD: Yes, that was my—

DR. LEONARD: --so—

DR. FITZGERALD: I had that on my list.

DR. LEONARD: Oh, sorry.

(Laughter.)

DR. FITZGERALD: That's okay.

CHAIRMAN TUCKSON: Now time out for one second. Debra, the clock has run out on Debra's advocacy role and now she's objective chairperson of the thing to figure out how we're going to all proceed.

So, Debra, I pass the baton to you. You've got Sylvia, Steve, Cindy and Martin in the queue, and then Tim. So those are the people that are lined up in that order and I will try to represent this team well in front of our illustrious director, Dr. Zerhouni, and report back to you this afternoon on whether he thinks you're wonderful or not.

(Laughter.)

DR. LEONARD: Everybody understands my conflict of interest so I mean I made that clear this morning.

One of the things that we do have to consider is we have until 12:10. Reed is not gone yet but could—does everyone feel comfortable making a decision at this point? This doesn't end the discussion but can we table—can we have a decision as to whether this is something that the committee thinks we should work on?

CHAIRMAN TUCKSON: Thank you for that. Let me just—

DR. LEONARD: Okay.

(Laughter.)

CHAIRMAN TUCKSON: I vote that we do something.

DR. LEONARD: We're not going to do this individually. We're going to do hand raising, Reed.

CHAIRMAN TUCKSON: I just want you to know I'm definitely in the group of doing this and

feel strongly about that so I just wanted to be on record.

DR. LEONARD: Okay. So is that okay that we move ahead? Okay. So everyone in favor of voting, raise your hand. I mean in favor of working on this.

(A show of hands.)

And everyone opposed to working on this?

(No response.)

Wait. Let me do it this way. Anyone opposed to working on this?

(No response.)

Okay. So it's unanimous for working on this. Okay.

So now I think we've created a very long list of things that's going to be very interesting to see how we do this but I think that's what we need to focus on or the last two of the questions that Reed posed to us is what things do we want to hear about. What discussions do we want to have? And then I don't know that we can pre-assign what recommendations we might want to make. I forget what the third point of the question was. But anyway—so paths forward. Let's focus on discussing that.

Sylvia?

MS. AU: I just wanted to make sure that we weren't being kind of territorial. There's lots of health care providers that order genetic tests besides geneticists so we want to make sure that health care provider is the category and not just genetics professionals.

DR. LEONARD: I think we had clinicians so we can do health care provider.

MS. AU: And then also another group is public health programs. Having personal experience at having to halt a program to implement genetics into a chronic disease program because of a patent, I probably think that some public health problems might have similar experiences as my public health program and that would probably be important.

DR. LEONARD: Thank you.

Steve?

DR. TEUTSCH: I just want to put a couple thoughts on the table I think we touched on. One is the whole concept of a clearing house for this kind of information so it can be gotten and I think the other concept I've heard here is we need to find a fair and reasonable way to make that available and that might be done through something such as a clearing house which sets those kinds of standards.

The other thing I'd like to just build on beyond just access to these tests, clearly there needs to be access but it's also access to tests that actually matter to patients that make a difference. There's a lot of stuff out here and I think we need to keep focused on the things that are actually going to make a clinically important difference in the management of these folks. Going forward, hopefully, there will be a lot of that but at the moment there's only a modest amount of that given the therapeutic alternatives that are available.

DR. LEONARD: Okay.

Cindy?

MS. BERRY: Perhaps this would be taken care of by industry representatives but maybe we would benefit by having some outside economists that could help us with the other end of the access question just so that we're fair and balanced, not to paraphrase a certain cable news network.

(Laughter.)

Because I think we're all leaning in one direction assuming that there are access problems because of this patent issue but if you take away or if we issue recommendations without carefully considering potential access problems of stripping some intellectual property protections then I would rather our recommendations be informed by getting all sides of it and I don't have anybody in particular to recommend but somebody could help us.

DR. LEONARD: It's interesting that you bring this up because we did search. I don't know where Sarah is but we searched for someone who could bring an economic perspective and it was very

hard to find someone. I'm not sure that this kind of research has been done.

Tim, do you have any idea whether ELSI has funded—

MR. LESHAN: There haven't been—we've done a very little bit of research in this area but not so much specifically related to patents. More economic analysis as it relates to integration of genetics and genomics into health care practice. Scott Ramsey is someone who comes to mind from UW who wouldn't specifically talk about patents but he's at least someone you could talk to about economic analysis in this area. If not him, he would know the others in the field.

DR. TEUTSCH: Or Richard Gold.

DR. : Yes, he's done work on this.

MS. BERRY: I know there are a lot in the area of pharmaceuticals but I don't know about this particular area.

DR. EVANS: I know Gold has worked on the genetics patent and he's an economist.

DR. TEUTSCH: And Pat has worked on pharmacogenomics.

MS. BERRY: Pat?

DR. TEUTSCH: Danson.

DR. LEONARD: Pat Danson. Okay.

Martin?

MR. DANNENFELSER: I am just following up on Kevin's point. I thought when the Genetic Nondiscrimination Act—some of the more interesting forums we had were with people from Capitol Hill and we at different times had someone from the House and the Senate. So on that legal question in particular I think an appropriate person from House and/or Senate committee would be very informative in this area, and perhaps doing a search to see if there's already some legislation that's pending in congress that addresses this issue.

DR. LEONARD: I know there isn't any pending but Lynn Rivers had introduced legislation that could be reintroduced. I think the College of American Pathologists may be able to address that because they had worked with Lynn Rivers and they are looking for a forum to get that reintroduced.

MR. DANNENFELSER: Okay.

DR. : But there is legislation relating to patent reform in general that is on the table in the House and the Senate so there are people in the various committees that could potentially address the broader issue of patents but they may not have considered genetics in those discussions.

DR. LEONARD: Okay.

MR. DANNENFELSER: I think our particular focus should also be on where there's government funds involved. I think that's the strongest hook where particularly NIH is funding research and to the extent that people then go patent things that they develop based largely on the NIH funding.

DR. LEONARD: Okay. Since one of the ways to approach this in addition to—was congress, congress and USPTO or courts. I would like to hear from Breyer, frankly, but I don't know whether we could get him to come in here since—no. Okay. Well, I just—I was reading that in my office like cheering and I was sad that it was the dissenting decision.

Anyway, let's see. We have Tim.

DR. : Just one quick point. Given that the National Academy has done this study that focuses on the research side, I think it's important for the committee to make sure you stay focused more on the clinical side of this issue so that you're not rehashing old business.

DR. LEONARD: Right.

DR. HANS: Just a quick comment on several points that while the tech transfer folks may be good, it may be even better to have the deans and the university presidents who control what the tech transfer offices do.

DR. LEONARD: Do they really?

(Laughter.)

DR. HANS: Well, they have interests on both sides of the table when we're talking about NIH funded research and what kinds of things NIH may choose to do or not do, and trying to get money out of their tech transfer offices. They have interests on both sides of that equation.

DR. LEONARD: Right.

Barbara?

DR. McGRATH: I'm sort of struggling with this issue that, Kevin, you brought up about the legal and that was my idea, too, but I'm going back to what Dr. Cho was sort of saying that in the last couple of years a lot of the patents haven't been--regulations haven't been enforced. Usually when society doesn't enforce a law it means that there's a sea change going on in society. I was trying to figure out the best way to capture that and maybe it's like Laurie Andrews. We're trying to pick up what that is about rather than just the laws that exist but what's the societal implications of this. It's a more amorphous sort of thing but it would be nice to somehow capture that perspective as well.

DR. LEONARD: Could that be done through someone like Laurie Andrews, the societal implications? I mean legal societal implications. What type of person are you thinking about--

DR. McGRATH: Well, that's the—

DR. LEONARD: --to do this?

DR. McGRATH: Maybe she would be one to ask about that if she would address that issue. That's what I'm struggling with but I don't have an exact person to capture that but something is going on. If the laws aren't—the regulations aren't being enforced and there's something going on other than what—than the regulations as written.

DR. LEONARD: But which laws are not being enforced?

DR. McGRATH: Well, the regulations—the patent regulations, right?

DR. LEONARD: The patent—

DR. McGRATH: That was one of your comments that you were saying the changes in the last couple of years since your research was done was that they haven't been enforced on the—

DR. LEONARD: Oh, Mildred did mention that. I think what she meant was there has been a window—so most of my examples were from '99-2000 was the latest. And there has been like this window of three or four years but now there is EGFR, Gleevek. There are now—it is all like emerging again.

DR. McGRATH: Okay.

DR. LEONARD: So I think there—for some reason, and it's not clear why, there was this like little window where the patent enforcements had—

DR. McGRATH: It's not a trend. It was just a window.

DR. LEONARD: I don't think so.

DR. McGRATH: Okay.

DR. FERRIERA-GONZALEZ: I think what is happening, too, is that we knew about these targets. There was a lot of research that was done. Now we have new targets that research is being done and now that we have research to make that CLIA association the patent holders are coming back to enforce that.

MS. McGRATH: I see.

DR. FERRIERA-GONZALEZ: There is something to enforce.

DR. LEONARD: Right.

DR. FERRIERA-GONZALEZ: And we might see that there are a lot more patents out there for like beta 2 adrenergic receptor that might be waiting for more people, even the federal government, to pay for all these types of research to come and enforce.

DR. LEONARD: Right.

DR. McGRATH: Got it.

DR. LEONARD: Like number 3 on the opportunities list of the FDA's critical pathways

document is asthma and its beta adrenergic receptor variant correlations with response to treatment in asthma and they want that researched. However, that is patented.

Any other comments?

Joseph?

DR. TELFAIR: Yes. Just going back to the—just in the tasks for specific groups. Since the practitioner group is going to be a broad group, I would just recommend that they—if we're going to ask them about what was recommended, a balanced view of access, that we be very specific about what elements of access we're talking about in terms of that. Is it the receiving end? Is it the actual receiving of the benefits? Is it the asking of a particular question? Is it the screening issues? What is it that the access problems may be or not and then whether it's being helped or not? It just seems to me that if we have such a broad group, given the multidisciplinary nature of the group, it would be better if we just were very specific about what we asked them.

DR. LEONARD: Well, I think if we are going to—if the group feels that having a public discussion forum would be useful with different constituencies—we have to write a document basically that says what do we want them to address. What is the question for public discussion? So that's part of where that would be defined, I think, in the writing of that document that would be sent out to the patient groups, the patient advocacy, genetic counselors, health care providers, all the different groups that we think could contribute to this public discussion.

MR. DANNENFELSER: The most high profile issue that has the Secretary's attention right now is pandemic flu. NIH is doing a great deal of research on vaccines and I believe working with the private sector. I don't know if there's any connection here at all. Maybe Tim could speak to this. In terms of if patent issues rear up in that—in there, is there any exceptions that are—in terms of this research where they can't go out and patent it because of the public interest and the massive ramifications?

DR. : All I know is there are patent issues but I don't know the details. I think there are other people in the room who—other people from NIH who probably would know better but it's something we can definitely address in another meeting.

DR. LEONARD: One of the things to consider is this committee, SACGHS, has a broader mandate than SACGT had. So SACGT was really focused on genetic testing and that limited somewhat as to what they could consider. We have a mandate that includes bioterrorism organisms and there are patents on hepatitis C virus. There are patents in other areas and I don't know if we want to think about this more broadly or we really want to keep to the genetics but it is a question to think about.

Emily?

DR. WINN-DEEN: Yes. So if you broaden the view to genetic-based tests there's quite actually a long list of viruses whose entire genomic sequence is patented. So if you want to make a test for this virus that targets any place in the genome you must take a license. Some of these licensees are widely available. Some of them like Hep C are very closely guarded and very limited licensing available.

So it does open up a whole other list of things that one might explore in terms of public health and the benefits to society of having widely available testing.

DR. LEONARD: In a sense it's genetic sequences in general and, in fact, the Invivoscribe patent that I was talking about is a somatic variation that you're looking at, not inheritable. But genomics—we've had this discussion as to what's genetics, what's genomics, and I think this committee has taken a much broader look or perspective on genetics than just inheritable change. So it's something to think about.

Any other—I think if we give the staff any more suggestions as to what we could do we're going to be looking at this for the next three years or you are. This is my last meeting by the way.

(Laughter.)

DR. : Debra, just one other small thing.

DR. LEONARD: Yes, Tim.

DR. : I think what—

DR. LEONARD: Is this the thin mint?

(Laughter.)

DR. : I think one of the things that Dr. Collins was trying to say is that there is a lot of work being done here at the NIH on some of these issues and some of that will clearly inform your deliberations, the committee's deliberations, as it goes forward. I'm sure we, the NIH, will be happy to provide that information as we go through with that.

DR. LEONARD: Can you just expound a little on how much teeth can the NIH have in this realm or not?

DR. : I don't think I know all the details on that but I think that there are limits on how much teeth the NIH can provide in this area but I think there's an interest on the part of the NIH to sort of push that envelop as far as possible without breaking the law and without going too far without harming that balance that Joseph was talking about in any way but wanting to make sure that enough of this information is publicly available to the research community primarily.

DR. LEONARD: Well, I think NIH is setting a bar, a standard if you will, like with the GAIN project and putting the information in the public domain, and that's nice but even though you teach kids to play nice in the playground they are still going to fight and they're still going to do the wrong things or what you don't want them to be doing. So setting a good example is nice but it doesn't prevent anyone from doing the opposite or something that's not as noble, if you will, as what the NIH is trying to do, both with the Human Genome Sequence, with the HAPMAP and with the GAIN project but we still have patents and patent enforcements and it's not solving the problem.

DR. : No, I don't think it's solving the problem. I think NIH is just hoping that it will benefit—make some headway in terms of trying to solve it.

DR. LEONARD: And how much do you—so one of the things that I think this committee has to grapple with is—and I've heard this said by people at NIH also—is that for genetics and genomics the horse is out of the barn. Basically there is so much genetic sequence already patented that why bother. So one of the questions is there are a lot of patents that exist and do we do something that just fixes things going forward or is there something that can be done to protect against the enforcements that already exist because I think Mildred showed a list of the number of patents that exist and they are enormous. So I think that's something the committee is going to have to grapple with as well.

Any other questions or comments? I think we're right on time for finishing and I wish you all the best of luck.

(Laughter.)

So let's see. I now have to do my other job here, which I've lost my commentary. Where's my script? Thank you.

So we're now moving into a public comment session and one of our critical functions is to serve as a public forum for deliberations on the broad range of human health and societal issues raised by the development and use of genetic technologies. So we greatly value the input from the public. We set aside time each day of our meeting to hear from the public and we welcome and appreciate the views they share with us.

Today we will be hearing from five speakers and the first will be Michelle Schoonmaker from Association for Molecular Pathology or AMP.

PUBLIC COMMENTS

DR. SCHOONMAKER: Hi. Good afternoon. My name is Michelle Schoonmaker and today I'm speaking to you as a member of the Professional Relations Committee of the Association for Molecular Pathology or AMP.

For the record today, AMP is an international medical professional association representing over 1,400 physicians, doctoral scientists and medical technologists who perform genetic testing as well as

other testing based on the knowledge derived from molecular biology, genetics and genomics. AMP members practice their specialty in academic medical centers, community hospitals, independent clinical laboratories and federal and state health facilities.

On behalf of our membership, the executive counsel and the professional relations committee of AMP thank the committee for the opportunity to provide commentary on the issue of intellectual property right and patent protection of genetic information.

Our members have had to cease, curtail or alter clinical laboratory testing due to restrictive gene patents for an ever growing list of diseases, including Alzheimer's disease, hemochromatosis, neurodegenerative disorders, congenital deafness, familial breast and ovarian cancer, lymphomas and treatment resistant leukemias.

The Association for Molecular Pathology believes that the human genome sequences are in the public domain and, therefore, there should be open access to them for any clinical application.

Genetic test services are medical procedures and, as such, they should be widely available to promote optimal patient care, medical education and medical research.

The restrictive use of patents or exorbitant licensing fees prevents physicians and clinical laboratories from performing genetic tests, limits access to medical care, jeopardizes the quality of medical care and raises its cost.

Exclusive licenses that limit genetic testing to a single provider are detrimental to the public interests by limiting patent access to testing, medical education and practice, the advancement of medical knowledge and the enhancement of public health.

AMP urges the committee to investigate the clinical impact of gene patents and develop recommendations for steps that can be taken so that patients continue to have broad access to the benefits derived from ongoing and future research on the genetic basis of disease.

Consequently, AMP makes the following recommendations:

All clinical laboratories should be exempt from gene patent restrictions for diagnostic testing in the practice of clinical medicine.

Research funding agencies should oppose patent licensing agreements that inappropriately limit clinical care, the use of medical procedures, medical education and medical research.

Organizations, including universities, that hold patents and require licenses for use of their technology for genetic testing should offer non-exclusive licenses and make available to any—make these available to any qualified clinical—CLIA certified high complexity laboratory on an equal basis.

To ensure that testing remains widely available and affordable, financial terms for test licenses should be reasonable. License agreements should also be free of any terms that limit the number of tests that can be performed by a laboratory or regulate the technical performance or clinical use of the test.

License agreements should, likewise, be free of terms that inappropriately limit research related to the testing or the public dissemination of the resulting research findings.

AMP appreciates the opportunity to address the committee on this very important topic and we invite you to contact Dr. Wayne Grody, who is the chair of our Professional Relations Committee, if we can provide any further information.

Thank you.

DR. LEONARD: Thanks, Michelle.

Any questions for Michelle?

Thank you very much for coming and we appreciate AMP's willingness to continue to provide comments to the committee and work with the committee. We may be calling on AMP for input.

The next speaker is Elissa Levin from DNA Direct.

MS. LEVIN: Good afternoon. To briefly introduce myself, my name is Elissa Levin and I am a board certified genetic counselor and the clinical director of DNA Direct. DNA Direct is a web-based company that has been offering direct to consumer genetic testing and genetic counseling services since

February of 2005.

Having worked at two major academic medical centers, I recognized that the current model of delivering genetic services was not meeting the needs of all patients. As a representative of DNA Direct and as a genetics professional, I strongly believe that genetic testing services can be offered responsibly and reliably by a direct to consumer approach. In no way will direct consumer testing services ever replace the traditional models but if direct to consumer is offered responsibly by appropriately trained professionals, these services can be a valuable and viable complement to the traditional model.

I would like to highlight a few critical reasons behind why some consumers have chosen to utilize direct to consumer services just to name a few.

Limited access to genetic services by qualified professionals. This may be due to regional limitations, the overall paucity of trained genetics professionals or current health care networks, and referral patterns that makes it difficult for people to access genetic testing services.

There are also concerns about privacy, confidentiality and genetic discrimination. Again no matter how legitimate the risk of discrimination is based on genetic test results, public fears exist and represent a major barrier to someone who could significantly benefit from testing. Anecdotally, I can say that the majority of consumers who have used DNA Direct services have not sought testing through us for that reason.

Genetic interpretation and support services is another reason. We have had patients come to us because they have received incorrect or incomplete information and no follow up or referral support references through their physicians. In addition, we've also had physicians refer their patients to us. One example is that some physicians refer their cystic fibrosis patients to us for cystic fibrosis carrier screening because they are not comfortable offering or interpreting the test results.

Finally, cost of testing and services. Testing for physicians' offices or academic centers may actually be more expensive than going direct to consumer in some scenarios.

There are many more reasons that I will not go into right now.

Direct to consumer companies need to be responsible for developing and maintaining standards of practice. By setting the bar for reliable and comprehensive services provided by qualified health care professionals, the industry will hopefully move in a direction that will ultimately benefit consumers. In doing so, it is critical that health care providers and policy makers acknowledge that a spectrum of direct to consumer services has emerged.

Consumers must be able to distinguish between these companies and it would be a disservice to consumers if policy were to lump together all direct to consumer services.

There are there key factors that currently distinguish the market.

One: Selection of tests offered.

Two: The laboratories utilized.

Three: The level of services provided and who provides those services.

So, first, all genetic testing is not equal. Under the rubric of genetic tests is a significant range from neutrigenomics and fitness profiles to paternity and ancestry testing to clinically validated tests under medical guidelines in a dozen or so approved tests.

At DNA Direct we offer clinical genetic tests that are routinely offered through most genetic centers. We evaluate each test option in light of its clinical validity and utility and we utilize renowned experts in the medical and genetics fields as well as relevant guidelines to help us convey this to consumers.

Second, it is not up to the direct to consumer industry to defend the validity of laboratory testing. That is an issue that needs to be resolved through CLIA, the FDA and other relevant agencies.

Critics have suggested that FDA approval would be a safeguard for consumers but since the FDA is not currently regulating genetic tests, consumers should be made aware that reliable testing can still be obtained often using the same laboratories that their primary physician would use. Until this issue is

clarified, providers of any tests need to be more transparent about where laboratory testing is done, not just direct to consumer. DNA Direct addresses this by partnering only with large reputable CLIA certified laboratories.

The third point relates to the level of services provided and I think this is an extremely important one. Some direct to consumer companies enable consumers to test or order on line, providing no human contact or support by genetics professionals, often referred to as DAT or direct access testing. Pre-test education may be unavailable or incomplete. Informed consent may not be required and post-test results may be disclosed without access to genetics professionals and without interpretation.

I can speak to the fact that DNA Direct has gone to great lengths to address these issues. We have developed a website that offers patient oriented information. All of the materials on our site have been developed to reflect the same core information that is conveyed in genetic counseling sessions, including the limitations of testing.

We all know that people learn differently and the web enables people to seek information in ways that makes sense to them in a time frame that works for them. The web is dynamic and enables us to adapt consumer feedback, updated standards and guidelines, and to add new interactive tools to help people work through the decision making process.

Further, all test orders are reviewed and authorized by a board certified medical geneticist. Signed informed consent through DNA Direct is required. Test results are conveyed via personalized reports that include interpretation based on the individual's personal and family history. All interpretation is reviewed by both genetic counselors and a medical geneticist. Our disclosure protocols are test specific so for some tests reports are only released once they've been disclosed through a post-test discussion with a genetic counselor and the patient. Genetic counselors are available to patients at any point before, during and after the testing process, and all of our clinical interactions are HIPAA compliant.

One last point I would like to raise as a genetic counselor is that I feel it is my professional duty to provide consumers with accurate information. I receive no economic incentives for people to test, though I acknowledge that providing services is our core business model. However, direct to consumer is certainly not the only example of a conflict of interest in the workplace. Other scenarios have proven that genetic counselors can maintain their professional standards even if their salary is paid by the company offering testing.

Why is direct to consumer any different?

It is the responsibility of direct to consumer companies to hire and maintain staff who are competent, qualified and who are morally and ethically dedicated to the patient's best interest. When testing is offered responsibly in these ways, consumers can benefit. Indeed, we are finding that people are appropriately selecting whether or not to test. We know this because currently 38 percent of all people who have tested through our services have had a positive test result. This trend is consistent and this number is significantly higher than is seen in most academic medical centers and it is significantly higher than would be expected in the general population.

In summary, whether or not genetic testing is offered direct to consumer or through other avenues has almost become irrelevant. Genetic testing can be obtained not only through academic centers, physicians offices and internet based direct to consumer companies but also through wellness centers, spas and drive through clinics.

Our society is moving towards more virtual services. Almost 32 million adults in the United States go to the web first for health care information. The media continues to bring genetic testing into the spotlight. Isn't it critical that consumers be able to distinguish between valid testing services?

The direct to consumer industry, health care providers and policy makers should be collaborating to set the bar. We should be asking questions like does the current model, regional medical services, meet the public's needs? Is it effective? Can the traditional system keep up with the advent of new clinical

tests? Is it morally and ethically responsible to withhold new validated testing that may reduce morbidity and mortality due to issues of dissemination and access? In these areas, direct to consumer testing is a viable alternative.

We have common goals and we need to work together to ensure that testing is provided safely and effectively to consumers.

Thank you.

DR. LEONARD: Thank you. If you have a moment—question, Kevin?

: Thanks very much for your presentation and just one quick question. From your experience you mentioned you did some genetic counseling in medical centers. Is that correct?

MS. LEVIN: Yes, correct.

: So from your experience, are there disadvantages to doing the counseling over the phone without the face to face interaction and then how does your group then address those disadvantages?

MS. LEVIN: Well, essentially the direct to consumer model is clearly not for everyone and we recognize that and we are very transparent about that. I am continually doing assessments by phone counseling and if someone is highly anxious, if they are not understanding the core information that we're conveying, if we need additional medical records and assessment, or if we don't offer the testing that they're requesting, we refer them to a regional medical center. I try to hook them up with a local genetic counselor or genetics group. So there really is an opportunity for additional referral networks.

Similarly, we have had genetic counselors and physicians refer patients to us, for example, for at risk family members who don't have access to local testing services.

So, yes, I do think that effective genetic counseling can be done by phone but again it needs to be—there need to be additional referral services to make sure everyone is covered.

DR. LEONARD: Joseph?

DR. TELFAIR: Thank you very much for your presentation. The question that I have is that it seems that one of the things that you're advocating very strongly is that there need to be—there's a real need in the industry, the DTC industry itself, to have very high standards in terms of practice.

MS. LEVIN: Correct.

DR. TELFAIR: But there seems to be—that doesn't seem to be a consistent perspective across the board. In your experience so far, and this may not be something you can answer but I think if it comes to this committee, we'll have to make some recommendations, what do you see—first, what do you see as an attraction moving in the direction of kind of raising the bar as you're advocating and what do you see as sort of one or two or maybe a few key things that would begin to move it in that direction given—I don't know if my question is clear.

MS. LEVIN: I will try to answer that to the best of my ability.

DR. TELFAIR: Okay.

MS. LEVIN: We have taken the steps to create our own standards and guidelines that are posted on our website if anybody is interested. It's www.dnadirect.com. And under "about us" we have posted standards and guidelines and that addresses our own internal practices and our own internal standards as well as guidelines for patients that utilize our services. That addresses issues, everything from marketing to testing to accuracy of information, support services, everything that we have heard and we know that are critical of the DTC industry. So we think that there are many different areas that can be focused upon. I just named a few. I hope this is getting towards what you're asking me but I think that there is a lot of room to essentially set that standard and then have others have to move towards it. I think that one of the things that needs to be considered by this committee is how to get that concept out there.

DR. LEONARD: So if I can just follow up or sort of overview, you—from what you have described—are providing fairly state of the art genetic testing and counseling services that are fairly complete and sensitive to whether the patient is really getting what you're saying in genetic counseling, and you'll refer outside, et cetera, but not everyone is providing this level of service.

The testing that you're also providing is pretty much clinical standard testing. It's not nutriceutical type testing.

So in that you're saying that there is a problem out there and it does need to be addressed. We just need to be careful not to lump everyone into the same level of concern category but really look at the individual practice of each direct to consumer provider.

MS. LEVIN: Right. I really would like to emphasize that we view the services that we are providing as a complementary service, an adjunct service, and not a replacement. There are—it is never going to replace the traditional model and I think that what we hear both through the media and through consumers is that they don't—that everything does get lumped together.

There aren't easy ways to distinguish between the good and the bad companies. I think that that really needs to be addressed on a more formal level.

DR. LEONARD: Well, hopefully, the FDA and FTC are listening and taking note of your comments. Thank you very much.

MS. LEVIN: Thank you.

DR. LEONARD: The next speaker is JoAnn Boughman from the American Society of Human Genetics.

Welcome, JoAnn.

DR. BOUGHMAN: Thank you very much.

I'd like to sit down because at this point my comments are actually informal until I get them written up and submitted.

I am JoAnn Boughman, the executive vice president of the American Society of Human Genetics and I would like to just make a couple of comments regarding your discussions this morning on what ASHG is doing about some of these issues around patenting and licensing.

I can tell you that I can't quite come to this issue without bringing my experience of ten years as vice president for research and development and responsible for a tech transfer office that I hope did listen to me at least from time to time.

The executive committee of ASHG is very concerned about the issues that you've been talking about this morning surrounding patents and licenses and are investigating and discussing responses that our organization, that ASHG, may use to address the research clinical interface, ASHG having researchers and clinicians and genetic counselors as members.

We are looking and discussing these downstream effects in clinical testing from the research laboratory perspective. This domino effect if you will.

I would just like to reiterate to the committee as I do to our committees in discussion that there is a difference between legal and ugly. This applies both in patent law and in the contract law situations that we are referring to with the licensing processes. We have to be very careful in discussing practice guidelines, actual practices and certain players that are not playing by the general rules as we have just heard pointed out in another situation.

Our primary focus at this point is that we recognize that our member scientists need to be educated and informed and some first need to be made much more aware about these issues surrounding the patent and exclusive licensing issues so that they can deal from their own scientific perspective as a research scientist understanding that there is going to be downstream effect as these tests are translated.

The scientists should have a role and should have a part in this discussion with their tech transfer and their licensing departments. And if they don't know, if they don't know what this landscape looks like, we cannot depend simply on the tech transfer and the licensing officers to handle this.

We are also looking as a third party when you have the investigator and the companies and so on looking at this. We're also asking questions about our rights as a third party organization and our limitations around advertising or publication issues at our meeting, in our journal, and the idea of what can we do in order to help our members differentiate between practice guidelines and practices of certain

organizations or individuals.

We are also asking about what the impact of these discussions themselves and/or commentaries about these issues might have. We think that, in fact, bringing light to this issue, bringing these issues to the fore and making people aware of these differences is a step in the right direction.

I would finally say that ASHG highly values all of its members, whether they are academicians, whether they are clinicians in a different practice, whether they are industry scientists, whether they are consumers, and we clearly recognize the importance of science in academia and from the industry perspective.

Still our leadership is concerned about the actions of the few and the impact that that may have on the many, i.e. the patient community, in the long term. So, in fact, we are actively discussing and looking at these issues and will work with you in any way that we can to help the committee in any further deliberations.

Thank you.

DR. LEONARD: Thank you, JoAnn. Could I ask a provocative question having been president of the Association for Molecular Pathology? One of your points was to look at the advertising and publications and meeting support, et cetera. Are you willing to piss off some of your members by making open statements about their patenting practices and things? Is that what you're implying? Because most societies are not. They want to keep all their members happy and don't want to upset any particular group. So I'm not quite sure what that point was.

DR. BOUGHMAN: We certainly don't want to upset groups of individuals but as you have heard from a variety of people, even within industry, there are many folks, both in the industry and the university side, that are willing to play by guidelines or rules that, in fact, would encompass a more accessible model in the long run. In fact, if you look at our website, for example on somebody who could put a booth up at our meeting, and we are getting a legal reading on this right now, it clearly says that if there is not space available or at the discretion of the organization we could deny somebody the ability to, in fact, rent a booth at our organization. Now whether we have the right to and whether we're going to do that are two different things but I'm saying that, in fact, we are concerned enough about this issue that we are at least asking that question.

DR. LEONARD: Any other questions for JoAnn?

Thank you very much.

Our next and final speaker is Joanna Rudnick from Kartemquin Films. Before Ms. Rudnick begins her remarks, I'd like to point out that her testimony is being videotaped as part of the documentary film she is producing. As a committee governed by the Federal Advisory Committee Act, our meetings are open to the public and may be covered by the media.

Ms. Rudnick?

MS. RUDNICK: Good morning. Thank you. I'd also like to introduce Beth Iams who is my associate producer and filming me right now.

This has been very interesting for me. We also, as film makers, talk about intellectual property issues all the time so this has been highly informative.

My name is Joanna Rudnick and I am a documentary film maker with Kartemquin Films. I don't know if anyone here has heard of "Hoop Dreams" but that's our most famous, famous documentary. We've been around for 40 years making social issue films.

I'm here today both as a film maker—that' better—and as a woman at high risk for hereditary breast and ovarian cancer.

When I tested positive for the BRCA mutation five years ago, the last place I ever imagined I would be at—would be was on television sharing my story with millions of people. I went to great lengths to keep it a secret. I tested anonymously. I was very worried about privacy and discrimination issues. I told my employer that I just happened to have many doctors appointments, more than anyone

else, and I told my boyfriend at that time--he thought I was avoiding him because I didn't tell him I was testing for the mutation.

When the only friend who knew that I was getting tested asked what my results were, I lied and said I was negative because at the time at 27 I really didn't have the right language to be able to deal with this.

I moved home to Chicago in 2003 to be closer to my family and to finally come to terms with what it means to carry this mutation. I began to realize that being BRCA positive was not a curse but an opportunity and I slowly revealed my BRCA status to those around me and set about seeking information to help inform my future decisions about how to protect myself.

As I learned more about the BRCA mutation and those it affects and interviewed over 50 women for my original film proposal, it became clear to me that there really was a very important story here. And "In the Family" is a film about predicting breast and ovarian cancer, the consequences of knowing and knowing that you live with the risk.

In addition to telling my own story, the documentary also chronicles the story of other high risk—stories of other high risk women like Martha Haley. Martha is a three time breast cancer survivor who tested for a variant of unknown significance on the BRCA2 gene. She wonders openly why so few African American women like herself have tested for BRCA mutation. I follow her and she takes this information to her "Y-Me" support group on Chicago's Southeast side and pleads with more women to test so that we can have a better understanding of the role of genetics in African American women's breast cancer.

We also meet Linda Pedraza, a 43 year old BRCA positive mother of two, who is diagnosed with both breast and ovarian cancer while screening herself carefully for both diseases. Knowing she is losing her battle with cancer, Linda worries about the fate of her 16 year old daughter, Nicole. What will this information mean to her future? When should she get tested? You will see more of Linda's story in the upcoming clip I'm about to show you.

Often when you read stories or watch media pieces on BRCA, the mutation characters are reduced to vignettes used to illustrate a purely scientific over simplified ethical statement about genetic testing. The women who live with this information day in and day out and make life altering decisions based on it have much more to teach the general public policy makers, other high risk women and health care providers about the implications, fears and concerns of living with predictive genetic knowledge. They are having discussions in their homes and on their support websites about some of the same issues you're discussing here like fears of genetic discrimination, direct to consumer marketing and patenting.

"In the Family" is the first comprehensive documentary dedicated entirely to telling their stories while asking some of the larger questions about the legal, social and ethical implications and complications surrounding genetic testing for adult onset diseases.

By coming here today, I'm hoping that members of this distinguished audience will connect to the film and see its potential as a resource for public education and professional development.

We are in the process of forming a coalition for outreach and education and want to find partners with expertise in the field and establish networks to help us create and distribute targeted video modules and workbooks.

As the committee works to increase our understanding of how human genetics is impacting society, we want to partner with you to bridge the gap between policy and the people whose lives it most directly impacts.

So I'm about to show a two minute clip here and then I'll show my full 18 minute sample from the film in room 8 so please bring your lunch and watch. We'd love to hear your comments.

Thank you.

(Video presentation.)

DR. LEONARD: Thank you very much.

Any questions for Joanna--for Ms. Rudnick?

So as Ms. Rudnick just stated, a 17 minute clip of “In the Family” will be shown during the lunch in conference room 8, which is out this door. It’s the conference room to the right. So your lunch is in 7, the film will be in 8. Committee members, ex officios and members of the public are welcome to view the film and participate in a discussion to follow during lunch.

Ms. Rudnick also will be on hand to answer your questions and comments.

So we are not moving into lunch. Committee members and ex officios, the lunches you ordered are in conference 7, to the left out the door.

The members of the public and those members who did not order lunch, there is a cafeteria on the first floor.

We will reconvene at 1:28. You wanted to be reminded that there is a fire drill scheduled for 1:30. If we do not start at 1:28 then those of you may get caught. So that’s why I’m moving it up two minutes.

I didn’t ask Sarah for permission to do this so we’ll start at 1:28. Otherwise, you’ll have to walk up the six flights of stairs. So if anyone comes in here out of breath we will know you were late.

(Laughter.)

(Whereupon, at 12:44 p.m., a luncheon break was taken.)

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

UPDATES FROM WORKING GROUPS ON DIRECT TO CONSUMER MARKETING OF GENETIC TESTS AND SERVICES

CHAIRMAN TUCKSON: I'm going to ask our speakers indulgence that if you get interrupted then—so play it easy and we'll be cool but I don't want to lose any more time. We have a lot to do.

Let me give you a sense of what we've got to accomplish here. By the way, Sarah, do I need to tap dance or are you guys having trouble over there?

MS. CARR: We're okay.

CHAIRMAN TUCKSON: Okay. We want to do the direct to consumer marketing update. We need to do, quite happily—we have two very terrific guests on the genetic discrimination issues, which I really want to make sure we don't rush through because this is going to be good.

And then apparently there are some people who are deserving of certificates and honor, and I don't want to rush through that lest the rest of you think that when it's your turn—

(Laughter.)

--and you all decide to mutiny now. But also we need to spend a couple of minutes on restocking committees, which is sort of important. So we've got a real set of challenges so we're going to go ahead and move through and try not to have too much disruption whenever whatever is supposed to happen.

Direct to consumer marketing. In '04 we sent a letter to the Secretary urging FTC, FDA and other HHS agencies to collaborate on the regulation of advertisements for genetic tests marketed directly to consumers. We encouraged relevant HHS agencies to collect the necessary data and to conduct an analysis of the public health impact of direct to consumer marketing of genetic tests.

In very responsive response to these recommendations, two interagency workgroups were formed. One composed of staff from FTC, FDA, CDC and NIH, and they have been working on an assessment of the scientific accuracy of claims made by companies advertising genetic tests on the internet.

The second workgroup composed of staff from FDA, CDC, NIH and HRSA have been exploring mechanisms for collecting data on the public health impact of DTC market of genetic tests.

Matt Daynard, Joe Hackett and Scott Bowen will now give us updates on the work of these two important groups.

Let me turn it over to, I think, first—I guess, have you guys decided who is going first?

MR. DAYNARD: I will, yes.

CHAIRMAN TUCKSON: Go ahead.

FDA-FTC COLLABORATION

MR. DAYNARD: Sure, why not.

Thanks very much, Dr. Tuckson.

Actually I think this will be brief but I think Secretary Leavitt really summed things up pretty well as to the status in his letter to you, Reed, earlier this month when he said that the FDA, the CDC and the FTC were developing a consumer alert that, among other points, encouraged consumers to talk to their health care practitioner about using at home DTC tests and about their interpretation. Also, encourage them or warn them, if you will, to question claims made by these companies because there may be scientific validity issues and there may be issues about whether they've had a full examination and in what context they're having these tests done.

And, in fact, things are pretty far along. The CDC has approved a draft, cleared a draft. The FDA and FTC are on in the process of clearance and we think we'll have something out in the not too distant future. So in a nutshell that is where the consumer alert is.

DR. LEONARD: How will it be sent out? I mean who and—I mean how do you get these public things out to everybody in the public?

MR. DAYNARD: Right. A good question. There are several ways. The FTC could release it as

a consumer alert and have a variety of media alerts to go along with it so that it gets picked up. It's a press release. It's a consumer alert and then it gets released as if we sued somebody and had a consent agreement or if we went into court or something, we'd have a press release and then we'd alert the media and there are a variety of ways that our public affairs office gets it out to the media, and they usually do a pretty good job.

The FDA and the CDC are going to do a similar thing.

DR. LEONARD: I may have missed this in what you just said but part of that alert is then there a resource that the public can turn to go—because it's just—the presentation we just heard indicates the heterogeneity of what's out there and so there may be some groups where you'd say, okay, this is legitimate and others which are certainly not. So is there a resource that's going to be made available to the public?

MR. DAYNARD: Sure. Well, the first line of resources, if you will, are certainly the three agencies, the FDA, the CDC and the FTC, and we can direct them further if need be. And then the alert itself, of course one of the main themes is you must talk to your health care—your doctor or your health care practitioner or someone who knows about these tests and can direct you further.

CHAIRMAN TUCKSON: Do you want to—I mean, I guess, I think part of your question is the specificity of the guidance that will be in the press release.

MR. DAYNARD: Well, the alert itself says do this, do A, B, C and D when you see these kind of claims.

CHAIRMAN TUCKSON: Okay. So what we need to learn is what an alert is.

MR. DAYNARD: Ask these questions. Yes.

CHAIRMAN TUCKSON: I think we need to respect the power of an alert.

MR. DAYNARD: Right.

CHAIRMAN TUCKSON: It's a pretty big deal when FTC does that.

MR. DAYNARD: We like to think so.

(Laughter.)

CHAIRMAN TUCKSON: Humble though you are.

MR. DAYNARD: Yes.

CHAIRMAN TUCKSON: All right.

DR. LEONARD: But is there a way that people—is there like a contact us or alert us if they're concerned?

MR. DAYNARD: Oh, sure. Yes.

DR. LEONARD: Is there a website or something?

MR. DAYNARD: There is a website and it will be—

DR. LEONARD: Some place to—

MR. DAYNARD: Yes. It will be on our—

DR. LEONARD: --that they go that they can provide you with names of companies that the public is concerned about?

MR. DAYNARD: Yes. There is a hotline number for FTC.

DR. LEONARD: Oh, okay.

MR. DAYNARD: Call if you need help.

CHAIRMAN TUCKSON: When is it going to be available?

MR. DAYNARD: I'm sorry?

CHAIRMAN TUCKSON: When will this be available?

MR. DAYNARD: Let me look in my crystal ball. Hold on.

CHAIRMAN TUCKSON: When is this coming out?

MR. DAYNARD: I can't speak for the other agencies but I have to think it's going to be very soon. It depends on how things work with three agencies trying to agree on something. But I think it's

going to be very shortly. Hopefully next month.

CHAIRMAN TUCKSON: Okay. That's what—just a ball park.

MR. DAYNARD: But that's not cast in stone.

CHAIRMAN TUCKSON: Got it. And we won't—we won't make you get in trouble—

MR. DAYNARD: Thanks very much.

CHAIRMAN TUCKSON: All right. The other thing is—

DR. LEONARD: But before the next meeting can we have a copy of it in your books? I won't be here.

CHAIRMAN TUCKSON: Yes, we will, I'm sure, have that and we will also—

MR. DAYNARD: Oh, sure.

CHAIRMAN TUCKSON: --have it on our website.

MR. DAYNARD: Right.

CHAIRMAN TUCKSON: So, Sarah?

MS. CARR: (Not at microphone.)

CHAIRMAN TUCKSON: Now you see there.

(Laughter.)

MR. DAYNARD: Yes.

CHAIRMAN TUCKSON: That's what I like.

MR. DAYNARD: It's wired.

(Laughter.)

CHAIRMAN TUCKSON: That's responsiveness. All right. Well, thank you.

By the way, one of the things that we will do—now, you don't mind if when we put it on our website sort of say that we called for this—we identified this as an issue and we called for it and look how terrific these agencies are?

MR. DAYNARD: I don't think we have jurisdiction over the committee's website.

(Laughter.)

So you can say what you want.

CHAIRMAN TUCKSON: So the folks who are new to the committee, if you are sort of wondering whether or not we—

(Simultaneous discussion.)

MR. DAYNARD: Absolutely, of course.

CHAIRMAN TUCKSON: Debra, you're not going to get your certificate.

DR. LEONARD: (Not at microphone.)

(Laughter.)

MR. DAYNARD: We might even—who knows. Our office of public affairs might even attach the Secretary's response letter to you.

CHAIRMAN TUCKSON: See that's what I'm looking for is credit.

MR. DAYNARD: Yes.

(Laughter.)

CHAIRMAN TUCKSON: I want the committee to know that their work delivered something. By the way, just to conclude, although I'm joking because we do want credit—

(Simultaneous discussion.)

CHAIRMAN TUCKSON: Well, we want credit. But I will say this in seriousness, this is an excellent and extraordinary example of government agencies working together and I'll tell you the speed with which this has occurred is by my way of thinking astounding. I would appreciate it on behalf of the committee if you would let your respective people know in the agencies that it was noticed and appreciated.

I think we probably, Sarah, need to send a letter to the Secretary sort of commending again these

organizations for responsiveness. I mean this is a great thing and you deserve a round of applause.

Thank you all very much.

(Applause.)

MR. DAYNARD: Thank you.

CHAIRMAN TUCKSON: With that, we're going to move then to—by the way, did I cut anybody else off that wanted to chat?

MR. DAYNARD: No.

CHAIRMAN TUCKSON: Okay.

MR. DAYNARD: I just want to thank you, Dr. Tuckson. That's very much appreciated.

CHAIRMAN TUCKSON: No, thank you.

Genetic discrimination. Are we okay over there?

(Simultaneous discussion.)

CHAIRMAN TUCKSON: Oh, you did want to talk?

MR. BOWEN: Right. We were going to have an update no the data collection.

CHAIRMAN TUCKSON: Oh, good. Do that. Do that.

MR. BOWEN: If you're still—

CHAIRMAN TUCKSON: No, I want you to do that.

DATA COLLECTION ON THE PUBLIC HEALTH IMPACT

MR. BOWEN: Okay.

Well, on behalf of CDC and the working group, I'd like to thank you for this opportunity to report to the committee about data collection efforts. Given the current lack of information regarding public health impact, we have been working actively to collect data about direct to consumer marketing of genetic tests, including levels of awareness among the general public and among practicing physicians.

At the national level, CDC is collecting data using the Health Style Survey in late 2006, which is targeted at consumers, and also the Doc Style Survey, which is comprised of primary care physician respondents.

Questions will include knowledge of various genetic tests available and the type of media by which that knowledge was gained. Also physicians are also going to be surveyed about the number of patients who asked about these tests and who actually brought such tests results to them.

In addition at the state level through mutual encouragement, three of the CDC funded capacity improvement states have added questions regarding direct to consumer marketing of genetic tests to their behavioral risk factor surveillance system modules for 2006, including Michigan, Oregon and also Utah.

The questions will ascertain awareness of direct to consumer marketed genetic tests and usage of the tests.

Results from all of these efforts are expected by mid year 2007.

In addition, I'd like to mention, as many of you know, Myriad Genetics launched an intense media campaign, a five month media campaign, in 2003 to promote the availability of direct to consumer tests to detect the presence of BRCA1 and BRCA2 mutations to women in the cities of Denver and Atlanta.

CDC then conducted a study of the resulting public health impact using Raleigh-Durham and Seattle as control sites and the results were recently published actually this month in the Journal of Genetics and Medicine. The study found that after the campaign physician's knowledge did not differ between pilot and control cities on a statistical basis but that more physicians reported greater interest in tests among patients and that more physicians in pilot cities versus controls, 14 and 7 percent respectively, reported an increase in the number of times they ordered genetic testing for breast and ovarian cancer in the previous six months.

The researchers also concluded that given the complexity and limitations of genetic testing for risk of breast and ovarian cancer that the development and broad dissemination of clinical guidelines and

education of physicians are needed. In fact, many of the physicians responded that they needed more information about available genetic tests and would like to know more.

So there's a lot of work to be done in this area but we are pleased that these efforts are moving forward.

CHAIRMAN TUCKSON: Let me just make sure. I think that there was a subtlety there that I want to make sure that I am not missing. You looked at the results of direct to consumer advertising and picked up that the people who were—in addition to the consumer—it was the health professionals who were picking up on it and, therefore, were getting information—and ordering more tests but it wasn't clear whether or not that was a way of reaching—the direct to consumer was a way of reaching the physician audience or was it the patients coming in and bugging the docs?

MR. BOWEN: Primarily it was the patients coming in and asking the doctors about it. Maybe they mentioned family history or just that they heard about the commercial and were concerned about their risk. The survey was actually conducted on primary care physicians and so there is a proxy factor to consider for consumers.

It's also worth mentioning that Myriad also had a limited campaign directly to physicians in terms of workshops and things like that.

CHAIRMAN TUCKSON: It just seems to me, by the way, though, that probably the most—one of the things I think that would be important to know is direct to consumer does hit the physician because it's in the air and they're not getting this stuff in other places. So this may, in fact—it could be parenthetically argued that these campaigns are a way of giving information to clinicians.

MR. BOWEN: Certainly. It's certainly true and we see the same thing in direct to consumer marketing of pharmaceuticals as well that there's—through heightened awareness and questions that physicians often report higher levels of knowledge about the product.

CHAIRMAN TUCKSON: Great. Terrific. Thank you very much. We will follow this update with interest.

DR. HANS: Thank you very much, Scott. Just a quick question is that I know that your conclusions regarding the need for more clinical guidelines in that and I'm assuming that the CDC's work was done prior to the release of the United States Preventive Services Task Force recommendations regarding testing. I don't know if there would be any follow up from the CDC to see whether something like that—those—the implications of actually having the release of recommendations from a government agency would have had any impact further than the direct to consumer impact.

MR. BOWEN: I think it's a very interesting question. I think you're referring to their response with regards to BRCA1 and 2, the U.S. Preventive Services Task Force. And it would be nice to—it makes an excellent research question and something we'll look at.

CHAIRMAN TUCKSON: And one last question from Emily.

DR. WINN-DEEN: So I just wanted to know if you were also going to do similar research on the Tell Someone Campaign that's currently running on HPV testing?

MR. BOWEN: We are not. However, if the states where the pilot is occurring—I'm not sure if that's a national campaign or a state-based campaign.

DR. WINN-DEEN: I don't know. It's running in California for sure.

MR. BOWEN: But if those states are interested in asking for our help, we would certainly entertain that.

GENETIC DISCRIMINATION

UPDATE FROM KEY STAKEHOLDERS ON THE STATUS OF THE FEDERAL GENETIC INFORMATION NONDISCRIMINATION LEGISLATION

CHAIRMAN TUCKSON: All right. Well, thank you again, Scott. So we'll get an update on this from you as it goes forward.

Now to the genetic discrimination section.

We're going to get an update from key stakeholders.

As you know, we have been actively interested in this for a long time. One of the things, and I will not get a chance to spend a lot of energy today because of time on the meeting that I had representing you in front of the director of NIH but I will say, just as a general statement, that I could not be more pleased by his interest in what you are doing. I found him to be exceedingly responsive to our agenda. He was excited, enthused, fully attentive and aware.

I will say that Sarah is doing a great job in her own right and with Lana Skirboll, who was there as well, and they really were up on it.

So I just want to--and I'll find another time, hopefully, to be able to give you all the things that he said but he had a lot of ideas about ways in which we can enhance the value of our work. He, in fact, has taken assignments on a couple of things where he personally wants to do more to ensure that our work is getting the implementation and the visibility within the department that it deserves. So he has got a whole bunch of strategic things that he wants us to do and what he suggests that we might consider, and things that he wants to take the ball and run with.

One of the areas in which he was most engaged was on the issue of discrimination, genetic discrimination, and he has--he is going to give us a report back that we will distribute to you--in terms of the things that the government has done in this regard. And he, personally, as a result of our pushing forward in terms of our statements to the secretary, which have then been translated into a presidential directive of support for getting this legislation passed, and then he has then emboldened, and he started ticking off a list of the members of congress that he has met with to push this forward so what he's going to do is make sure we know those things that he has done and that's a report that's coming from him.

So I just wanted to be real clear that we were sort of wondering how much stuff the administration was doing based on our report. He made it very clear that our reports are well known in the administration, that they have acted on those reports, and that he and the secretary have authority and empowerment to go forward and to try to help move this stuff forward so he was very engaged in that regard.

Well, we have been really pleased to have had a chance over time--I'm going to try to bring the new members up-to-date--to have a chance to have a number of conversations from the advocacy community, the business community, and the health insurance community. And we've been able to sort of have conversations where we were sort of--of having a chance for common dialogue inform behind the scenes and individually and one-on-one as these very responsible organizations have moved forward with this agenda.

I am particularly pleased that Mr. Eastman, Michael Eastman, Director of Labor Law Policy at the U.S. Chamber of Commerce, is here and that Sharon Terry, CEO and President of the Genetic Alliance, is here on behalf of the Coalition for Genetic Fairness.

I think that what you clearly have seen in all of this is a really, I think, noteworthy example of constituency groups being responsible, willing to talk with people who share perhaps some differences, willingness to discuss those differences in an open and honest way to try to get to solution. I think that's really, really, really noteworthy and so I commend both of you for your leadership and your willingness to be collegial in trying to reach a consensus of opinion, and you deserve to be noted therein.

Let me ask you, either one of you which wants to go first, and let's see where things are today.

MICHAEL J. EASTMAN

MR. EASTMAN: Thank you, Mr. Chairman.

I would like to do two things in my remarks and then turn it over to Sharon, and then open it up. The two things I want to discuss are, first of all, how the Chamber of Commerce--or the fundamental concerns that have driven the Chamber of Commerce in its position that it has taken historically on this issue and, then, secondly, I want to turn the page and discuss common ground and where we are today.

So, by way of background, our position has been that if there is to be legislation dealing with

discrimination based on genetic information, then it should be narrowly drafted to ensure that it accomplishes its goals without inviting frivolous or unnecessary litigation or burdensome--undue burdens, excuse me, on employers as they try to implement the new law. So that has been one of our fundamental concerns as we've gone through this process.

Number two is that legislation dealing with genetic information has appeared to be serving a different purpose than traditional civil rights legislation, and let me explain that. From our perspective, Title VII of the Civil Rights Act, the Americans with Disabilities Act, the Age Discrimination Act and so on, were created to remedy a long history of ongoing pervasive discrimination. In this case, it appears to us, that while that may be a concern, the primary purpose is to deal with a fear that people have, a fear that is keeping people from availing themselves of genetic services, genetic tests and so forth. Because those purposes are a little bit different that may mean that some of the ways in which the law is implemented may need to be different as well. So those are two sort of fundamental themes that we've kept in mind as we've looked at this legislation over time.

I should also point out that most of the Chamber's involvement in this issue has dealt with the employment discrimination piece, not the insurance discrimination piece. We do understand from some of our colleagues that there are some concerns with that part of the bill, the so-called Title I part of the bill, but our primary focus has not been on that. It ha been on the Title II, the employment discrimination piece.

Now, I don't want to spend a whole lot of time talking about numbers and statistics. I just want to give one example, though, that I think serves to illustrate how the unnecessary litigation is a big concern, and that is with current EEOC statistics on existing civil rights laws. Using last year's data, 2005, there were about 75,000 charges filed at the EEOC. The agency found no reasonable cause in 62 percent of those cases. They found reasonable cause in 5.7 percent. It doesn't add to 100 because there were settlements and other things in there. So I think that, while not conclusive, certainly that's evidence of the scope of the problem that's out there and the amount of cases that are filed without merit. Keeping in mind that employers spend somewhere between, I think, $30-50,000 to defend the run of the mill case, it's a significant burden, and that's what we're concerned about.

I just want to give a few examples of our thematic concerns we've in the past before turning to where we are now. Our three, I would say, fundamental concerns have been dealing with the issue of damages and what the appropriate scope of relief is for true victims; with whether or not the bill has preemption of state law; and, third, the extent to which the bill goes beyond discriminatory conduct and addresses the collection and flow of information that employers have. So those have been our three thematic concerns. There are many other serious, though more narrow focused, concerns that we've had as well.

Turning the page, I'd like to talk about where we are today. A little over a year ago, maybe a year-and-a-ago, when the Genetic Alliance asserted more leadership in the Coalition of Advocates for Genetic Information Nondiscrimination Legislation, we found things had changed, frankly, in the environment in which we'd been working. We found it much easier to talk to proponents of legislation and we sat down in a series of meetings, I would say, over at least a six month period. Long, long meetings where we tried to shut out all preconceptions and just talk about issues and concepts, and we started very big and we got down to very detailed, just trying to understand where each other were coming from, and we made great, great progress, I think. While we do not have a detailed legislation before us today, we do have common ground principles that we agreed on and I'm happy to share those with you today. They fall into eight categories.

The first category is "fear" and that we recognize that many people are not availing themselves of new technologies or treatments in health care or participating in scientific or clinical studies because they fear being discriminated against based on their genetic information. We also recognize that employers, employees, health care providers, patients and others fear the unknown. None of us know what new

treatments may be produced by the burgeoning genetics field and we don't know what the consequences of new legislation will be, including the potential for new unforeseen litigation.

Category two is the "Standard and Scope." We agree that legislation, which would be enacted to create a single national standard with regard to nondiscrimination, providing the same protections, obligations, remedies, enforcement and exceptions from state-to-state, the scope of the law should focus on discriminatory conduct, for example, broad employer testing, and not the flow of HR information or unrelated processing of health care information.

Number 3: Enforcement process. A particular process for an individual bringing forth a claim should be filtered in some way to weed out un-meritorious cases. Now one such model would be the current Title VII model, a three part remedy--well, excuse me. The current Title VII model in which the EEOC acts as the filter. It reviews the case, tries to get conciliation and then that does weed out a number of frivolous cases, and then the individual can proceed directly to court if they wish.

Under "remedies" we envision a three-part process. This is number four, "Remedies." Including injunctive relief, equitable relief and additional remedies for egregious cases. The law should offer basic protections that will allow individuals to receive genetic services without fear of discrimination and that will minimize challenges for employers in implementing and administering new protections.

Legislation should not invite non-meritorious or frivolous litigation. It should encourage protection and not litigation. One possible option we discussed but by no means the only possible option is creating a mechanism so that the EEOC could provide immediate expedited injunctive relief and equitable relief, make whole remedies incurred through loss of work, health care coverage, et cetera, in most cases, and in the egregious case an individual could pursue additional remedies.

Category five: The "Definition of Family Member." We believe that family members covered under legislation should be limited to three generations, grand-parents, parents, siblings, spouse, children, including adopted children.

Number 6: "Permissible Exceptions and HR Compliance." Inadvertent collection of genetic information should not be the focus of legislation. An employer should not be required to violate an existing law or be punished on occasions when it is reasonable for the employer to take action based on the employer or prospective employee's genetic information. For example, compliance with other laws such as the Family and Medical Leave Act, employment benefit counseling, wellness programs or direct threat situations.

Number 7: "Sunset Clause and Independent Study Commission." A new law enacted today could present unforeseen negative consequences in the future for individuals, employers, health care plans and participants. As such, we believe that an independent review of any new law should take place within six years in favor of some sort of truly independent commission to examine all aspects of the law. If legislation is kept narrow and there is a truly independent commission, we do not believe there's a need for a sunset clause in the legislation.

Finally, number 8: "Communication and Education." An education and communication campaign will be necessary to help carry out the purposes of the law, reducing fear and educating constituents about the law. The campaign should be aimed at employees, employers, health care participants in plans, and focus on individual rights, responsibilities and obligations.

That's where we are in our common ground today and I'm going to leave it there and turn to Sharon, and then we'll have some discussion.

SHARON F. TERRY

MS. TERRY: And I actually am going to keep my remarks very brief because, as Mike and I have been doing this together, sometimes I do all the talking and sometimes he does all the talking but neither one of us needs to talk much if the other has presented these points.

We've been able to present these to Congresswoman Biggert, who then decided that we were really ready then to meet with the Ed and Work Force Committee staff, which we did. We had a very

good meeting with them. They are ready now to sort of go into the weeds and look at what do these common ground principles mean for this legislation and how can we move this piece of legislation forward. So we continue to work together, albeit with less intensity because we certainly did have some intense months of locking ourselves up with each other so that we really did understand where we came from and you can see we've come a very long way to a very common place.

So I'll leave it open to your questions.

CHAIRMAN TUCKSON: My gosh! Kevin.

DR. FITZGERALD: Just a quick question. Based on these eight foundations of your common ground, how close to these foundations is the current legislation do you think?

MR. EASTMAN: Well, I would say that we certainly kept in mind the current legislation as we came up with these common ground principles. Some of them are a direct response to what's in current legislation. Some of what's in current legislation directly addresses some of these problems. For example, an exception for Family and Medical Leave Act issues.

I want to keep the door open in terms of what the best way is for legislators to proceed. Some of these provisions will be difficult to draft, I have no doubt. Some of what we have talked about in terms of damages is not quite equivalent to some of the other laws out there and it's going to take some bright people some time to work through. I hope that they begin doing that and we'd be happy to be part of that.

Other provisions, I think, are relatively minor changes and could be done quickly.

CHAIRMAN TUCKSON: Good. A good question.

Cindy?

MS. BERRY: I was wondering if you had gotten any commitment from the committee and/or from the leadership in the House about moving the legislation. Specifically, I wanted to hone in on Health Week, which was supposed to have occurred in the House--was it--last week. It kind of fizzled. I think they're talking about doing another one since the first one was such a resounding success but I think part of the new Health Week will be taken up by the Health Information Technology legislation, which is critically important and a lot of what we do and what we're talking about. I can see where there's a good linkage between HIT and this bill, and I was wondering if it had come up that it could be potentially a candidate for that new Health Week, whenever that is.

MS. TERRY: So yes to all of that. It was supposed to be part of the first Health Week perhaps. I have learned from my incredibly naive position that this is very, very complicated. You know that old thing about it's like making squash or not squash--

MR. EASTMAN: Sausage.

MS. TERRY: Sausage, yes. It's worse than that. So we are working on a number of fronts to move this forward so we're working on the number of co-sponsors. We're up to 208. That's keeping the democrats that want to get on off so that we keep the balance between republicans and democrats. This past week we faxed 120 offices. We have another ten visits in the next couple of weeks. So that's one piece of momentum.

The other piece is the committee piece and whether or not they're willing to work it. They so far have not given us a commitment to a date or time. They do understand that both in terms of privacy issues in this nation right now this might be a very good thing to pass, as well as a Health Week related kind of issue. They are certainly very busy with a lot of things and I certainly understand that and we keep bugging them to move this stuff as quickly as we can go.

I don't know, Mike, if you have any other--

MR. EASTMAN: All I would add to that is certainly we saw a time this year where the committee's activities slowed down around the transition when they got a new chairman this year through the new majority leader challenges. So I think the committee did have a little lull. They're reassessing their priorities and I believe they're now beginning to pick up speed again.

CHAIRMAN TUCKSON: Great. We have Debra, Francis and James.

DR. LEONARD: Can you explain to me where this legislation is? Is it in one committee or three committees? Does it have to be--it then goes to a House vote but at what point? And then it has to be rationalized with the Senate bill? Or is this the same bill? Can you just give me an update on the legislative process? Also for the new committee members.

MS. TERRY: Sure. This will be definitely the quick and dirty and non-expert explanation. So it's the same bill as the Senate bill that passed 98:0 at the beginning of this session, which was last January, January of 2005. It is a bill that is in three committees. It's in Ed and Work Force, Commerce, and Ways and Means. We've met with Ways and Means. They said, "This really has a very insignificant piece in it that has anything to do with us and we'll sign off immediately once we need to do that." Commerce doesn't seem right now to have too much--paying too much attention to it because of the insurance kinds of problems with the bill, at least the people that we talked to. They pretty much signed off on the bill and said, "It's okay with us. It really is just the work force or employment provisions."

So right now it remains--again, this is a balance that I don't quite understand all the pieces of but the committee that our Congressperson, Mrs. Biggert, has decided to have go first on this, so to speak, is this Ed and Work Force Committee. They'll need to move it. Once they move it, then the Commerce Committee has to take it up, and so does Ways and Means, except that they will probably sign off on it. And then it can go--once it's marked up--go to the floor of the House for a vote. If it substantially changes in that process and it is passed in the House, if it's so very different from the Senate, it has to conference with the Senate bill and they have to make a decision together about what the final signed law looks like. If it passed in its current form, it's the same bill and that should be a very easy process.

And then there are other parliamentary procedure kinds of things that could happen if we had more than 218 republicans, which means then-- Mrs. Biggert is sure that there's enough support in the House--it could actually go to the floor without going through the committees but I hear that that's not a very common thing and that usually the various congress people like to give the committees jurisdiction over what they have jurisdiction over before they move them.

DR. LEONARD: Can this be accomplished in this year?

MS. TERRY: That's a great question and we have, from the beginning of the year, felt like we need to do it today, as in January, so we get more and more worried every single week because we have a very short year. As soon as congress recesses for the summer, they come back and they get re-elected essentially.

DR. LEONARD: And you start all over.

MS. TERRY: There are those in congress who say, "Yes, it could move if it wants to move if the committee chairs decide it's going to move."

The other alternative is a very sad one for us because you know that we've invested a great deal of energy in this and that is we would drop it in the next congress, and maybe hope that we could get the Senate and House to drop it together, that we could get all these people to sign on again, but the enormous amount--I mean, my feeling is like we've rolled this rock to the very edge of the top of the hill and we just need to get it over. So we're having a Hill briefing Thursday. Mrs. Biggert is going to speak and Joanna Rudnick is going to speak and show her film. We're hoping that will build some more momentum and help people understand why we need to do this now.

DR. LEONARD: Is there anything we can do to help with this process?

MS. TERRY: You have helped a great deal. We have the phone book and we have brought it to about 25 offices physically where we plunk it on their desk and say, "Look at this." We've sent a lot of people to the web site to the testimony that you recorded last year or whenever that was. I think to just keep vigilant-ing (sic) your various communities about making sure that people in your private sector like are contacting their congress people. And then these kinds of things, I think, help a lot because the transcripts and that web cast, and these sorts of thing are very beneficial to point to.

CHAIRMAN TUCKSON: Thank you.

Francis?

DR. COLLINS: So I just want to really thank both of you for the incredibly hard work you have done, along with many other colleagues, to arrive at what sounds like a real path forward and, particularly, thank Mr. Eastman from the Chamber of Commerce for rolling up his sleeves and trying to figure out what could be arrived at here in terms of a solution that would protect employers against the kinds of frivolous lawsuits that I know have been a concern. I really want to thank the Chamber for deciding to negotiate on this instead of just trying to basically say we don't want to talk about it. So thank you. That's really gratifying to see how far that has come. I know everybody has had to bend a little bit in that regard. I think we're all very anxious now about the waning days in the 109th Congress and how possible it's going to be to get this through.

I guess my question is to what extent are you, in fact, staying in regular communication with the Senate side so that if there are going to be new bits of language inserted into this bill you already have a sense about whether that's going to create another problem in that maybe somebody on the Senate side didn't quite like what you said and then you end up in a conference that goes on longer than our current congress is going to have to resolve this? Is this something that can be optimized a bit by making sure that the two sides of the congress are actually chatting with each other as you're considering doing a little re-crafting here?

MS. TERRY: Francis always asks very pointed questions. So, yes, we have been in touch with staff in the Senate. Ryan Peterson, who is the Health LA for Mrs. Biggert, has also been in touch with those staff. So we do keep in conversation with them. We have, however, not, for example, presented these points partly because, as Mike said, we don't know where this is going to go. There are certain things that are well beyond either his or my group's purveyance and that will be decided by the congress.

We have asked Mrs. Biggert and her office to make sure that she is keeping the Senate side informed and asking for when can we go and do that as well.

So our hope, too, is that there's no surprise; that the bill passed in the House--let's hope--in the next month or two isn't one that the Senate says, 'Oh, my gosh, this is really completely against what we had hoped for.'

MR. EASTMAN: Let me just add that one of the hardest things you can do is get the House and Senate to talk to each other. It is going to be a challenge. It's a challenge, also, because the Senate has a very clear position which it has adopted two congresses in a row. If the House does something different than--that may present challenges but I have had informal conversations with Senate staff indicating that if the House did something different, they'd certainly be willing to take a look at that in a positive way.

CHAIRMAN TUCKSON: James?

DR. EVANS: My questions already got answered. Thanks.

CHAIRMAN TUCKSON: Great. Well, once again I just really think that this is terrific. I'm glad that Debra asked the question what more can we do and I think that it's good to know that again on another issue we did something that added value, both--I left out Julio. How shameful! Please.

DR. LICINIO: My question was partially addressed before but it has to do with some of the limits of the legislation. From Sharon's perspective, do you think that it's too restrictive now or is this kind of completely okay for both sides in the way it stands?

MS. TERRY: So I think if we stay in an ideal world then it's probably not very good for either side but I think what Mike and I and our groups have decided, coming together, was that the world is not ideal and we need to figure out a way to live together well so that we get rid of the fear but don't put too much burden on the employers. So the points that we have come together on, we're very comfortable with on both sides that they take care of what we need them to take care of and we both--both sides can live with it feeling comfortable.

Now, I should also say there are groups within the Coalition for Genetic Fairness who did not renew three years ago to be members of this coalition because they wanted to see much stronger remedies

and much stricter provisions in this legislation. They are holding to an ideal that perhaps we should hold to. My group, the coalition, at this point feels it's better to get this practical thing done so we can raise the flag and tell people to go ahead and be tested without fear, and that is a much more practical and important way to go.

CHAIRMAN TUCKSON: Terrific. I didn't mean to cut off questions. Julio, I'm sorry. Is there somebody else?

MS. AU: What was the decision about state preemption?

MR. EASTMAN: Well, we talked a lot about this issue and we certainly feel very strongly about it but we realize that a lot of members of congress have--in particular, have a strong concern about preemption and they don't like to use the "P" word. So we have come out with a position in favor of one single standard and we've described a little bit about what we think that means but at the end of the day we're going to have to see what congress does with that.

MS. TERRY: And part of our concern there was on both sides there are good state laws and there are poor state laws. There are republicans and democrats who have passed those laws who both feel strongly about that. It really is a mishmash across the states. We understand that, both for our members and for employers, one single standard would be a very good thing. And if it was an adequate standard or more than adequate standard then that would be fine. But, also, that it wasn't something that we felt like we could resolve and bring it to the congress. Like the definition of family, I don't think they're going to quibble with us. This definition, I think they would have some problem with us taking the control away from them in terms of that determination.

CHAIRMAN TUCKSON: Joe?

DR. TELFAIR: I want to again thank you all for the hard work you've done because actually you've answered one of the questions, and Julio asked the same. I was concerned in terms of after this. I have kind of watched this and talked to a lot of people but my concern is that I know that there are people who feel very strongly of saying they want something beyond what it is you are having. I'm wondering do you have--this may be--maybe I'm being optimistic in the sense I expect something to happen. But after the fact, what is your plan in terms of trying to work to bring these other folk back into the fold because the groups that I have seen that they are pretty important to us who work in the field. So I'm wondering do you have some idea, and this is specifically to you, Ms. Terry.

MS. TERRY: So while those groups sort of left probably three years ago or so, my conversations with them more recently, because we work on other issues together, are that they are not opposing now what we're doing. They are just neutral on what we're doing. What they are claiming is it's not a priority issue for them. I think that's a nice way of them being gracious about what we're doing and I appreciate that a lot.

So I don't foresee any problem with working with them, for example, once we develop some kind of education campaign. I'm certain that they'll want to disseminate that information as well. At the same time, would some of them want to mount a campaign later to pass even more stringent legislation at some point? And maybe they would. Again, coming from where I come from, serving 600 groups who serve 1,000 diseases, I keep thinking we have very important things to do and I don't have the time or energy to then go and mount the next campaign but maybe some group would. I also know that it's very hard once legislation is made to change it and I think it won't be practical, and I think they are pretty convinced of that as well.

So I would say it isn't the problem it was maybe two or three years ago, and I think we've all moderated in our views and come to a more common ground overall.

CHAIRMAN TUCKSON: Well, thank you again. I'm behind you. I snuck around you.

(Laughter.)

Once again, I think that--quite frankly, I think you both deserve, really, a round of applause for what you all have done.

(Applause.)

And we wish you good luck on translating the shared vision and the principles documents and all that into legislation in a timely way but, whatever happens, you couldn't get there unless you did what you have done, and it really is a shining example. So thank you both for joining us. We appreciate it.

All right. Now--at the beginning of the meeting I introduced—I'm over here because this is formal and it's serious.

(Laughter.)

PRESENTATION OF CERTIFICATES

CHAIRMAN TUCKSON: We introduced three new members at the beginning of the meeting. Unfortunately, that of course means that as of this meeting this is the last meeting for three of our colleagues as official members of the committee.

We have really benefited from Debra, Agnes and Emily's involvement over the course of this committee. I want to thank each of them individually for their contributions and let me start with Debra, who is an exceedingly hard working member of this committee. As chair of the Patents and Access Task Force she really did skillfully steer us through the review and evaluation of the National Academy of Science report and has also been a member of almost every other task force that we have ever had. She has been on Coverage and Reimbursements, Large Population Studies, Genetic Discrimination and has made important contributions to each of them.

If this were not enough, she serves as our SACGHS liaison to the CDC's EGAPP workgroup. During the committee meetings I think you've noticed that she is not shy about expressing her opinions and raising cogent questions and we have benefited from each and every one of those comments.

In recognition of all of your work these past three years, we'd like to present Debra with this certificate and a letter from Secretary Leavitt.

(Applause.)

DR. LEONARD: I won't make a big speech but it really has truly been an honor to be on this committee. I watched SACGT from the seats and just tried my best to restrain myself from trying to participate. So to actually have a seat at the table and to be able to participate has been wonderful.

I charge you all with being really committed to this committee because you're doing great things and you guys have to carry on the work that some of us have started and are currently working on but just keep going. You're doing great things.

(Applause.)

CHAIRMAN TUCKSON: The one thing, of course, that is probably the most enduring specific legacy that she leaves is a permanent ban on the word, the phrase, "home brew." She ain't home and she ain't brewing nothing.

(Laughter.)

Thank you for that.

Secondly, Agnes Masny, who has served also as an extraordinarily valuable member to this committee for the past three years. She capably led our efforts on our number one agenda item and that's, of course, genetic discrimination. In that role she ably chaired the public consultation that we held in the fall of 2004 and guided the development of three letters to the Secretary calling for the passage of federal genetic discrimination legislation. She led us through the creation of the legal analysis, the DVD highlighting the testimony of the October 2004 hearing, and a compilation, the telephone book as it is now famously referred to, of written public comments. She approached this role with a combination of sensitivity and gentle tenacity.

Agnes, please accept this certificate as a token of our appreciation for your three years of service to the committee and you have been just a delight, delight to work with.

(Applause.)

MS. MASNY: Well, thank you very much. I also have to echo Debra's comments. I have very

similar sentiments about the committee's work and the honor that it has been to be here but I also would like to thank the leadership that we've had both from Reed Tuckson as well as Dr. McCabe, who was the chair of the committee when I first came on the committee, and of course, without saying what everybody knows already, to thank the staff, Sarah Carr and her staff, for the excellent support that we've all had, without whom none of this would be able to get done.

Thank you.

CHAIRMAN TUCKSON: Thank you so much.

(Applause.)

And feel very, very good about what you've achieved through your leadership on this.

Emily Winn-Deen, an integral member of our committee since its inception, chair of the Pharmacogenomics Task Force. She has guided the development of the draft report and the recommendations, which as we saw yesterday is no small task and you really were able to put together for us such a thoughtful menu of things to consider and we really appreciate it. You have ensured that we were properly informed about the issues, needs and ongoing activities in this area and that our fact finding efforts were comprehensive.

In addition to serving as chair of the Pharmacogenomics Task Force, you also made valuable contributions to our Coverage and Reimbursement, Genetic Discrimination and Patents Task Force. You have been very, very busy.

Please accept this certificate, Emily, and our gratitude for your hard work these past years, and I am most appreciative for everything you've done for us.

(Applause.)

DR. WINN-DEEN: So I, like Debra, sat in the side chairs during SACGT and actually got to occasionally participate by invitation and I hope that potentially I'll get the same invitation to come and represent the in vitro diagnostics community. I think what this committee is doing is tremendously important. Everybody works hard and contributes a different facet to what's going on here and I commend you to really continue the process that we've started and make sure that all of these good things are seen through to fruition.

Thank you very much for the honor of being on the committee.

(Applause.)

CHAIRMAN TUCKSON: In the spirit that no good deed goes unpunished, each of our three retiring members are drafted back into service and they are now ad hoc members of the subcommittees. So don't let this, the new folks, scare you away but when we get you, we get you for life.

We're now going to go through the process of stocking the committees.

Before we do that, Sarah, while you're there and making sure you've got it up, would you please—there are some of our members who are trying to remember the rules that govern the committee and the subcommittees really about meeting and how many people can meet without having the public announcement and the sunshine-ness of everything that we do. Obviously we take those rules very seriously.

Would you please remind people so that—especially for our new committee members, their questions can be answered about the rules on meeting?

NEXT STEPS AND CONCLUDING REMARKS

MS. CARR: Yes. We are governed by the Federal Advisory Committee Act. When we meet as a committee we meet in public. Although if we are reviewing confidential information there are processes we can go through to close the meetings but the public has to be informed of that.

We can meet in subgroups and don't have to meet—those subgroups don't have to meet in public but they must report back to the full committee and there must be a report developed for the sake of the public so they know what the discussion in the workgroup was all about.

There's also a process that we go through in terms of evaluating conflicts of interest in the

working group level as well. So those kinds of issues are certainly attended to in the working group process.

CHAIRMAN TUCKSON: Terrific. Now while we get the computer turned back on and the super password that's needed—what does that say? I missed it.

(Laughter.)

What we now want to do is go through the process of creating our subcommittees and making sure that we're squared away. Some of our new colleagues asked how does it work. Like this. We sort of figure it out.

So let's—Sarah, why don't you take us through what we have so far and what we need to do?

MS. CARR: Okay.

CHAIRMAN TUCKSON: I'll let you drive the train.

MS. CARR: All right. Well, we need to—sorry. We just want to be sure that we reflect on our rosters of task forces the transition of the old members to ad hoc status and the identification of new leadership, and also to incorporate the three new members who have come on board on these task forces.

So we've had some initial discussions but we—

CHAIRMAN TUCKSON: Some arms twisted.

MS. CARR: Some arms twisted. And so for the Genetic Discrimination Task Force, which we were thinking might some day go out of business actually but it's still in place and Cynthia Berry has agreed to chair it. Reed will still be on it and Agnes will become an ad hoc member. And you see the rest of the membership here.

CHAIRMAN TUCKSON: Let me—by the way, before I forget that, let me just make a note real quick about Tim. What did I do with my note? Tim is going to do something fabulous and wonderful.

Tim, where are you at?

MR. LESHAN : I'm going to Brown.

CHAIRMAN TUCKSON: I know. But come and tell us now that she has put the cat out of the bag that you're going to Brown. By the way, we're happy that you're going to have this big time federal job there with Brown but tell what you're going to do.

MR. LESHAN: Thank you. First of all, it has just been a real pleasure. I have actually come to every one of these meetings.

CHAIRMAN TUCKSON: Yes, you have.

MR. LESHAN: And participated in them and participated in the subcommittees as you can tell. So, as Reed would say, keep doing. Keep doing.

But I'm going to be going to Brown University to head up their office of government relations and community affairs and doing local, state and federal government relations. So I'll be coming back to Washington and will be able to check up on all of you.

CHAIRMAN TUCKSON: Hey, man, thank you very much. We really appreciate it.

MR. LESHAN: Thank you.

(Applause.)

CHAIRMAN TUCKSON: So that means we've got to bump him off the list, right?

MS. CARR: Yes, we do.

Tim, can you—

CHAIRMAN TUCKSON: Or can he stay?

MS. CARR: --at this juncture—well, not and represent NIH, I guess, but who from NIH will you—

MR. LESHAN: (Not at microphone.)

MS. CARR: Okay.

CHAIRMAN TUCKSON: So you're going to do it?

DR. : (Not at microphone.)

(Laughter.)

CHAIRMAN TUCKSON: Well, terrific. Just so we get it—so has everybody met? Stand up and tell us who you are. Don't be shy.

DR. : (Not at microphone.)

CHAIRMAN TUCKSON: Well, welcome aboard. If you do a terrific job, we'll applaud you, too, at the end.

(Laughter.)

Thanks. Okay.

So is that a good—that's a good committee, right?

MS. CARR: Yes. Peter Gray from EEOC, Robinson Frohboese from HHS Office for Civil Rights. And just among the new members or even the old, anybody else want to come aboard this task force, and if you don't you can—I mean if you don't today, you can think about it and let us know if you'd like to join. We don't—I don't think we made any next steps for this task force today.

CHAIRMAN TUCKSON: Right.

MS. CARR: Except to continue as full committee members—in full committee to monitor the situation.

CHAIRMAN TUCKSON: I think you're right.

MS. CARR: Okay.

CHAIRMAN TUCKSON: So I think we've probably got a good group there. Cindy is not shy about reaching out.

When we went to CMS to talk to Dr. McClellan, it's really fun to walk the halls of HHS with Cindy Berry because you're stopped every three seconds like you're with Sting or some rock person, and everybody wants to shake her hand and she knows every single person in the building. It was just really terrific. So Cindy is very connected so she'll be fine.

(Laughter.)

MS. CARR: And then the Pharmacogenomics Task Force is we have transitioned from Emily as chair to Kevin Fitzgerald has agreed to lead our efforts.

(Laughter.)

DR. FITZGERALD: (Not at microphone.)

MS. CARR: Kevin, did I forget to talk to you about that? Sorry.

(Laughter.)

CHAIRMAN TUCKSON: It's Kevin. It's Kevin. Kevin is the chair of that.

MS. CARR: Yes.

CHAIRMAN TUCKSON: And we appreciate it.

MS. CARR: The existing members are Jim Evans, Julio Licinio, Hunt Willard, Andrea Ferriera-Gonzalez will be joining, as well as Steve—our new member, Steve Teutsch, and the ex officio or the—from the ex officio agencies we have Francis Chesley from AHRQ; Guvarneet Randhawa from AHRQ; and Muin Khoury from CDC; Steve Gutman, FDA; and Joe Hackett, FDA; Allen Rudman, FDA; and Alan Gutmacher from NIH; and Rochelle Long from NIH.

And then our—so any of the other new members? Barbara has—well, I know what Barbara is going to do so we'll get to her next.

CHAIRMAN TUCKSON: So Emily is key in terms of--first of all, we're thankful you're willing to stay on. We really are and so you'll learn Kevin up on all that. We're going to go in a minute and review what we think the next steps are from—just to try to get a quick synopsis of that. I think that's going to be an important conversation which we'll rush through in just a minute.

Let's move to the next committee.

MS. CARR: Yes. The next task force is the Large Population Studies Task Force, which has been developing the draft report and organizing and managing the public consultation process. That's

chaired by Hunt Willard; Sylvia Au; Chira Chen; Julio Licinio; Kevin Fitzgerald. Barbara has joined that task force and Joseph Telfair are the members. Muin Khoury from CDC; Francis Collins from NIH; as well as Alan Gutmacher from NIH; and Alan Fox and Sherrie Hans from the Veterans Affairs Department are members of that task force.

We'll be hearing—they'll be working over the summer reviewing the public comments and helping incorporate them into the draft report and you'll be seeing that in November.

Then the Patents Task Force is now going to be chaired by Jim Evans.

CHAIRMAN TUCKSON: Great.

MS. CARR: Sylvia Au; Andrea Ferriera-Gonzalez has joined; and Debra will become ad hoc.

CHAIRMAN TUCKSON: Thank you, Debra.

MS. CARR: And other members can join if you would like.

CHAIRMAN TUCKSON: Is that enough?

MS. CARR: Yes. That's a good question.

DR. : We need ex officios.

CHAIRMAN TUCKSON: That's what it is. Okay.

MS. CARR: Yes. Actually Tim Leshan had been helping in that task force's initial efforts.

CHAIRMAN TUCKSON: She starts smiling like oh god.

(Simultaneous discussion.)

CHAIRMAN TUCKSON: Joe, you have a hand up?

DR. TELFAIR: (Not at microphone.)

MS. CARR: Well, that is sort of the way we've been referring to the task force but it's access in relation—the effects of gene patents on patient access. So it's—this is the gene patent task force really.

CHAIRMAN TUCKSON: Yes, James?

DR. ROLLINS: Just put me down on the—as ex officio on this committee.

CHAIRMAN TUCKSON: Terrific. That's what we're looking for, volunteers. Who else has their hand up? Scott?

MR. BOWEN: I'd be glad to add my name as well.

CHAIRMAN TUCKSON: My man. I mean good.

(Laughter.)

Denise? Denise is putting her hand up as well.

DR. : (Not at microphone.)

DR. : Who from the NIH?

CHAIRMAN TUCKSON: Are you willing? Are you the right person?

DR. : Yes.

(Laughter.)

CHAIRMAN TUCKSON: Francis, you wanted to comment?

DR. COLLINS: No, I think MK would be terrific for this but we were just powwowing that we really ought to have somebody from OTT on this particular group and that may as well be Mark Rohrbaugh who is the head of OTT. Now he may figure he can't do it.

CHAIRMAN TUCKSON: So we're going to reach out to Mark and putting MK on—we've got Denise on—Cindy Berry wants on. Cindy, oh, yes.

DR. : (Not at microphone.)

CHAIRMAN TUCKSON: Oh, good. All right. So wait a minute now. Hold on. Let me see. This is terrific. Wait a minute now. So we've got a lot of people here so let me just make sure. Do you want other ones?

(Simultaneous discussion.)

CHAIRMAN TUCKSON: Let's put Chira on there, too. And then we have—put Chira on there.

MS. CARR: Chira.

CHAIRMAN TUCKSON: Martin is willing to be ex officio.

MS. CARR: So the ex officios are Scott Bowen, James Rollins, MK from NIH, Mark Rohrbaugh from the OTT, NIH, and Denise. And was there another?

CHAIRMAN TUCKSON: Martin?

MS. CARR: Martin.

CHAIRMAN TUCKSON: This is going to be a pretty intense committee. All right. Very good. That's all the committees. Okay.

DR. TELFAIR: (Not at microphone.)

CHAIRMAN TUCKSON: We don't know. It's sort of in quiescence for the moment although we're going to have the committee chair pay a lot of attention to what's going on and she will give us the—because she's so connected. She will raise the alarm bell.

(Simultaneous discussion.)

CHAIRMAN TUCKSON: Yes, I think you might hold off. We're going to use you—we're going to put you into some other things when crises come up. Okay.

First of all, let me thank everybody for their willingness to be on these subcommittees. This is tough, tough work.

I want to let you know that what I'm going to probably do is to have a session with the committee chairs sort of almost like as a little—I just want to talk some ideas out and then bring them back to the full group around greater public visibility about the work we're doing, the way in which we use the reports that we write, and to try to find a way to have them a little bit more noted.

I also want to talk a little bit about some issues regarding briefing the media about what we're doing and we're going to get some guidance from the communications office about what we can and cannot do.

I'd like to find a way to see if we can't have some of the media at least be briefed about the issues that we are concerned about and why we're concerned and get those more into the public discourse. I think that's something that we need to be thinking about doing.

As I started this meeting off, I want to sort of—as we start to get into closure and reviewing the next steps and end right on time, I want to sort of get at this idea of getting—the theme from the very beginning was getting stuff done. I think we had a lot of evidence at this meeting that there is a logical place we begin and something happens as a result of what we're doing. I think we need to keep at that and keep going forward. So I want to find ways in which we can enhance the visibility of the work that we're doing and so I probably will have a little meeting of the subcommittee—use a subcommittee of the committee—a committee of the subcommittee chairs, something like that, and then work it out a little bit and then present it back to the full group at the next meeting.

All right.

Sarah, can we go through what we sort of see as the high level summary today?

MS. CARR: This is the—what was agreed yesterday and today on the issues of the work that the committee wants to do on oversight.

CHAIRMAN TUCKSON: Just one second, Sarah. By the way, we've got like 15 or so minutes to do this. Please if you—as she goes through this, if there's something that you see as a glaring error of omission, shout it out so that we can get it captured now.

MS. CARR: After the presentation about the plans to augment the CLIA regulations, it was decided that we develop a document that describes the current regulations and outlines the gaps that the planned augmentation would address and review components to be addressed in the notice of proposed rule making.

I think we're going to bring that back to the full committee or did the committee want to share that with—distribute it among the members and get some better sense of where we want to go with the

oversight issue?

I'm not sure apart from this that we came to a clear next step on this issue. There was discussion later in the day about the home brew issue or the—rather—

(Simultaneous discussion.)

MS. CARR: Yes, I know. Sorry, Debra. The question about whether FDA—getting clarification from FDA about the status of their authority to regulate laboratory developed tests.

CHAIRMAN TUCKSON: Right. So your question—I mean I think your question is—I think everybody—I think we agreed that those are high priority issues that we want attended to and so that we are expecting that you would put together this analysis, this document, that describes the current state of the art. We're going to give the people, the committee members, as part of the preparatory background for this the work done from the previous committee. We're going to ask you to succinctly in the introduction to your document define the problem and we want you to also take the opportunity in this to draw the bridge between this issue and the pharmacogenomics—I mean the patent issue, I think, which is also all related. So I think it's important that all those things get defined.

At the end of the day I think that what we really want is to have it presented to us in a way that tell us that—that defines the oversight hole, the hole in the oversight process, that we are concerned about and then, therefore, analyzes the situation for us and so that it becomes very clear as to whether or not we feel that this is an important enough issue that deserves further activity or not. So you really are presenting for us a definition of the problem—a sense of what the—defining where the controls are and by inference where the controls are insufficient, and then we decide whether or not we want to do anything about that or to make suggestions.

I see—does anybody else have a different view on how they heard that discussion?

All right. So that's really what we're looking for. I think that will be important. This, again, as you continue to keep in your mind our grid of our priority issues, oversight is one of those major issues that we have to be attentive to. As we said, this is a problem that has been hanging around a long time so we're going to decide one way or the other whether we're going to deal with it or not any further.

All right. Next?

MS. CARR: Yes. On pharmacogenomics we had the long discussion yesterday afternoon and I think the committee, as a whole, agreed that we—the task force needs to continue to work on the transformation of the literature review, the review of the Lewin effort to transform that into the draft report of the committee, and to identify the gaps from that report and work on the refinement of recommendations and the consolidation of some of the recommendations that were presented yesterday.

A number of the committee decided to take off the table and so the goal—the work of the task force will focus over the summer on really narrowing down and refining what recommendations to bring back to you and to again bring the draft report to you in November. After the—after you have a chance to consider it in November it will then go—if you're comfortable with it at that point—out for public comment.

CHAIRMAN TUCKSON: All right. So most of this work again, as I recall, will take place in the task force itself. However, each of you were encouraged to take a look at the yellow pages of the literature review that was done and to see whether you believe that there are any glaring gaps or omissions in their analysis that you think are important.

Secondly, I think that the task force would appreciate any thoughts that you all may have around the prioritization of that menu of issues that we've sort of discussed.

I think the real challenge here for that committee is lumping and splitting of those things, lumping and splitting and then prioritizing. So which things go together and then what the priorities are? And again we—and I think, Kevin, it's good that you're the chair of this. I think we—because you, I think, expressed it, in fact--but the notion of remembering what can we do within the scope of this committee's bounds and authority, I think, are important.

However, having said that, I am beginning to realize from that discussion, and I'm not prepared to present it to the committee today, but this idea of what I meant by press briefing and other things—I am beginning to get interested in the idea that as we discuss these big issues and discover things that it's almost sort of being able to, in an intelligent way, sort of being able to describe and capture our reasoning. So we think this is important because of these things. These are the things that we're choosing to do but here are some things that we can't do because they're outside of our priority but they are thing that others may want to take up.

I think that's an important clarion call in some ways and so it's just an idea to think about. I've always sort of, during my tenure as chair, I've been very vigilant at restricting us to only thinking about things that we could recommend to the Secretary. I think that's probably appropriate for focus but I would say that there may be some things in each of these reports now that may beyond our ability to respond to ask the Secretary to do but that you think are important enough to at least raise to the public discourse. I want you all to be thinking about ways in which you get those things into the public conversation.

I see a hand. Is that you, Jim? No.

So anyway just a thought. I don't want to take it anywhere but just that.

So, Kevin, I think that is really the challenge, though, is what's there.

Is that a shared understanding of what we did?

Again, I think one of the great things about the conversation yesterday that Emily led us through was at least we got a chance to all sort of talk about the issues so at least we are familiar with the lexicon and the concepts, the ideas, and the beginning of a shared vision.

Next?

MS. CARR: The Patents and Access Task Force will be picking up from the decisions made today and I think, Reed, you weren't here but Debra did get a consensus of the group that the committee is concerned about the effects of gene patents on clinical practice, including but not limited to patient access, the use of genetic/genomic services, the economic impact and the quality of those services.

The group decided—the committee decided that we will investigate the effects of patents on clinical practice and that as we do that we'll consider—the scope will include single and complex gene diseases. We'll consider legal and legislative issues, industry perspectives, economic considerations, and the processes of granting and licensing medically relevant patents.

CHAIRMAN TUCKSON: I really applaud that summary there and I really like the use of the word "balanced." I think that that's very important and I think that—again, the way in which—just to give the—again I hope the new members—this is the last time I'm going to refer to the new members but I do want to try to keep you—to underscore some of the nuances and things. One of the things that just happened with this genetics discrimination deal is that we could have come out really hard ball and tough on some of the folks that were constituencies that were considered to be not helpful in the legislation.

I think what we did was to create an opportunity for win-win scenarios by a balanced approach by inviting people to the table and creating a friendly environment for different points of view to get expressed and to be worked on behind the scenes.

I think that's important and so as we look at this issue of the patents and access issue, being able to bring the industry folk to the table and have them feel comfortable about participating in the process, even as we work through our issues, I think is important. So I would commend the leadership of Debra as reflected there by the balanced approach and getting everybody at the table and finding a way to get multiple folks working together to solve a problem. I think that's terrific.

DR. LEONARD: And we did generate a complete list of all the things that—we didn't include each—every last item but we kind of lumped to be able to describe but there is a complete list that will be handed to Jim that can be used for thinking about different sessions and what needs to be done.

CHAIRMAN TUCKSON: Terrific. A good job.

MS. CARR: And then I think the only other thing—action item was that the committee wants to write another letter to the Secretary and I guess to the FTC to commend the agency efforts and the collaboration among them.

CHAIRMAN TUCKSON: Outstanding. All right.

DR. : (Not at microphone.)

CHAIRMAN TUCKSON: I think that we—I'll tell you what. That's a great question. Let's just quickly—what would you like?

MR. DAYNARD: I think wisdom would dictate that you wait until we publish it.

CHAIRMAN TUCKSON: And then say it's a good job.

MR. DAYNARD: Yes.

CHAIRMAN TUCKSON: Or beat you up if it's a lousy job.

MR. DAYNARD: Yes.

CHAIRMAN TUCKSON: So would the committee—would the sense of the committee be to wait until it's done and then we'll send it out? All right. I see a consensus.

Let me ask, as we close out a little ahead of time, are there any other issues, process, substantive, topic that you would like to raise that are important to you?

Barbara?

DR. McGRATH: I think this is the last time I get to claim being a new member so I thought I'd use the last few minutes to say that and maybe it's coming from a position of naiveté that I'm allowed this one meeting but I really applaud what you were just saying about balanced reports and doing things we can make a point—I think the three members joined us hoping that this could be a body that actually makes a change, and balance is important with that.

But I also heard yesterday somebody talking about this is a great bully pulpit and this room is filled with incredible people. So I would also hope that the committee addresses issues that maybe we can't have an influence on but we bring to the public discourse and not just go after the sort of low lying fruit of things that have a solution right in front of us but really get at some of the thornier issues. There may be other multidisciplinary—I mean this is such a multidisciplinary group here that it's a pretty rich room and I hope we get to approach those things as well. So I applaud what you were just saying about that.

CHAIRMAN TUCKSON: Well, that is important. Thank you. One of the things, I guess, that we need to consider—I don't think we can perhaps debate it today but, as you know, again, we start every meeting off—it's almost semi-theologic with me that we put that vision document up there in terms of our priorities. We have not visited that since 2004 and we're working our way through.

(Slide.)

There it is. And so we deliberately for this meeting developed check marks and circles about—circles—what was my—give me my code again?

DR. : (Not at microphone.)

CHAIRMAN TUCKSON: Right. So I mean I knew. I just wanted her to say that because she did the slide.

(Laughter.)

But I think the idea is that that is it there and so we are moving forward on some of those things. So maybe with the sense that genetic discrimination may not—although it's going to always be important and we're always going to be on our list, since this may not be something that we're going to be rolling up our sleeves on, maybe it's time to think about adding something.

So, Barbara, what I would sort of suggest is that each of us think about it between now and the next meeting, whether there is some urgent issue that you think ought to be added to that list—Joe?

DR. TELFAIR: (Not at microphone.)

CHAIRMAN TUCKSON: Put your thing on so they'll know what you're saying. Your mike.

DR. TELFAIR: Okay. Put the microphone on. That's my thing. Thank you.

(Laughter.)

I have to get as many in before you leave. Okay.

The thing that I—I think it is important. I mean there are a couple of liaisons that this committee serves to other groups and I just want to bring up something because you were closing out is that the group on heritable disorders that I sit on actually was extremely appreciative—the staff, of course, helped me put together a slide presentation on what we do. They really had no clue as to what this committee does when I started out. So I actually took advantage of just providing from start to finish, even though I was only supposed to report on the meeting itself, and they were very impressed on many things.

It struck me at that discussion that there are issues that come up on these committees that we serve—that we serve as liaisons that are relevant to this group that maybe we can just take the opportunity to ask them because I know that one of the big issues they brought up was direct to consumer testing and we talked about that.

Also they were very impressed with the fact that this committee is very active in getting letters written and also that we have been doing that, and that's not something that it does yet but it's working towards that.

So I think that maybe one of the things to do or us who are liaisons can just ask other committees we serve on or the groups we work with about issues that are relevant and we can do that but that's just a suggestion.

CHAIRMAN TUCKSON: Do you want to tell them where you got this?

DR. LEONARD: It's the evaluation of genomic application in prevention—

(Simultaneous discussion.)

DR. LEONARD: Yes, thank you. Steve Teutsch is a member of EGAP.

CHAIRMAN TUCKSON: Well, why can't Steve do both?

DR. LEONARD: Right. So I think Steve is the logical person to take over for me.

CHAIRMAN TUCKSON: Bing!

(Laughter.)

All right. Good job.

Yes?

MS. FROHBOUESE: On the issue of looking at our priorities, I just—I'd feel remiss if I didn't mention that Secretary Leavitt in his senior leadership retreat last week where he brought together the heads of all of the operating divisions and staff divisions within HHS focused again on his top nine priorities which he describes with a sense of urgency because he's doing the count down of number of days left in this administration. We're now at about 930.

Interestingly enough, the work of this committee, I think, fits into a number of these objectives but for the first time genetics/genomics is specifically mentioned in one of the priorities and that is a priority of personalized health care. In that area I think all of the work that we're doing on pharmacogenomics and really focusing in on individualized personalized care is something to consider in terms of the Secretary's major areas of focus.

CHAIRMAN TUCKSON: Terrific.

MS. FROHBOESE: And just looking at that window of opportunity.

CHAIRMAN TUCKSON: So let's use that for what it is. This is important.

Thank you, Robinsue. That's great.

As we communicate with the Secretary, we will have the best opportunity to get him to pay attention to what we are doing if we can show that his involvement or the administration's involvement in our issue is something that can fit within the 913 day window.

So to the extent that they can—because he's really focused in on that and that was important to hear. So it's like, okay, what can we get done in the time we have left?

So as we write our letters to the Secretary, Sarah, or do any communication, it has got to sort of be saying, hey, look, you can achieve this in a reasonable period of time, therefore you ought to focus. That's part one.

Part two is the personalized agenda.

Now one of the things that the committee has asked us to do is to get our work more in front of the Secretary.

Greg Downing from the Secretary's office has been at these meetings in the last two days. He is going to be key at getting us in front of the Secretary and/or the Secretary in front of us.

So I think this--and where he was most interested in his conversations with me off to the side has been on the pharmacogenomics because of its connection to personalized medicine.

So I think you really said some tactically important things there and I thank you for it so keep that in mind.

Great. Any last thing with one minute left? Not to chill the comment.

I want to thank you all for a terrific meeting. Feel good about what you accomplished.

And all of our ex officios and committee, thank you all very much.

Staff, you're terrific.

(Whereupon, at 3:00 p.m., the proceedings were adjourned.)

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