SECRETARY'S ADVISORY COMMITTEE{PRIVATE }
ON GENETIC TESTING

Tenth Meeting

Friday,
August 17, 2001

Conference Room 6C-10
Building 31
31 Center Drive
National Institutes of Health
Bethesda, Maryland

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C O N T E N T S

P R O C E E D I N G S (8:38 a.m.)

DR. McCABE: Well, good morning, everyone. Welcome, everyone, to the tenth meeting of the Secretary's Advisory Committee on Genetic Testing. The public was notified about this meeting through an announcement in the Federal Register on July 19th and a posting on SACGT's Website. We appreciate the public's interest in our work and, as is our custom, we've provided an opportunity to hear from members of the public during this meeting. If you are interested in making comments on issues relevant to genetic testing and have not yet signed up, please do so at the registration table outside the meeting room.

In addition, and I think this is a first for us, we are being Webcast by the National Narrowcast Network.

Our meeting today will focus on two major topics. First, we will review the outcomes and discussion of the outreach meeting held yesterday by the Data Work Group. The purpose of the meeting was to gather additional perspectives and insight on FDA's proposed pre-market review template, HHS' post-market data collection efforts, and SACGT's own proposed Q&A for genetic tests for health providers. I want to thank Drs. Wylie Burke and Susanne Haga for all of the work they did in preparation for and during the meeting yesterday.

While I'm thanking individuals, let me also thank Sarah Carr and Suzanne Goodwin, and a special thanks and good wishes to our summer interns, Aaron Goldenberg and Kate Heineman.

This afternoon, we will be discussing issues related to genetics education for health professionals and plans for the Education Summit in November. Drs. Boughman and Haga will summarize information gathered on genetics education of health professionals, which is under Tab 8, and Mr. Joe McInerney and Dr. Priscilla Short will present preliminary results from a survey conducted over the summer by the National Coalition for Health Professional Education in Genetics, NCHPEG. The American Medical Association also played a major role in collecting and analyzing data from the professional organizations that participated in the survey. We will discuss plans for the November Education Summit.

We will also hear progress reports from other SACGT work groups, updates on relevant activities of CLIAC, as well as the Office of Human Research Protections and the National Human Research Protections Advisory Committee, and a briefing on developments regarding genetic discrimination legislation.

I want to report on the response to our letter to the Secretary on gene patents and licensing practices. As you will recall, we conveyed concern we had heard from some academics and professional societies and patient groups that certain commercialization approaches were having adverse effects on access to and cost and quality of genetic tests. We recommended that further

study by appropriate experts might be warranted to determine the scope of these practices and their overall impact.

In your meeting folders, you will find a letter from Dr. Arthur J. Lawrence, Acting Principal Deputy Assistant Secretary for Health, outlining a plan for gathering the additional data on the types, terms, and conditions of licensing agreements for gene-based discoveries, the advantages and disadvantages of the various types of agreements, particularly as they pertain to National Institutes of Health-funded research, and the extent to which exclusive licenses are being used in genetic testing or the overall impact of such licenses.

Dr. Lawrence indicates that NHGRI, through the Ethical, Legal, and Social Implications Program, is in the process of initiating a study to gather the necessary data, and that once the data are on hand, he will work with the NIH Office of Technology Transfer, which is the lead for the Department on patenting and licensing matters, to determine whether further steps need to be taken. SACGT will be kept apprised of NIH's progress in gathering data.

On behalf of the entire Committee, I would like to thank Dr. Lawrence for his response to SACGT on this issue. I believe the stepwise plan he has outlined for gathering additional information, and from there determining whether further efforts are needed, is a very appropriate course of action. We will look forward to reports in the future from NIH on the progress of this study.

Before we begin, I want to welcome Dr. Susan Zullo to this meeting. Dr. Zullo is now serving as the alternate ex officio from the Office of Human Research Protections, OHRP. Dr. Zullo received a master's degree in genetics from George Washington University and a doctorate in genetics from a joint program sponsored by GW and NIH. Her doctoral work focused on the development of novel vectors for use in gene transfer research. After receiving her Ph.D., Dr. Zullo served as an AAAS congressional science fellow in the office of Senator Richard J. Durbin of Illinois, where she focused on science and health policy issues, including human subjects protection, tissue banking, and genetic discrimination. Dr. Zullo joined OHRP this past March as a senior advisor to the director. We appreciate your being here and look forward to your input in matters of mutual interest. Thank you very much.

Let's now turn to Sarah for her important reminder about the ethics rules.

MS. CARR: Thank you.

Being a member of this Committee makes you a special government employee and thereby subject to rules of conduct that apply to government employees. The rules and regulations are explained in "Standards of Ethical Conduct for Employees of the Executive Branch." You each received a copy of this report when you were appointed to the Committee.

At every meeting, in addition to reminding you about the importance of following the ethics rules, we always like to review the steps we take and ask you to take to ensure that any conflicts of interest are addressed. As you know, before every meeting you provide us with information about your personal, professional, and financial interests. We use this information as the basis for assessing whether you have any real, potential, or apparent conflicts of interest that could compromise your ability to be objective in giving advice during Committee meetings. While we waive conflicts for interest for general matters, because we believe your ability to be objective will not be affected by your interests in such matters, we also rely to a great degree on you to be attentive during our meetings to the possibility that an issue will arise that could affect or appear to affect your interests in a specific way. If this happens, we ask you to recuse yourself from the discussion and leave the room.

If you have any questions about the rules of conduct or conflict of interest, our committee management officers, Claudia Goad and Mary Nuss, will be happy to address them.

Thank you.

DR. McCABE: Thank you, Sarah.

Before we turn to Dr. Wylie Burke to lead the discussion of the Data Work Group outreach meeting, I want to restate our goals for this session. It is important for the full Committee to consider the work group's recommendations on the questions it addressed yesterday and to reach consensus on those questions, as well as several sets of additional questions. These questions can be found in Tab 2 of your briefing book and in the briefing book memo in the front cover.

Let me take a moment to walk through the additional questions. The first set relates to FDA's pre-market review process. Do we believe at this juncture in its development FDA's proposed process is feasible? Will it be effective in ensuring appropriate review of genetic tests? Are there any changes we would recommend to be made to the pre-market review template? We also want to begin discussing how data submitted for the pre-market review template should be evaluated and what parameters should be used in determining whether a test is ready for the market.

The second set of questions is about post-market data collection. Are the HHS agencies making sufficient progress in addressing the need for public-private collaborations to advance post-market data collection efforts? What additional steps, if any, should the agencies be taking at this juncture? What other efforts, if any, are needed to advance the post-market data collection and dissemination goals?

Finally, after considering the work group's recommendations, we need to determine the next steps for the provider summaries. We have regarded the summaries as important elements in our vision of enhanced oversight. We need to come to final conclusions about the summaries and

decide what, if any, recommendations we think should be made to the Secretary about the promotion and dissemination of the oversight tool.

At the end of our discussion on these issues, we will review the draft report at Tab 3 entitled "Development of a Classification Methodology for Genetic Tests: Conclusions and Recommendations of SACGT." If we are in general agreement that the draft reflects our conclusions and recommendations, we would like to submit it to the Secretary as an addendum to our July 2000 report on oversight of genetic tests.

Also, and I think that's what happening at the other end of the table, Dr. Francis Collins will be joining us by speakerphone. Dr. Collins? Can you hear us, Francis?

DR. COLLINS: Yes, I can.

DR. McCABE: It's going to be hard for us to hear you, so if you want to ask a question at any time, it may be better for you to hit one of the buttons on your touch-tone phone.

DR. COLLINS: I'm actually on a cell phone and I'm afraid if I hit too many buttons, weird things will happen.

DR. McCABE: We can hear you now.

DR. COLLINS: Maybe I'll just make a big noise.

DR. McCABE: We can hear you better now. Thank you for joining us.

DR. COLLINS: Yes, sure. Glad to be here. I wish I could be there in person.

DR. McCABE: I'll now turn to Dr. Burke for discussion of the Data Work Group outreach meeting.

Francis, I'll also mention, and I mentioned it earlier, but there's a first for SACGT. We're being Webcast by the National Narrowcast Network.

DR. COLLINS: Oh, really?

DR. BURKE: We had a very intense, constructive conversation yesterday. We covered a lot of area. I'm going to try and summarize the key conclusions from our conversation, but a lot of people who were at the meeting are here, and I hope they will join in at the end and add in any details that I may have missed.

As Ed outlined, we discussed three general topics. Our discussion fell into three phases. One

was the pre-market data template that FDA has developed that is intended to be the primary mechanism of a pre-market review process, the second was the area of post-market data collection, and the third was a review of the provider Q&A summary. So I'm just going to go through those topics.

First of all, pre-market data template. The basic conclusion from the meeting is the template is okay. There were some suggestions for minor revisions in the template. For example, it would be appropriate for the template to include information about mode of inheritance. It would be appropriate to clarify exactly what clinical validity information is required and clarify that that includes genotype-phenotype relationships. It's appropriate to clarify the rather limited standard for clinical utility that FDA requires. But what the labs told us was that basically we're doing a lot of this already, that the information that is provided in the pre-market data template is information that a test offerer would normally expect to have and be able to make available.

So the template's okay, but there is a lot of concern about the regulatory process, and that concern really couldn't be addressed in our conversation yesterday because we don't have details about what will happen with the data template, what exactly the regulatory process will consist of.

So the primary to do's from this discussion are to flesh out what happens next with the data template. First of all, we identified that it would be useful to have more examples and, in particular, examples of predictive tests. There have been a lot of examples and they helped people to see how one would fill out a template, but they don't cover the full range of genetic tests. To the extent that one would have to fill out this template for tests other than DNA-based tests, there should be some examples of those tests as well.

There is clearly going to need to be very explicit guidance as to what level of information is enough in each of the boxes, and that guidance can be provided in part by examples and in part by the instructions that accompany the examples. In discussion, there was a particular focus on guidance about clinical validity and clinical utility information. What's enough in those boxes?

There was quite a bit of discussion, both from FDA and from people who might see themselves ultimately as filling out these forms, about how the pre-market data template can be made user-friendly, and I believe a lot of consensus around the table that that's a really important goal. So, for example, Steve raised the question, and I believe there was a lot of interest, in the possibility that one might be able to link to procedure manuals or to other documents that the lab has produced and provide appropriate copies of those portions of the manual that relate to certain places in the data template, and that's just offered as an example of how the data template should not be a burdensome thing to fill out.

But there are a lot of questions where basically we feel we need more information from FDA at this point, that we're now ready to hear from FDA about what the steps in the process would be after a lab has filled out the data template.

Two items in particular came up for a fair amount of discussion. We've talked about deemed status for professional organizations. We've talked about professional organizations potentially participating in the process in terms of perhaps, for example, helping to create some standard ways of answering certain portions of the templates, helping FDA to determine standards and how material within the templates would be organized. At this point, we now need the role of professional organizations to be defined very concretely. How would FDA bring professional organizations into that process?

And people who would contemplate filling out the template really feel a great need at this point to understand each step in the process at FDA between handing in the template and FDA saying, okay, you can offer this test, and one mechanism that was suggested as a possible route to do that, based on an approach that FDA has used in other analogous situations, might be a workshop, where FDA would walk people through a possible process, using that kind of workshop as a way to test out whether that's an adequate process, a feasible process, and get feedback.

I want to again emphasize that we heard a lot of concern in the laboratory community that even though the template's okay, the process is worrisome or the possibility of the process feels worrisome. There's a lot of concern that the process around the template will be burdensome.

On post-market data collection, this was a very diffuse conversation that started in the post-market data collection period of our discussion and also dominated a lot of our discussion about provider Q&A, so I'm going to intersperse these two a bit.

Post-market data collection, everyone wants more data. It was clear that there was no difference of opinion about how important post-market data collection is. The question really is who's going to do it and how's it going to get done. A theme that came in early in the discussion and stayed throughout the discussion was the theme of resources. So there's a who in terms of how you bring people into the process, how you get people collecting data, but there is most urgently a who's going to pay for it. Data collection costs money.

There are a number of important challenges when you think about the kind of data that we would like after a genetic test has come to market in order to really pin down the clinical validity and the clinical utility. Again, in our discussion of pre-market data templates, it's acknowledged that what kind of data you would have at the time that a test comes to market is often relatively limited. There certainly should be some clinical validity data, because otherwise you don't have a meaningful test to offer, but you're certainly going to get much better and more in-depth clinical validity data as time goes on and you often have, in the clinical utility box, really a supposition, a proposal, of how benefit might occur, as opposed to outcome data.

But in order to get the good quality data that informs us better about clinical validity and clinical

utility, we need to think about things like multi-site research, because getting adequate power is likely to require data from multiple different sources. Longitudinal follow-up is likely to be crucial, and that occasioned a fair amount of discussion about whether we should think about creating certain kinds of registries.

There were some interesting analogies brought up. For example, SAER registries. Another interesting example is the fact that pediatric oncology care is largely done through clinical trials. The majority of kids getting treatment for cancer are in trials, as compared with adults, where only a small minority are, and how does that kind of coordinated process happen and might that be relevant to some genetic tests. The Cancer Genetics Network is another example that was mentioned.

Another challenge is that if you want to have data collection after a genetic test has been done to understand what the long-term implications are, you need to think about linking lab and clinical data, and again, in a multi-site context, in a longitudinal follow-up context, how can that be done. Clearly, one has important concerns about informed consent and privacy protection.

Also, a theme I'll mention now and again later, secondary data analysis is very important. We not only need to collect the primary data; we need to pull results from different studies together, collate them, and do meaningful meta-analyses, and then disseminate those results back out. That's how we're going to get the information flow that we all want. That means one needs to address the problem of access to data for the secondary data analysis and also the very significant sort of multiple challenges that are involved in dissemination of data.

So there are many different efforts and needs, and in terms of where we are now today, there are efforts that are in different stages of development. I think it would be fair to say that in every area where we see a need for post-market data collection, there is usually something going on, and the question is how to find those examples and perhaps learn from them and build upon them in terms of expanding and also creating new, similar efforts. So clearly, there are research studies going on and there will need to be many more research studies addressing the issues of outcomes related to genetic testing.

Secondary analysis, as I mentioned, is an extremely important part of this process. Information summaries of a variety of sorts are needed for a variety of different end users. Some of the end users that were mentioned in the course of our discussion are providers, patients, people who make decisions about health care coverage, people involved in the technical side of delivering tests, et cetera.

There are already a number of excellent Websites that provide information. Some of the ones that were mentioned were GeneClinics, GeneTests, CDC's HuGENet, NCI's CancerNet, et cetera, but we need to think about whether we have the right Websites now or need more. We need to think about linking and coordinating. We need to think about other methods of dissemination for

people who don't have Web access, and it's very clear that although our focus was on data, at a certain point data segues into educational efforts, and so those should be coordinated.

As a first step, we thought that SACGT needs to hear from the Federal agencies regarding their role. We did hear a very interesting presentation about a project going on in CDC that is analyzing genetic test data, basically an example of secondary data analysis that helps to underscore the importance of data, and we also talked about CDC's coordinating role, which has previously been discussed in this Committee meeting, but in the context of the kind of list that we have here, one of the things we acknowledged is this is a big effort, or this is many different efforts, all of them fairly significant in scope.

So at this point, rather than in a simple way defining a coordinating role to a given agency without defining the scope of what's going on and what should be coordinated, it is not probably a meaningful approach. Instead, what needs to happen now is for all of the HHS agencies to look at this sort of list of data collection and dissemination activities and define what each agency would already see within its scope, in order to then think about how coordination should occur and how different tasks should be shared out.

The provider Q&A was a very interesting discussion. We quickly got the message this is a good idea but a bad example. The provider Q&A is not something we should proceed with. It is the advice that the Data Committee was given by the people around the table, and I think there was a consensus, as discussion went on, that that was the correct conclusion.

The idea of brief summaries of genetic test reports, brief summaries about genetic conditions, et cetera, is a good one, but as the provider Q&A was presented to the group yesterday, it was clear that this was a document that was not likely to be sustainable, and it was unclear who would produce the document and how it would be updated, but even more importantly, it was a document that, particularly as a stand-alone document, was very likely to result in oversimplification or in pulling genetic test data out of context.

So summaries should be linked to more detailed information, so the whole issue of provider Q&A became an issue of dissemination. Where are the good summaries now, how can those efforts be expanded, and how can those efforts perhaps be developed to include, as part of what they provide, succinct summaries, executive summaries, that get people to the main points?

Now, as we think about promoting that kind of effort, which is really primarily promoting or identifying efforts that are already in place and building upon them and making sure that resources are available, it's important to think about test information being provided in context, and in particular being provided in a clinical context, so that if you focus on a particular test for a particular genetic condition, you may miss a crucial issue, which is the larger differential diagnosis around the presenting complaint, and sometimes that presenting complaint is an identifiable genetic entity or an identifiable disease entity and sometimes it's a symptom. So

there are a variety of different ways in which we need to think about the context, the clinical context, in which test information should be provided.

So again, summaries are a good idea, but they should link to larger, more complete documents, and clearly we need to keep thinking about the multiple different audiences for that information. So again, key ones are consumers, the health care providers who are ordering tests, policymakers who are deciding about decisions, people that create the test.

Good quality information requires resources. So good data requires resources, good summaries require resources, and those resources need to be applied to development, to the dissemination process itself, and also to the very formidable task of updating.

SACGT could play a key role as a champion because we're talking about resources and we're talking about trying to put resources into innovative approaches or enhancing certain activities that currently occur on a relatively small scale. So we need new funding mechanisms or enhanced funding mechanisms, and SACGT can champion those. We may have better clarity about how to be a champion around funding mechanisms after we've heard back from the different agencies about where they see their role in the post-market data collection process.

We also need to champion multidisciplinary collaboration. We need to keep thinking about public-private partnerships and how to promote those, and we need to keep thinking about a broad array of target audiences that need access to information.

So that's my summary. I would invite others who were there to add other details.

MR. HILLBACK: One, I'd like to again congratulate you on doing a great job yesterday. It wasn't an easy meeting to keep on track.

I think your first slide summarized some of the things very well. We did make a lot of progress on the pre-market template, but there are a lot of open issues, and that's one of the things that I'd like to raise. I think a lot of us from all sorts of different factors that are here at the table need to sort of hear two things or have two things done, hopefully between now and the next meeting, if we can get it.

One is to understand more of the process internally in FDA of how they'll use this information. As it comes in, what will the process of review be? Because we did make good progress, the working group that was there, on looking at a template that isn't too onerous to fill out. There is still tweaking to do, but if the template's not onerous, but how it's used is onerous, then we haven't really gotten anywhere in terms of meeting the requirements that we've set forward.

I think the other thing that was raised yesterday that became interesting was what's the whole package. If this in fact brings these tests into the device regulation, what are the other

components of the device regulation and how will they have an impact then? For example, does it change the way laboratories are managed? Does it mean that they have to comply with good manufacturing practices, as any other manufacturing plant would, rather than good laboratory practices, et cetera? Does it change reference to other people's material, i.e., everything becomes part of your label? Someone made the comment yesterday that if you refer to another Website as part of the information you provide the public, you're in effect saying you accept what's on that Website.

I don't know if that's true or not, but there are a lot of these open issues, and it would seem to me that there it's not just FDA we ought to ask. I mean, there is a lot of knowledge about what device regulation is all about, and possibly our staff, working with staff at some of the professional organizations, including the device group, AdvaMed, and some of the others, could do a compare and contrast chart of what are the parameters of the device regulation and how do they differ from what labs have to do today, and we can start to get an idea of what would the impact be if we came fully under the device reg.

So while I think it was a great start yesterday on the pre-market approval process, it seems to me there's a lot more work we need to do before we're comfortable with the whole system.

DR. KHOURY: Thank you, Wylie, for giving a nice summary of what happened yesterday. I just want to add a couple of points in addition to what you just said.

Going back to Elliott's point about the package, I think when SACGT made the recommendation last year to have a multifaceted approach to oversight of genetic tests that includes the FDA process, the CLIA process, and then the post-market process, I think it set everybody up to begin all these processes that are moving on parallel tracks, and I think one of the things that came out yesterday is that we need to think about the issue of coordination among all these processes, and just a few examples we discussed yesterday were around the pre-market template as potentially sort of interfacing or interweaving with post-market activities. People have to use essentially similar terminology, similar standards, so that at the end of the day, because you have only half the data or even less than half the data in the pre-market phase, when we collect more data in the post-market phase on analytic validity throughout clinical utility, that these things can be comparable, that we compare apples to apples and oranges to oranges.

So I think that the need for standards has come up in the discussion yesterday, and the need to sort of look at a holistic approach from the pre-market phase to the post-market phase.

DR. TUCKSON: Yes, I just wanted to also underscore for the Committee the important point that Elliott has raised. We were pretty significantly and seriously challenged yesterday by the concern of the regulatory implications of what was the template going to be used for and how would FDA ultimately interpret these issues. I just want to make sure that people do understand. It was a fairly dramatic issue. I thought that Ed McCabe handled it extremely well when he

came and spoke to it, but the bottom line is that I think that the Committee really does need to get an update on the subtleties of how FDA is going to try to again make sure that, as we try to protect and be concerned about the small academic research labs not getting snuffed out or being harmed by the overall issues of putting this into FDA, and I really thought that Dr. Gutman was very forthcoming about their attempt to be as flexible as possible, but that they haven't finalized a process for that. So this was a very important moment and I want to make sure that the Committee is just aware of it.

DR. McCABE: Yes, I wanted to follow up with that, and then probably it would be appropriate for Steve to make some comments.

The question is could we ask FDA, through Steve Gutman, to request from your general counsel whether FDA has the discretionary authority to apply its regulatory tools selectively. I think everyone fears that we'll let the genie out of the bottle here and may not be able to get it back in, and the issue is whether you can really use -- we talked a little bit yesterday about using a light hand with the regulatory authority. Would it be possible to really be able to do that and regulate home brews, regulate the old tests, as we suggested in our recommendations, with a light hand? I think the community feels that the majority of even the new tests don't have some of the concerns that are really driving a lot of SACGT's recommendations. So how much discretion would FDA have within your current regulatory structure?

DR. GUTMAN: Well, I'll answer that question first. We actually have begun to explore that, so I don't think our lawyers would be astounded to have that query, and that's a fair and very reasonable concern, and it's a concern in terms of how much latitude we might have in terms of pre-market review, but it's of more concern -- it was brought up yesterday, but certainly not emphasized, but it certainly has been brought up in discussions we've had with the professional societies that if you in fact did impose the traditional good manufacturing practice or quality system regulation systems on laboratories, what you would probably be successful at would be closing down genetic testing in the country, which I actually don't believe is an objective of this group.

But I do have a couple of comments, and we'd be happy to do a variety of things. One comment is that FDA, one thing we do have is a lot of review experience, and I realize that it's hard to communicate that review experience, but we actually have experience communicating that review experience. We actually have fielded an IVD workshop which we hold annually in which we actually go through the entire review process. The good news is it's available. The bad news is it takes a day, and it's an acquired taste.

And I mentioned yesterday that the closest thing I can think of that anybody here might actually have done for a living or done for fun would be to review an article for a medical journal, that what you're doing is you're reviewing data, you're reviewing claims, and in our case we're obsessively reviewing labeling, and you put that all together and it spells for an article, as I said

yesterday, fame, and for the successful company, of course, fortune.

What we don't have, of course, is experience reviewing data templates that we showed yesterday. That's a new beast, and that's driven entirely as a response to the SACGT request for an alternative approach. So although we have 20 years of reviewing 510(k)s and PMAs and occasionally IDEs, and increasingly pre-IDEs or protocols, if you want to know what our experience is at reviewing that protocol that we presented yesterday and that we are putting on the table, the truth is none.

We are willing to, frankly, experiment with that. We actually thought creation of the pilot examples we gave yesterday was certainly a first foray into this as an activity, and as we were preparing for yesterday's meeting noticed internally all kinds of shortcomings and problems with the template that we didn't share with you, because we think we can sort of fix, but we certainly, between now and the next meeting, are willing to pilot and play around with what the process might actually be.

Part of what will drive this is what thresholds we're willing to accept. The manufacturers here will appreciate that the thresholds that we put in those templates are very generous. We would never let a manufacturer get away with a precision study in which -- again, we haven't had a manufacturer come in with an exotic mutation that occurs one in 12 million times, but we would consider, to be perfectly candid -- this is awful, but to be perfectly candid, we would consider a two-mutation study by two operators for five days a science fair project, not a submission.

So it's going to require realignment in our thinking, and the manufacturers were very candid yesterday in saying if you let the labs get away with this, why not us? And so if we decide to look for differential treatment, we're going to have to figure out a way to justify it -- justify it because there's different labeling, justify it because there's a different marketing pattern -- and that's an important question we probably ought to ask our lawyers, too, and you might have two choices, having everybody honestly label and lower the standard or deciding that this isn't really as good an idea as you thought or that you actually need to write a new law to discriminate between the different kinds of products. That's become increasingly clear to me as we have interacted with companies who have a great interest in our use of the clinical literature as a base, rather than reinventing the wheel, particularly in the area of pharmacogenomics, but on the other hand, you can't treat product lines necessarily differently. So if you decide you can use literature to support pharmacogenomics applications, why can't you use it to support TB applications or tumor marker applications?

I'm taking a lot of time. I'm sorry.

Then the last thing, of course, everybody is concerned with timelines and work. Dr. Feigal, as I said yesterday, has clearly signaled to you that we have limited resources. We might get more, we might not, but we think we might have control over that, in that we won't call for more work

than we can handle. If it took the rest of my life and whoever follows or succeeds my life, that's okay. You may not be happy with the speed or the progress, but we're not going to call for a thousand products if we can only handle 20.

DR. BURKE: And I think that's very helpful and I think what I sense from our meeting is more discussions of this kind and sort of inching along, sort of trying to clarify what the process might be, in a context that it allows continued public input is what the group would really favor and recommend.

MR. HILLBACK: Just a minor point. I agree with what Reed said. I think, though, Reed, it's not just the small labs. Remember, one of the issues that we've all had is that most of these tests are for a very limited patient population, and therefore even a big lab doing a test for a limited number of people isn't an economic proposition if the hurdle is so high. So it's not just small labs, although we do have some advantages being a little bit bigger, but it's the small test, the rare test, that we're trying to protect, and that's been part of the discussion for the 10 meetings.

DR. TUCKSON: Thank you.

MS. BEARDSLEY: I just wanted to comment on the fact that good manufacturing practices have come up and compliance has come up, because I believe that that's a really important issue and it may be a more difficult issue to solve, actually, than the pre-market approval issues. And also to point out, and I expect this came up yesterday, too, that there are a lot of situations in which FDA by regulation exempts categories of devices from having to comply with good manufacturing practices, and not even with all of them, but picks and chooses. So you could say, well, a genetic test has to comply with a good manufacturing practice for collecting its complaints and looking at them and making sure this thing works, but it doesn't have to comply with these practices over here. I don't know how, Steve, you're working on this, but it may be that some thought about which pieces of good manufacturing practices should apply is something that the Committee might want to think about at some point.

DR. GUTMAN: Yes, I actually think that there may be more synergy. I think there's a difference in intensity and in inspection level, but more synergy between the quality system regs and, for example, CAP or CLIA requirements than one might guess.

The real killer is design controls. People in the lab, and that includes me and I've been at the agency 10 years, I don't really understand what design controls are. Everybody tells me how great they are. I couldn't write them if my life depended on it.

MS. DAVIDSON: Yes, I just want to speak to another issue, that of how to keep the information in data templates current. There's no question that this is just a tremendously important piece of material to put together, but if we don't put resources to it -- and the resources are tremendous not only in the first phase, but even in the process of updating, because it's a deliberative process and

to some extent a negotiating process. So I know this was discussed yesterday in the Committee, but I want to keep bringing our attention back to it, because there's nothing worse I think for someone who's receiving test information but to receive outdated information. That can cause just tremendous emotional damage and kind of steer people off in a wrong direction completely.

The other thing is that, and this is I think difficult for us to do, but that the information needs to be offered in a very qualified way, because all of this is a moving target, and the one thing that I think the public really doesn't well appreciate is to what extent, you know, what we know today is different than what we know tomorrow. I'm hit with this every time I go out to speak. I mean, people feel that we know what we know much more than we do, and so offering the information in some way and providing those links and being sure that there are tremendous resources set in place when the whole process begins is really going to be --

DR. BURKE: I think it's appropriate to emphasize that point. It came up repeatedly yesterday, and it's resources and it's also careful thought to making sure that information is credible, that people understand the sources of information and their quality.

DR. McCABE: I had two comments, back to some of the things Steve was talking about. One had to do with the discussion yesterday about deeming, and you mentioned about personnel assets within FDA and that Dr. Feigal had commented on those in the past as well, but one of the things that came up yesterday was the possibility of using some of the professional groups with a deemed status, working through that, and we had asked you to come back to us at the next meeting and let us know how that would be done, because that's a way of bringing people who are very invested, personally and professionally, in this area, who have the knowledge base about genetic testing, who, as you point out, are used to reviewing colleagues, both in research articles and grant proposals, so that's not something that's completely alien to them, and this might be a way of dealing with throughput, and also might help with some of the decisions about which are the more difficult areas that need to be considered.

The second had to do with really I guess both Steve and Kate's comments about GMP and picking and choosing, and one of the things that we have worried about is the rare disease testing and that being quite vulnerable to any regulatory process, and yet if you look at the number of tests, it's quite significant in terms of the number of individuals who are having genetic testing for rare diseases.

So in terms of picking and choosing, as you inform us about the criteria there, whether numbers can become a criteria, so that we don't have to reeducate the FDA about what might be perceived as our science fair projects that are going on in the universities around the country, but what are the criteria by which one could pick and choose, but the rarity of the testing is certainly an issue that we have discussed before.

DR. TUCKSON: Two points. One is I guess I am a little confused now about the sequencing

and the process for our work. It seems to me that, Wylie, I'm not sure. You mentioned sort of the need for sort of inching along with multiple public inputs as we go forward.

Well, I wonder, until we understand, until the FDA is clear on what and how it's going to resolve this matter, it seems to me, and I'm looking for guidance and help here -- I'm not making a statement, I'm struggling -- that without that guidance, so much of the work that we are doing it would seem would be theoretical, and that we sort of need to know how this thing is going to play out. So I think one of the questions I have is if that is true, then what can Steve sort of -- not commit, of course, today. That would be inappropriate, but some kind of timeline so we would know how the rest of the work needs to be done.

Secondly, I think Mary's point was very important that however you look at this, there is going to be a variability out there in the world which is going to be fairly great, which I think comes back to this notion of information being transparent, timely, accessible, understandable, so that anybody, anywhere, anytime should be able to, without a lot of hassle, dial in and know what we know and, more importantly, what is not known about a particular test. So at least you can have a person and their physician make decisions based on the best available information. I just think that role is going to be key and I think the resources necessary to get that going need to be started sooner, rather than later.

So I'm back to another timeliness question, and that is how do we decide if that is in fact important and if in fact it is important for the government to do, and then, if in fact that is important and the government should do it, how do we begin to get that process in place, so that the pre-work can get done so it won't be 10 years from now before you actually have something up?

DR. BURKE: And I think those are very helpful comments. Let me make an interpretation of what I think our discussion said yesterday.

First, in terms of the sort of inching along comment, I think what we've heard from FDA, and I'll let Steve correct me if I'm wrong, is that FDA may be in a stage now where it can begin to talk about possible ways that the pre-data template might be implemented and the regulatory process might go forward. As it does that, it is creating the opportunity for public comment.

So in fact, at this point, I would see the Data Committee has having sort of turned things over to FDA for a process of exploration that includes public input, and hopefully would include, as part of that public input, input from the Data Committee, but a key other part of that input has to be people who will be affected by this regulatory process.

DR. GUTMAN: I can emphasize that from the standpoint of the agency that's absolutely essential, because we have in place what are called "good guidance practices," so we couldn't really in any legitimate way move forward with either guidance, a preliminary reg, or a final reg

without putting it through our good guidance practice.

DR. BURKE: So that's the incremental process, and I think it would be primarily under the aegis of FDA, with us potentially playing a helper role, if that were appropriate.

In terms of the other piece, it seems to me what I think I heard in our conversation is a strong consensus in support of exactly the kind of information opportunities that you described, and that it's very hard for us as a Data Committee to go forward or to advise SACGT without first going back to the agencies.

So I think the action item there is that the agency reps on SACGT need to advise the Committee, perhaps working together and figuring out sort of how they coordinate or how they might suggest coordinating, and then coming back to us, and I think it's a matter of discussion now what recommendation we want to make at this point. Leave it open or make a very concrete recommendation about how the agencies should feed information back, advice back to us, and whether that information should come back to the Data Committee first for chewing over or whether it should come to the Committee as a whole? So I'd see those as discussion points for now.

DR. CHARACHE: I was on a parallel trail, but I wonder if it's time now for this group to also request that our second regulatory arm think through what the processes will be for their contribution, and that's namely the CLIA arm, because we know that right now they will also need guidance documentation on what to look for, and we know that neither CAP nor Joint Commission nor any other regulatory deemed status group has the staff or the knowledge base to review the application of these tests in the laboratories, and that can happen even faster since the laboratories are already there.

DR. BURKE: So Pat, are you suggesting a coordination between CLIA and FDA on this?

DR. CHARACHE: I'm suggesting that HCFA and CDC come up with their proposal of how they plan to review it, and then that be coordinated with FDA.

MS. YOST: I think we really have to do this in order. We kind of have to know what FDA's going to do before we can really engage to be able to coordinate, but there's clearly been preliminary discussions that that obviously has to happen.

DR. BURKE: So just to clarify, we've just described that FDA is going to enter into a process of considering possibilities and discussing those and getting feedback on those. During the course of that process, which may take awhile, it sounds like your comment suggests that you folks should be interacting with FDA and thinking about the implications for you as FDA goes along.

MS. YOST: That's right.

DR. KHOURY: Wylie, I'd like to rise to the challenge here. Obviously, this whole package requires a lot of resources and coordination.

DR. COLLINS: I'm having trouble hearing Muin.

DR. KHOURY: Francis, can you hear me?

DR. COLLINS: No. Can you get a little closer to the microphone?

DR. KHOURY: Okay. I'm as close as I can be, but you're so far away from me. You're at the other end of the table. Can you hear me now?

DR. COLLINS: It kind of comes and goes.

DR. McCABE: Pick up the mike. There we go.

DR. KHOURY: All right. I'm going to start shouting now.

Okay, so whatever processes we engage in, especially at the post-market phase, require a lot of resources and coordination, and I think those two key words are essential to highlight throughout the day.

In terms of the coordination part, I mean, there is a mechanism for this. There is an interagency HHS Genetic Testing Working Group that Bill Raub has headed for awhile now. We haven't met for a while. We even had a Data Subcommittee as part of that working group, which we haven't met for awhile now, but there is a process by which this Committee can receive sort of the HHS response to what you guys recommend to us. I mean, we can take this back -- and Michele and NIH and others, feel free to pitch in -- and edit out through Bill Raub's committee, perhaps have one meeting among us, either the big committee or the data subgroup of that HHS committee, and then come back to you with some more input at the next meeting.

But in order to do this, I think that FDA piece is also very important, and the CLIA piece is important, too, because those three-legged stools are sort of what SACGT has recommended in terms of a total package of oversight. So that Committee has to also engage the CLIAC and the discussions there, as well as the FDA process.

So that would be my suggestion of a solution for at least at the post-market phase discussion.

DR. BURKE: I have a question, and then I know Michele will make a comment. The question is I think Muin has made a fairly concrete proposal and that is in keeping with what we said we needed to work on. How do we get that HHS feedback? And so Muin is proposing that an

already existing HHS interagency committee be asked to provide the feedback.

But your comment, Muin, about we need to know about FDA and CLIA, realistically, as I understand it, that's going to take a lot of time, and there's an urgency to moving forward with some pieces, particularly the pieces that have to do with proceeding with secondary data analysis, identifying research agendas, identifying places to disseminate data, supporting efforts to put summaries online, those kinds of things, many of which represent activities where there are already efforts in place, and so even before anything is known from FDA or CLIA, would it not be reasonable to get some feedback from HHS agencies?

DR. KHOURY: Sure.

DR. COLLINS: This is Francis. If I could make a comment, I'd appreciate it.

DR. BURKE: Yes, Francis. Go ahead.

DR. COLLINS: I think it would be very helpful at this juncture for SACGT to be quite clear about what it is that you're asking the agencies to respond to. Listening to this conversation, I have some idea, but I don't think it's as sharply defined as it might need to be in order for the response to meet your needs. So perhaps that would be one request.

Then it may be, after looking at those queries, that there are other ways of responding than going through the interagency work group, which has not met for awhile and we'd have to I think reconsider the membership of that group to be sure that it fits the queries that are being posed.

When it comes to the post-market data collection, I think there are a number of important issues, and not having heard yesterday's discussion, I'm not quite sure where the group came down, but I guess I'd like to get a better sense from you about this. In particular, is there a consensus amongst the group or a general feeling in the direction that what one needs is a registry that tries to track all possible genetic tests being carried out? Or would it be just as satisfactory to identify those that are in greatest need of this kind of data collection and try to organize either test-specific or disease category-specific forms of follow-up? The latter part might be more amenable to the usual way of doing of research studies than the former part. Setting up a centralized registry could be contemplated, but would obviously be much more complex.

I might say that certainly NIH is familiar with those kinds of studies, but they're usually carried out by specific institutes focused on specific categories of disease, and the Cancer Genetics Network has already been raised as a paradigm. There is the GeneClinics and GeneTests database, which might also be an attractive venue for collecting such data, and of course that is NIH-supported.

But I think I'd have to have a clearer sense from the group about exactly what's contemplated

here in terms of the breadth of the data collection. Are we really trying to do everything here or are we trying to pick some areas where this is going to be particularly critical and make sure those are done well?

DR. BURKE: Yes, I think I can address some of those questions, but I first want to give Michele a chance to make a comment.

DR. LLOYD-PURYEAR: My comment was actually I concur with Muin, and to remind the Federal agencies that are here, except that FDA is not a part of it, but we have an MOU amongst four of the Federal agencies who are at this table to actually coordinate activities, and there's actually one model that is sort of similar to some of the issues that we're talking about that's around immunization, both the research and the actual practice, and that's between FDA and CDC. CDC is analyzing data that's collected by FDA. That's an ongoing process, and that's in the pre-market review also that happens, and then there's a whole post-market review that's actually also a part of this process. NIH comes in and interplays at this point in sponsoring the post-market research, but that data again is fed back and the review is coordinated by FDA.

I mean, there are other examples where the agencies do collaborate and coordinate their activities around specific issues.

DR. BURKE: Thanks.

Let me, in the context of Muin's and Michele's comments and the questions that Francis raised, reflect what I think I heard at the discussion yesterday, and then I would invite others who were there to add comment.

First of all, Francis, I think we can be very clear that we were not talking about one monolithic registry, that one of the reasons the Committee felt that it needed to hear back from the HHS agencies is that there needs to be priority setting. So we all understand that resources are limited. We can't get all the possible data that we might ideally like to have on every genetic test. So there needs to be a prioritizing process where we decide what level of research effort is appropriate for a given genetic test/genetic disease situation, which means that there needs to be some consideration of where are we with a given disease condition/genetic testing opportunity, what are the gaps, and at that point, what are the ways in which we might fill the gaps. And at that point, this becomes a very concrete question for different HHS agencies. What's already there in place that might help to fill the gaps or might be able to be enhanced in an appropriate way to fill the gaps?

So we acknowledged explicitly in our conversation that things like the Cancer Genetics Network that are already in existence might be part of the solution, and that a number of the challenges to be addressed on the research, particularly on the primary data collection side of research, might well fall into the usual mission of different institutes within NIH, and it's really, having laid out

the kind of data we are concerned about, which is long-term outcome data and includes both medical and social outcomes related to the use of genetic testing, we feel like we need to hear back from the institutes and different Federal agencies that support significant research activities in terms of, in essence, what's already in the portfolio or what might reasonably be included in the portfolio that would address that issue.

We also, as you heard, were very concerned about information, the creation of information, the assurance that information is of good quality, and that information is accessible, and acknowledging that resources need to go into those efforts and that SACGT could be a champion for those resources, but again that we need advice from the Federal agencies about what might be possible. You know, we don't just want to sort of champion resources without having a clear idea of how those might be used.

In that discussion also, there was an acknowledgement of a lot of things that are already in place -- specifically, GeneClinics, GeneTests, the HuGENet, the CancerNet -- a recognition that there are a lot of resources already available, and also a recognition that these will segue into educational activities, so we want to hear more about NCHPEG's activities and work of the Education Committee and so on.

So I hope I'm answering somewhat concretely, very much an interest in knowing what's already in place that addresses the concerns that we have and how the agencies see what's already in place as a potential to be built upon.

The point about coordination that Muin mentioned, though, is extremely important because as we begin to get a picture of what different agencies are doing and contemplate continuing to do, we're very interested in appropriate, sort of efficient use of resources, including a coordination effort, so that efforts aren't duplicated and also the gaps aren't ignored.

So as the picture becomes clearer, and I think really getting the picture clearer is the point now, what we're really concerned about is coordination to avoid overduplication and coordination to fill in the gaps if there aren't existing mechanisms already in place to address the concerns.

Now I have Muin and Reed, and I don't know, Francis, if you want to make another comment.

DR. COLLINS: No, that's very helpful. Thank you, Wylie.

DR. KHOURY: Just to answer Francis briefly, and then elaborate on Wylie's comments, I agree with you completely, Francis, that we should look for ways for the HHS -- the composition of any interagency working group at this juncture. I mean, enough time has passed that I think we might want to revisit this, but I don't see any other alternatives, other than the agencies to get together. Maybe not exactly the same players that met last time, but I mean, we have to find a mechanism, and working with Bill Raub's office might be the place to start, and then having

different agency representatives.

I want to amplify one point that Wylie and others made that as we move into this new arena here, the disease-specific or categorical funding becomes very important, and that implies the involvement of all of NIH, because it involves cancer and heart disease, and all these tests have something to do with the disease categories, the same thing I can say about CDC, because the funding streams are categorical in nature.

In terms of the prioritization process, I think it's extremely important, and that's why I want to revisit this issue of classification at the beginning. You know, remember, we had so much discussion about the classification of genetic tests, and it was viewed to be a pre-market-type classification to help FDA, but for me I view it as a post-market tool to at least direct some of at least the CDC resources into areas of immediate public health concerns. You know, more tests to be used for more people, like newborn screening or common diseases, et cetera, and I think we might want to revisit this issue of classification a bit later on.

The third area I want to expand on is this notion of primary versus secondary data analysis. We discussed it yesterday and Wylie mentioned it this morning. I think it's imperative and important for academia and the private sector not only to collect data -- I mean, everyone is busy writing grants and collecting information, they write a couple of papers, and then the rest of it sits on a computer somewhere and never sees the light, because people are always seeking additional funding.

That tool of secondary data analysis, and meta-analyses specifically, is a very important one and we at CDC have taken the active initial step in sponsoring that kind of research through the project that we funded last year to develop the model approach to evaluate genetic tests, as was discussed yesterday, and additional funding this year to sponsor Centers for Genomics and Public Health that are based on schools of public health, whose one of three important functions is to pore over the literature, both published and unpublished, and evaluate using specific disease working models that correspond with the expertise of these places the genetic tests that are of impending use or existing use for diseases such as cancer, heart disease, asthma, diabetes, et cetera.

I would want to encourage the other agencies to be creative as we put all our heads together to look at the next phase with some concrete guidance from SACGT, and I think I want to stress what Francis said, that you have to articulate what the questions are as concretely as you can, so that we can respond as concretely as we can to this sort of amorphous post-market humongous deal here.

DR. TUCKSON: I want to start where you ended, Muin. That's great. I think Francis has asked the right question and I think, Wylie, you gave a very rational answer.

I go back to our charter. We are here obviously to provide suggestions that are within the purview of the Secretary of Health and the resources that he has available to him, but the goal is to protect and support the access to quality genetic testing for the public. So one of the things I want to make sure is that our perspective is not a perspective that is based on the mundanities, the intricacies, the complexities of the bureaucracy of the government. What we are here to do is to figure out how do we help people.

And at the end of the day, people have to make choices. People in this new era of health care are going to be making purchasing decisions regarding their insurance policies or out-of-pocket care for a variety of things, of which the genetic testing portion will be growing.

I mentioned yesterday again I am particularly concerned about marketing of tests directly to the public, as we've now seen with the movement away from not only just doing it for prescription drugs, but for diagnostic testing, and here we have an interface between both of those in many ways, and so we're into this new space.

As a result, it would seem to me that given that we're going to have such a variety of regulatory kinds of things here and tests of many different levels of scrutiny and lesser scrutiny, that at a minimum what we are talking about I think, Francis, is a consumer-oriented database that at least gives the average person a chance to understand, when they have a disease, what tests are available to them, what is known about those tests, and how they need to have conversation with their clinician about what the meaning of these things are, so that they can make rational decisions.

But I guess I would conclude, at the end of the day, the world we are in today is a world of people making choices, and they have to be available to have some way of making intelligent choices about the expenditure of their money and the implications of those expenditures. So I would hope that this site that we're talking about, while I really do appreciate the complexities of the government getting together and the bureaucracy and so forth and so on, which is important because you can't do it without that, at the end of the day, the purpose is Mrs. Jones in Poughkeepsie, Iowa. That's what this is about and those committees need to have somebody on it that knows something about communicating to Mrs. Jones in Poughkeepsie, Iowa.

DR. BURKE: Thanks, Reed, and I think that the sort of big piece that we can see that has to happen, the sort of major piece that isn't necessarily going to be visible in that consumer summary, is the right kind of research. There has to be the right kind of research that gets outcome data of the kind that we need to make those information summaries really useful, and there needs to be a process for collating and doing the right kind of meta-analyses to make sense of the primary data, and then there needs to be information summaries, and then those information summaries need to be disseminated with appropriate education, so that people can make sense. So those are the links in the chain.

DR. TUCKSON: And by the way, the thing I had mentioned was, the key thing, of course, is obviously Mrs. Jones in Poughkeepsie is going to need to be able talk to Dr. Smith in Poughkeepsie, and Dr. Smith herself needs to have access to the same database, so that she can make the right kinds of and so that -- I don't want to leave out, because we're going to talk about the physician education and health professional education in a moment.

I said health professional, too, Judith.

DR. TUCKSON: I don't want to leave out the other end of the dyad.

DR. LEWIS: Yes, right.

DR. BURKE: So there are multiple links in the chain. There are a lot of things that need to happen, and I think actually in terms of where the Data Working Group got yesterday, we're kind of at this point handing some work over. We're handing some work over to FDA. We're happy to continue to be involved, but FDA has to take the lead in beginning to think about possibilities. We're handing over a task to HHS agencies, which is here's the list of things we want. Where do you see your role and what are your thoughts about coordination?

I think it is reasonable to ask whether the Data committee should continue to talk about one piece that we might make some contribution about, and that is could we have an ongoing discussion about prioritization? You know, in particular, for example, prioritizing what information is really needed now? Is it possible to prioritize the most urgent information? So I would throw that out as something.

DR. McCABE: The comment was made about bringing all of the NIH institutes into play, and I just want to remind everyone that Francis is representing Dr. Ruth Kirschstein, the director of NIH, in his role here, and at a briefing I briefed all of the institute directors last summer about our recommendations. So this could go back to Dr. Kirschstein to consider when we feel that it's time to do that.

The other thing, I wanted to follow up on Reed's comments about that these really become purchasing decisions ultimately, and I was going to discuss this later, but I was contacted by the chair of the Horizon-Setting Committee for the Province of Ontario, and we started off the conversation saying our health care systems are so different that we're sure that their charge, which has to do with identifying the impact of genetic testing on their National Health Service and the dollars, and they want to be sure that whatever they are paying for has clinical validity and clinical utility, and ours is more regulatory in terms of safety and efficacy for testing. After about 10 minutes, we realized we were discussing the same thing. We come at it from a completely different perspective, but in point of fact, we get down to the same decisions about prioritization of tests, what are the resources that are going to be going to these decisions, and so I have been asked, and there will be other individuals, some of whom are in the room -- I know

Tony Holtzman has been asked to speak that day, as well as others, but on September 19th I will be representing SACGT at a meeting of the Horizon-Setting Committee in Toronto. I think it will be very interesting to hear the perspective of the Canadian government, at least the provincial government of Toronto, which, again, is more dollars-driven, but ultimately it's the same issues that we're dealing with.

DR. KOENIG: I just want to follow up very briefly about Reed's comment and tie it into something that Mary Davidson said earlier. I appreciate the issue of framing, and actually Ed just talked about this, that whether we're talking about this as a consumer choice issue or more on the side of the responsibilities of those in the research community and providers about what sorts of things are offered or paid for, but on the issue of consumerism, I just want to remind people that I think a lot of consumers do imagine that things that are out there and offered for sale in the medical marketplace and arena have already been vetted to some extent and that that's also our job, so that it's not simply a matter of just offering things for free choice. I'm not sure if that was incoherent. It ties in very much to some of the informed consent stuff that I'll be trying to talk about a little later.

DR. LEWIS: I also want to reiterate the point that Reed was making that the materials that we produce have multiple audiences, and I want to make sure that we're clear that the vast majority of providers who are looking at this stuff may not be genetic specialists, but may be out there at the frontline, so that the things we do need to be clearly available to people who don't have expertise in genetics, because they're the ones who are going to be making the initial decisions and they're going to be the ones who are going to be referring patients to genetic services or, as genetic tests become more broadly available, they're going to be the ones who are going to be ordering and interpreting. So we need to make sure that the material we produce is very user-friendly at all levels.

DR. BOUGHMAN: I'm sitting here not having been at the meeting yesterday and trying to get in my mind, at least, what I'm hearing are next steps and who's supposed to in fact do those next steps, if you will, and I think I've heard a few things. Let me just try this out as a very rough structure and see where we are on it.

First of all, there has been a pretty clear challenge to FDA to in fact clarify the processes that go along with the template and that SACGT needs to hear about that progress, and I would think that the November meeting would not be an unreasonable time to check on progress there.

I also heard some questions about interagency issues, and I'm not sure exactly how that process would work, but certainly in November I think I would like to hear what at least the agencies are thinking about as a proposed interagency structure.

A question I have in either one of those processes or suggestions is what role the professional organizations or consumers might play. It seems to me that the Data Work Group might be

continuing to work on a slightly refocused part of the effort with the data template now being off the table, and it seems to be focusing on the post-market aspect, but I'm hearing that we have maybe at least three different groups or parts to this. One has to do with the information for gathering and dissemination at the research phase, and the applications phase, and the consumer outcome there. That would include the prioritization of content, access, and format for each one of those groups.

But that's just a reshuffling of what I've been hearing, but those last things seem to me that the Data Work Group may need to figure out that next step while the agencies are working on the first part, but I toss that out and the basic question would be to the work group and the Committee as to what's next, because I think we do need to figure out what our addendum to the previous materials is going to actually say.

DR. BURKE: Thanks, Joann. Let's have discussion. I think Michele had a comment.

DR. LLOYD-PURYEAR: Just a quick point, a quick reminder, that I think the interagency part actually I think is easy, surprisingly easy, and I think will translate out nicely, but I think we need to keep in mind that this is much bigger than what the Federal agencies are going to be doing by themselves, and I think that's what you were getting at, Joann, because especially the post-market continuum of data collection, that's going to demand different relationships with consumers than what's normally done at the post-market stage. It's going to demand different relationships with professional groups, with public health and health care providers, that they don't normally have the kind of input that I think we're asking, and there certainly is no mandate for that kind of participation and no one's going to require that.

I think the Federal government actually can provide a framework, but it's just a framework. There's a lot more at stake and a lot more that needs to be done to get to your consumer information source.

DR. BURKE: I just want to reflect on Michele's and Joann's comments both. The issue of role of professional organizations it seems to me comes up in all three different places, so clearly that's part of what we want FDA to think about and tell us what they're thinking as they clarify the process that they would possibly contemplate for the regulatory pathway. Michele's making the point that that's a somewhat new undertaking or not business as usual undertaking for the HHS agencies, so that should be something they think about.

I would, as a result of this discussion, clarify that there are three different pieces of information or types of information, therefore, that we'd like to hear from HHS agencies. The first is how they see their role. In other words, to what extent, as we list the activities of post-market data collection, what's already there in their mission? What's already there being done? And it's more a matter of what topics it's done with.

The second is the point that Joann emphasized that we'd like to hear from the agencies what their thoughts are about the coordination/interagency interaction process, and the third is the point that Michele just made. Where do consumer groups, professional organizations, and others fit in?

What I think we are saying are the tasks on the table for the Data Work Group are also to discuss how professional organizations, consumer groups, and others fit into this process, as number one, and number two is generally for this fairly ambitious menu of things that happen in post-market data collection, how can we talk about prioritizing. Does that summarize what we've been saying?

MS. DAVIDSON: Yes, I just want to speak to needing greater clarification on the role of consumer groups in particular, and it might do us well, either here in this setting or in the Data Collection committee itself, to think about that presentation. But just kind of briefly, I mean, picking up on Reed's comments, first and foremost and fundamentally, just to provide an anchor so that when the work of the data collection group is finished, that we really are where we want it to be, which is to provide the best quality information possible to -- Mrs. Smith, was it? Mrs. Jones. Excuse me.

You know, and the consumer community itself is really a moving target, and what I tell you today is not going to be up-to-date tomorrow, but certainly at every phase of data collection, the groups are putting together patient registries, they're looking at mutation databases, they're looking at genotype-phenotype issues, and this is something that really is taking place, and so I think that there's a very active role not only in fusing the work of the committee and being sure that we end up in the right place, but also in really being able to use some of those condition-specific groups as living laboratories, because that's what they are.

They can also ensure, picking up on what you were saying, Michele, that people understand the reason for continued participation way beyond the test itself, so that we get that post-market data, and these groups have a long track record in figuring out how to produce information and communicate it to people in a way that's very helpful, and I think that their experience, as well as all the health professionals and health communicators, that that's going to really be an important part of this process.

DR. BURKE: So it sounds like part of the discussion, and it may well be an interactive discussion with other working groups, is what kind of process is involved in ensuring some sort of appropriate interaction?

Let me ask FDA and representatives of other HHS agencies, have we been clear enough and is it reasonable to ask for some sort of feedback by the November meeting?

DR. GUTMAN: Well, from my perspective, that's fine, yes.

DR. BURKE: Basically, a progress report I think is what we're asking.

For the other representatives, it seems to me we've identified three points and we'd be interested in some sort of feedback by November. We're being, I think, sort of open-ended because we're not sure what it is that you need to tell us.

So is it reasonable to get some feedback from HHS agencies on current role and how it relates to the kind of post-market data collection activities we've identified, how interaction/coordination between agencies might profitably occur around post-market data collection issues, and what the agencies would see the role of professional organizations and consumer groups in?

DR. KHOURY: I can't speak for all the other agencies, but I think by November we should be able to get you number one. We should be able to begin an active dialogue on how to do number two. Most likely, we'll probably have a chance to meet only once. Maybe we can have a couple of phone calls between now and then. I mean, among the agency group.

But it takes awhile to perhaps reconstitute a group, unless we want to revive the group that already existed, so we can just go off in a corner and see how we're going to do it, but I think we can get you part of your answer, not everything, by November.

DR. BURKE: Right, right. I think maybe what we're saying is we'd like to have some feedback at the November meeting that will help us to figure out what the next steps are, that from the Data committee's point of view, there's really a feeling of needing to hear back from the agencies before it can clarify other next steps that it might be taking.

DR. HUDSON: I think it's perfectly reasonable for us to provide some information about what NIH currently does and what we perceive that we could contribute to this process.

I don't actually think that there's a meeting that's required here. I think that we can all generate what we do and share that with one another. I don't think that we need to set up a bureaucracy in order to respond to the Committee effectively.

DR. LLOYD-PURYEAR: And actually, I think we can ask Sarah to constitute the group here, the agency reps here, to have that conversation.

DR. LEWIS: I think that's very important because when we report on the Access Work Group, we're doing some work on looking at some principles around reimbursement and we're going to be asking the agencies to share some information around those issues, so it might be helpful if -- you know, I think a lot of the work is going to dovetail one off the other in terms of, as we heard yesterday, that a whole big piece of this is how stuff's going to get paid for, and that's part of the stuff that the working group I chair is looking at, and one of the things we're going to be asking for is some information from the agencies and we're hoping at the November meeting, although it

may end up getting pushed back. So I think maybe if we can coordinate some of this and work together, it's going help us all move forward together.

DR. BURKE: I also want to emphasize what I'm fairly certain is the spirit in which these questions are being raised. These questions came up at the Data Work Group discussion yesterday because basically the Data Work Group says there's a lot of things that are important in post-market data collection, there's a lot of data that we really want to have in order to know what a good genetic test is, in order to give the consumer information that we want to give, but the last thing we want to do is recommend procedures that are duplicative, redundant, uncoordinated, and so we don't really I think have any secondary motive here. I think the Data Work Group just wants to understand what's in essence already in place, and not needing to be created because it's already there.

DR. CHARACHE: I wonder if one or more of the groups can also be addressing the question of where the data's going to come from. We know from reportable diseases that when it comes from the physicians, it often doesn't come, and when it comes from the laboratory, we have all kinds of problems with confidentiality, with getting the clinical matching data, and what have you. So I think that's going to be very important to be thinking through.

DR. BURKE: Judy just made a comment about concern to get information from the HHS agencies as well, and I guess the question comes up do we need to indicate what priority or order we need the information in? I don't want to be preemptive here, but I think what we feel we're asking is really just clarification. We're asking the HHS agencies to explain what they're doing so we understand it better. I think that's probably the first step.

DR. LEWIS: And that was exactly where we were coming from, too, just trying to get some status information. I'll be talking about that more later, so I'm hoping that maybe we can coordinate all this.

MS. YOST: I just want to clarify again. Are you speaking strictly of only post-market data? Because obviously it's a continuum. I mean, we've had these conversations before. You know, I hear this discussion this morning and I'm sorry I was not here yesterday, but that's what we're talking about right now, but I mean, the whole picture is not only data, but it's an associated process along with that and each piece is interrelated. Not only are the roles of the agencies and the programs interrelated but the whole process for this review that we're proposing is interrelated.

So I think it's important that we don't take one out of context from the other and lose that continuity, I guess. That's the only point I wanted to make. We're sort of having to provide whatever we can.

DR. BURKE: And clarifying, I mean, I think that comes under the heading of the Committee

being more informed about coordination.

DR. KHOURY: I think Judy is absolutely right. I mean, the data context is in the context of everything the agencies are doing, but I think the reason why we are where we are today is because there's this whole SACGT recommendation and process zeroed in on the fact that when tests are introduced in the market, to the market phase, data are inadequate and we need more data later on for education to communicate with Mrs. Jones or Smith in Iowa, et cetera.

So I think it will be important for the agencies to focus on how their processes are producing the kind of data that would allow that effort to go forward, and starting with the FDA pre-market template and then begin to see how these boxes, from analytic validity all the way to the ELSI issues, who's doing what and where, and then I think we'll have a clearer picture of how that template can be filled better on the post-market phase.

DR. BURKE: Yes, I think that's important. I think those are the boundaries that the Data committee is concerned about. How is the information going to be produced that we need and then organized into summaries and disseminated? We're interested in that pathway.

DR. KOENIG: This is on a slightly different point, but in your presentation, Wylie, you also talked about SACGT's role as a champion at various points in this, and so many people this morning, and apparently yesterday, mentioned the issue of the need for additional resources. I'm wondering how specific our recommendation should be about exactly what those resources should look like. Is that something we should be putting time into now?

I was thinking, as Muin was talking before, that the whole issue of additional funding for secondary analysis of data is a huge issue because, as you said, the bias in the system currently is for the constant generation of new data without the time to really look often at what you have. So I'm not sure if we need to be dealing with that now in terms of how specific recommendations should be.

DR. BURKE: I think where our discussion went yesterday is we need more data. In other words, that we can anticipate certain things, that there's going to need to be more resources in secondary analysis and more resources into providing good quality summaries and disseminating them, but we need to have more sense of where activity is now before we can get that concrete.

DR. McCABE: And included in that would be the resources that are being utilized now, and just in addition to what the agencies are doing, what their resources are for carrying out those activities.

I want to just redirect the discussion for a few minutes because there is something very concrete we need to accomplish before the break, and that is under Tab 3, "Development of a Classification Methodology for Genetic Tests: Conclusions and Recommendations of SACGT."

If you'll recall, we made some classification recommendations in our recommendations to the Secretary, and we fully anticipated and we did, if you recall, go through two generations of a classification methodology, both of which were rejected out of hand as being unworkable. It's very important that we tie this up and recognize that it is a loose end, and Sarah and her staff have put together this, which at this current state is a draft marked "Confidential, Not for Distribution," but it would be very handy for us to follow up with those initial recommendations. We get queries from the Secretary's office, from the Assistant Secretary's office, about what the status is of the classification methodology.

Basically, this goes through the history of those two generations and then why both were rejected. It has the summaries of the public comments on both of those generations, and then finally conclusions on page 7. I've looked over those conclusions and I don't think anything that we've discussed in the past two days really changes those conclusions.

But if we could look at those, be sure everyone is comfortable with them, and then, if at all possible, take a vote on them, so that we could let the Secretary's office and the Assistant Secretary's office know where we are with these.

DR. KOENIG: Just a point of clarification, and maybe this is a question for Sarah. If we do end up having to think about classification for another purpose, rather than pre-market review -- for example, like prioritization, Muin's point, or, for example, about thinking about levels of intensity of informed consent -- this doesn't preclude that.

DR. McCABE: No. The last sentence reads, "The Committee noted that the work of developing a classification methodology would likely be applicable to and useful in approaching other issues that SACGT may address in the future," because I think our general feeling was that we sort of understand in our gut what we were getting at. It was just that we couldn't get it down on paper quite the way we had predicted we would in our recommendations to the Secretary.

DR. KHOURY: Following up to Barbara and the discussion we just had this morning and the last day, perhaps something a bit more specific can be added at the end, a line or two that clarifies what some of these issues may be. I'm not good at this ad libbing.

DR. McCABE: Well, the question is whether we know what those issues are. You know, it may have to do with informed consent. It may have to do with access. There are a variety of ways. So Sarah, do you want to comment?

MS. CARR: Well, how about if we just put a "such as" for informed consent or secondary data issues, something like that?

DR. PENCHASZADEH: A point of clarification. The absence of a classification system will

essentially do away with the two levels of scrutiny. Is that right?

DR. McCABE: Well, what we found was that it was difficult to identify really what we meant by that as we tried to put it on paper, and we go through the history of why the template-driven process derived from those previous attempts.

DR. PENCHASZADEH: Shouldn't there be, then, like some comment to that effect, so that essentially --

DR. McCABE: Well, I think it's in here.

DR. PENCHASZADEH: -- we have the same level of scrutiny or we're not --

DR. McCABE: Well, I think that what we're left with, and it may have to do with the prioritization that we discussed earlier today, and the prioritization may be in effect getting at those levels of scrutiny in terms of where the concerns are.

MS. BARR: Just in answer to Victor, I think my understanding of where we are is that template asks I think 46 questions now. Is that correct? The FDA template and all the categories. And that for us to come up with any kind of linear notion about if you answer this one this way or that one that way, then you get put in a box, really is a dilemma.

What FDA was asked and as this morning's conversation referenced is now, you guys, okay, we can fill out the template. I mean, we got the labs really that far and in agreement, and even that the information requested was very useful, but then how is FDA going to use it? So I think we're just all deciding let's not prejudge that. Let's let them work on that and then we may end up with a clearer classification system.

DR. LEWIS: I think this makes sense because I remember our discussions around one of the issues was whether or not these were going to be used for individuals or for populations and whether they were going to be used for diagnostic or predictive use, and the bottom line is once a test's approved -- you know, we spend a lot of time talking about off-label use, and I think we get out of that forest, because things are moving so fast that to ask people -- I think one of the things we heard yesterday was the burden issue, and I believe that if a test is out there, it's going to be used for a variety of purposes, both approved and those that are still in research. So the categories we had for scrutiny I think were somewhat artificial and that the boxes are going to be flowing in together too fast, so I think this makes a lot of sense.

DR. BURKE: I do want to emphasize that this report was intended simply to reflect the discussion. We aren't bringing new ideas here. We were just trying to, as accurately as possible, reflect the discussion and where it brought us to at the end of I think the last meeting.

MR. HILLBACK: Yes, I just would agree with both Pat and Judy. I think what it in effect does is create a variable system, and now we're back to what is Steve doing, because the variable system is at FDA, and I think our expectations are that different tests are going to get looked at in different ways at FDA. That becomes a black box that right now we can't see into, which brings us back to the earlier point.

But I think, to go to Muin's point, I'm not sure it helps us to even do the "such as" because why try to predict where we may want to put into a scheme? I'm not sure we need to predict that to the Secretary. It may just tie our hands further. So I'd rather leave it open and assume that, as we said, we may want to use it for something else at our discretion. End of story. Period.

DR. McCABE: So what Elliott has proposed is that we leave it as written, not add the "such as" that we had done before. Is there a discussion on that? Because I do want to bring this to closure, so that we can get this off to the Secretary's office.

DR. BOUGHMAN: My comment was actually related to that, Ed. It seems to me that the report as written does in fact reflect the conversation of the entire Committee. I think in a cover letter from the chairman of the Committee to put sentences in context, because we need to make sure that we are addressing our original charge and that we are moving forward, although in a slightly different way than proposing a classification scheme, and it may be that in that cover letter, Ed, there would be a sentence that a "such as" might fit, but that would not necessarily reflect the report or discussion of the Committee.

DR. McCABE: So that the cover letter would be in essence an executive summary, but just to reflect very briefly why we were detailing this.

DR. BOUGHMAN: Right.

DR. McCABE: Okay.

DR. BURKE: So I think we have a recommendation to consider a vote.

Elliott, do you have a comment?

MR. HILLBACK: Yes. I just was going to agree in a sense, because I think it's useful for you to convey that there is a lot of motion, that sending this letter looks like we stopped doing something, and I think, Joann, your recommendation is let's not give the impression that we've stopped doing something and haven't done something better, and so I would agree with the cover letter, and then I don't have any comments on my proposal, because I still like it.

DR. McCABE: I would also point out that as you read this over, it says two things. One is that we've come an awfully long way in the last year and we really have accomplished quite a bit.

The second is that we listened to public comment and responded. We could have been bloody-minded on this and said this is what we decided in the recommendations and we're going to pursue it, but instead we did listen to public comment, we tried to rework it a second time, listened to public comment on that, and then took a completely different approach, so that I think it does reflect the distance that we've come and also the process that we've used to get here.

DR. BURKE: So does anybody want to make a motion about a vote?

DR. LEWIS: So moved.

DR. BURKE: We're voting on the document as is.

MR. HILLBACK: Second.

DR. BURKE: And we're also voting on a cover letter, somebody just noted.

So we have a motion and a second. Any more discussion?

(No response.)

DR. BURKE: Can we take this to a vote? All those in favor?

(Show of hands.)

DR. BURKE: Opposed? Anybody opposed?

(No response.)

DR. BURKE: Any abstentions?

(No response.)

DR. BURKE: I take that as a unanimous vote (12 in favor, 0 opposed, 0 abstentions).

DR. McCABE: Thank you very much.

The other thing is do we need to clarify any of these questions that we have gone through? Wylie, they were really the questions you had. Do you feel like you have an answer to all of those, Wylie?

DR. BURKE: I think we're clear on the questions that we started out discussing. I think we're clear on the status, and that is we started out yesterday discussing and reported here on the pre-

market template with relatively little additional modification. The template is satisfactory and actually suitable for distributing in public comment.

Our challenge to the FDA now is to provide further clarification about the regulatory process that will go on with the template, including consideration of how professional organizations will be incorporated in the process, and we have asked FDA to have a progress report on that process by the November meeting.

DR. COLLINS: Wylie, did you also suggest that FDA include a template focused on a predictive genetic test?

DR. BURKE: Yes. Yes. Thank you, Francis, for reminding us of that. We did want more examples, and in particular wanted to be sure that there was a predictive test example.

DR. McCABE: Didn't we ask for cytogenetics also?

DR. BURKE: Cytogenetics.

MR. HILLBACK: Other non-DNA-based, I think was the other suggestion that came yesterday from the CAP and lab folks.

DR. BURKE: Other non-DNA-based. And I think I can echo Steve in saying anybody that wants to help, their help will be gladly accepted.

HHS agencies, the discussion identified the need to have a better understanding of the current and projected role of different HHS agencies in those activities that we thought were most important in developing post-market data on outcomes of genetic testing, and those include collection of primary research data on outcomes, proceeding with secondary analysis of data on outcomes of genetic testing, developing information summaries that provide reliable, accurate information to a variety of end user groups, including health care providers, consumers and policymakers, and as part of developing and disseminating information summaries, not only the process of creating the information, but the process of disseminating the information.

So those are the specific areas that are important in the post-market data collection and dissemination process about which the Committee would like to hear more from the HHS agencies, and we want to be clear that what we're interested in is really just understanding what different agencies see as their current and projected role in terms of these issues. We'd also like them to consider how professional organizations and consumer groups might interact in pursuing their roles, and we're interested in their thoughts about how coordination between agencies might best go forward in order to avoid duplication and to make sure that gaps that are identified in current activities are addressed. I think what we said is that we would like to simply have what information the agencies are able to give us on those points by November.

DR. McCABE: And also the dollars.

DR. BURKE: Yes, that's right. We're interested in role and resources.

DR. KHOURY: I'm writing as fast as I can here, but the first thing is that Sarah will put this to us in some e-mail and maybe can convene us by phone what time to discuss that issue?

DR. COLLINS: Sorry. I can't hear.

DR. BURKE: Francis, Muin is just saying that he hopes that there will be something that comes together in written form that summarizes the stuff that I've just been discussing, and I think we do have notes and can do that.

DR. McCABE: And that Sarah may put together a conference call of the agencies represented here, which would be broader than the four agencies in that interagency genetics group.

DR. BURKE: And then finally, we said that what's currently on the table for the Data Work Group is an ongoing discussion of prior priorities. We've discussed a lot of things that we'd like to see happen as part of the post-market process, and we need to have an ongoing discussion about how do you figure out the priorities and what are those priorities, and we also should have discussion about what we see as the role of professional organizations and consumers, and in particular processes that might make their inclusion possible. I think that's our to do list.

DR. McCABE: If there is nothing else, then we'll take a break until 11 o'clock. Francis, you're invited to join us in the breakout, Room 9, if you wish.

Thank you for joining us on the phone, Francis.

I'd just remind everyone, there is a cafeteria on the first floor of the A wing, if you wish, for your break.

We'll resume at 11:00 a.m. sharp.

(Recess.)

DR. McCABE: We will now turn to Dr. Koenig, Dr. Lewis, and Ms. Davidson for brief reports on the Work Groups they chair or co-chair. A table summarizing the activities of all five groups is at Tab 4.

Before we proceed with the progress reports of the other work groups, I'd like to introduce Dr. Helen Burstin, director of the Center for Primary Care Research at the Agency for Healthcare Research and Quality. She is sitting in today for Dr. David Lanier.

We'll now hear reports from other work groups, IRB and Informed Consent, Access, and Rare Diseases. We'll start off with Dr. Koenig, chair of the IRB and Informed Consent Work Group.

DR. KOENIG: Great. Good morning. Is the sound okay?

DR. McCABE: Yes, thank you.

DR. KOENIG: Great. Okay.

As Ed said, I'm the co-chair, actually, with Ben Wilfond, of the IRB and Informed Consent Work Group, and we have been trying to address our mandate, which I'm going to quickly review with you. One of the first items is to address issues in informed consent from the research stage, when research is governed by the IRB, through the marketing of tests for clinical and public health uses, including, and then the second point, to support the overarching goal of a seamless informed consent process for genetic testing, and I think, given the discussion this morning about how tests are going to come on the market without clear evidence of clinical utility, which is appropriate, how important informed consent is going to be. So that's one of our overarching principles.

We also were given the assignment of developing an information brochure for the general public outlining basic questions and answers about genetic testing in order to enhance informed decision making, and this was meant to be a corollary to the provider summary, and now if the provider Q&A is going to be transformed, we're probably going to have to readjust to that, but we can think about that later.

And then, next, to develop criteria, and this is one of our key tasks tying back to our original report, and that is to develop criteria defining the level of consent needed for different types of tests, and this includes the phase of clinical testing.

Also, to explore the social risks of genetic testing and how such risks should be considered during pre-market review, to analyze the evolution of the informed consent process as tests move from the research base to the clinical setting, because unless we really understand all the elements of that, we won't be able to make appropriate recommendations, and to address some specific challenges of informed consent in genetics, and those are the challenges posed by multiplex testing or testing for multiple mutations at the same time, direct-to-consumer marketing.

Finally a whole range of possible limitations that might be caused by different access issues, whether it be individuals who don't have access to certain kinds of services or cultural barriers or whatever.

And also, explore issues raised by institutional review of multi-site protocols, which is again something that we've been talking about this morning, too, the importance of that to collect data post-market.

So I'm now going to update you on the status of where we are with these different activities.

The first, we had some concerns about whether the informational brochure was the right approach, and I should also thank Wendy Uhlmann for working hard on this brochure. We did, at our last meeting in May, decide that it was a very useful document and to proceed with it, and so I'll report on the status of that, but we changed the intended audience somewhat, rather than specifically patient-centered, to the general public. Again, I think we were dealing with the same sort of issue as the data group. Should these summaries be specific to a certain kind of disease and a certain set of issues or should they be more generic and involved in education for genetic testing in general? So we've moved toward a more general Q&A. What do you need to know about genetic tests if you're a member of the public? The final content is going to be discussed at our next meeting and, just so that you know, we are having another one-day meeting of the entire Informed Consent Subcommittee in September, and then we have projected submission to the full Committee in November of 2001.

When we last met in May, the IRB and Informed Consent Work Group also spent a day together working, and the main focus of that meeting was to develop criteria for defining the appropriate levels of consent for different categories of tests.

I also wanted to make it clear, since there might be some issue of whether we're talking about research versus the clinical phase of testing, that our initial focus is really on the clinical applications of genetic tests. We're not talking about informed consent during a research test or criteria in those situations where they're fairly straightforward.

The outcomes of that all-day meeting, we had a very, very elaborate discussion which I think everyone found quite useful, a productive discussion of the benefits, limitations, and challenges to enhanced informed consent for genetic tests, and we also really came away with the need for a very pragmatic approach to this, and also we talked a lot about the need to not ask informed consent to do too much work in this arena, but to instead find the right balance and have a very pragmatic and flexible approach.

So in the context of that meeting together as a group, we drafted a basic framework of the dimensions of informed consent and some of the features that we included were information disclosure, obviously, information comprehension, and then we also looked at another sort of dimension, which is the degree of directiveness that the provider might make versus the element of freedom of choice, and a good example of that would be something like in situation like testing for Huntington's, it's high on personal choice, whereas a pharmacogenomic test which really guaranteed the safety of a drug would be high on directiveness in terms of the clinician

recommending a test.

Then, finally, also the whole issue of documentation of consent. When should something be written, what should the levels be, et cetera, and at that point we came up with four levels. We were just basically working on imagining how this would work out. Minimal to high, with four levels.

Then, finally, we formed a subgroup to help refine the framework and the full report, and I'll now tell you about that subgroup, which included me and Ben Wilfond, and then three consultants we brought on board who have all done a lot of work on empirical studies in informed consent and some of whom have presented to the Committee already, like Nancy Press, but also Gail Geller and Pamela Sankar.

We've had a number of meetings and conference calls and have worked I think actually quite hard, although the issues are very complicated, and what we've tried to do is amplify the framework that we developed in May by developing an approach to categorizing testing according to levels of consent needed. So this is again the issue of we're back to sort of our level of scrutiny document, but in a slightly different iteration to try and find a way of thinking through how one would need to a priori think through which tests needed which level of consent.

So the next steps, the full working group is going to meet, as I said, September 12 to continue the development of the report, to discuss the framework and approach to categorizing tests, and to finalize the content of the consumer information brochure, and then we're hoping to present or we will present the final draft brochure and an informed consent report to SACGT at the November meeting.

That's it. Are there questions at this point?

DR. McCABE: Thank you very much.

Any brief questions for Barbara?

DR. McCABE: Thank you very much.

Next will be Dr. Lewis speaking about access.

DR. LEWIS: Thank you.

Since the last meeting, the Access Work Group had a conference on May 24th, and at the conference call we discussed a couple of draft documents. We looked at a draft document that was going to be issues around a white paper on billing and reimbursement for genetic testing and patient education, and then the other thing we looked at is a document that would have some

guiding principles for health care payers regarding appropriate issues around coverage and reimbursement for genetic tests and services.

Those have moved forward at some point. Suzanne Goodwin is working on one of them, and we're in the process of contracting for someone to work on the other one that's the specific issues around reimbursement, and hopefully we'll have draft documents of those to talk about in November if there's time, and certainly if there's not time in November, they'll be on the agenda for our February meeting, we hope. It's just hard to get all of these things up and running without us having to stay here for a month.

The other thing that we did is we spent some time looking at some questions and answers that we wanted the agencies to address, and after our original phone call, there was a second phone call that happened when I was on vacation, so I didn't participate, but Irene Stith-Coleman, Barbara Koenig, and Michele Puryear had a phone conversation at the end of June to discuss the next steps in terms of looking at what we needed to hear from the agencies in this area.

At that phone call, it was agreed that we should first hear presentations from OMB, from NIH, and from Robert Hahn at CDC, et cetera, about how population data are being collected, categorized, and reported in order to inform both the Data and the Access Work Groups how we should proceed on the issue, and this is something we were hoping to have on the agenda for November if there's time.

Just given the amount of resources that are available for our work, this has taken a level where we're doing some background work and we'll be ready to present as soon as some of these other issues get off the table.

I'd be happy to answer questions.

DR. McCABE: Good. Thank you.

Any questions for Judy? Yes?

DR. HUDSON: Judy, could you repeat what kind of data you're seeking from OMB and the various entities?

DR. LEWIS: Well, what we're looking at, and basically the focus of our group, is looking at access to services. So what we're looking for is information that would help us figure out how people are getting reimbursed, what kind of policies are in place in the agencies, and what are some of the issues in terms of access to genetic tests and services.

DR. McCABE: Yes, Sarah?

MS. CARR: I think you were asking about the population data, and maybe Barbara can amplify as well, because there's the access issue and then the --

DR. LEWIS: The disparities issue.

MS. CARR: -- Access Work Group is also looking at it in the context of health disparities, and this is of interest to the Data Work Group as well. How is population data collected, organized, analyzed, and disseminated, particularly in the race/ethnicity area? And this is part of why some of the work the Genome Institute is doing may be of interest to the Committee later, if you want to talk about that.

But does that clarify it? Okay.

DR. McCABE: Any other questions or comments for Judy? Yes, Michele?

DR. LLOYD-PURYEAR: Well, I have a question. Because I haven't seen them, have those questions been put forth to the agencies?

DR. LEWIS: No.

DR. LLOYD-PURYEAR: Yes, I didn't think so.

DR. McCABE: Yes, I think the appropriate approach to that would be certainly if the agencies are involved in the Committee, then they could be involved in bringing the data forward, but more typically it would come back to this Committee to prioritize the information that would be reported from them.

DR. LEWIS: We were hoping that those presentations -- we believe that those were of sufficient interest that they needed to happen at the full Committee.

DR. McCABE: Right.

DR. LEWIS: Which is why I was hoping that when we ask the agencies to present to us, it could be on issues of concern across, because I think there's a tight connection.

DR. McCABE: Thank you.

If there are no other comments or questions, let's move on to the Rare Diseases Work Group, and there Mary Davidson is going to present and then Mike Watson will present some brief comments as well.

MS. DAVIDSON: The Rare Diseases Work Group has two essential mandates. The first one is

to gather information about developments in rare disease testing, CLIA certification of laboratories conducting rare disease tests, and Mike's going to talk about that after I finish, and related issues like access, cost, availability, the role of the rare disease community in all of this, as well as information resources that are coming up through the rare disease community. A core to all of this is to develop a consensus definition about rare diseases.

In terms of our progress, we've developed, identified, and gathered together people from diverse and essential perspectives to be part of this group. We've had two meetings and we've begun, thanks to members of the committee, to collect rare disease definitions and found, I guess to nobody's surprise, that there's a good deal of challenge because they tend to be inconsistent and have other purposes than the one that we're looking at.

We've also begun thinking just about the tremendous variability that genetic research is revealing and the many conditions that we've thought of as being common are really going to end up being rare, and we're wondering kind of how that may affect or not affect our mandate.

We're looking at research and information resources within the rare disease community, and that, certainly, the Alliance is doing together with NORD and other consumer groups, and we've already begun looking at CLIA certification issues within laboratories.

The long view is that we want to put together a white paper outlining the impact on rare diseases by some of the mechanisms and procedures that we're recommending here around the table, and our target date for that is 2002, earlier rather than later, but we want to give ourselves enough time, and the process for that is that we'll have some working group meetings, we'll do a draft of the issues and preliminary recommendations that we would bring back to the SACGT Committee I guess optimistically, Sarah, in November, possibly? And to get public input and input of the Committee, then, with putting together a white paper in 2002.

Mike?

DR. McCABE: Mike, you want to come to a microphone and make some brief comments?

DR. WATSON: Yes, very briefly. In addition to what Mary mentioned, we're also beginning to, actually through the American Society of Human Genetics and the College of Medical Genetics, develop a survey to target research laboratories, rather than the traditional clinical laboratories that have been targeted with surveys about CLIA compliance. We're trying to develop something that is both educational, so they understand what the laws are about being CLIA-licensed, what are the various options available to them in either being licensed or associating with licensed facilities, discuss some of the issues of maintaining their confidentiality, and then begin to ask questions to profile them as basic research laboratories versus clinicians involved in basic research, for whom there are different kinds of questions about the kinds of tests that they're developing, get a sense of whether they're diagnostic tests largely or predictive in nature, and

then begin to think about whether they're moving into high-volume testing issues that might change one's perspective of whether they should be thought about as research labs, whether there's difficulty in maintaining those, finding places that will pick them up, and really get a sense of why they feel obligated to either keep those tests in their laboratories and not maintain alliances or develop them with clinical laboratories at some stage during the research development of their test.

DR. McCABE: Yes, Judy?

MS. YOST: All I would ask is that before you send out your survey that you share it with us, so that we can see how you're portraying the CLIA program.

DR. WATSON: Well, I may wait until I see how I characterize the program until I decide if I'm going to do that.

MS. YOST: Well, we'll give you that benefit of the doubt. However, it's really important that the message of how compliance is not only achieved, but also assessed, is clearly articulated because there are different approaches to do that that vary depending upon whether it's a private organization, whether it's a state agency, or so forth that's making that assessment.

So I think it's a real important point because we've found that just in experiencing the implementation of the CLIA program in the broader scale that there are a lot of perceptions and misunderstandings about that, and so it's real important, when you're asking the question, to make sure that that message is clear.

DR. WATSON: I think that it'll be interesting, and I'll have to strike a balance from my own perspective that there are levels of oversight and regulation for genetic tests in translation that are above what may be allowed in CLIA.

MS. YOST: Right.

DR. WATSON: And I wouldn't necessarily want to make people aware of the easiest way through the system.

DR. McCABE: And then there are also the states. Some of the states have regulations that are more stringent than CLIA.

MS. YOST: Absolutely, and more power to them, but I think it's clear that there be a balance about that presentation between the very minimum to the maximum.

DR. WATSON: Yes. We'll land between somewhere.

DR. McCABE: Any other questions or comments for Mary or Mike?

DR. McCABE: Thank you very much for bringing us up to date on the work groups.

We'll now hear from Dr. Pat Charache, who is liaison between SACGT and the Clinical Laboratory Improvement Advisory Committee, or CLIAC. Dr. Charache will give us a brief update on CLIAC activities.

Dr. Joe Boone, assistant director for science in CDC's Division of Laboratory Systems, is also present and Joe will add a few words about the status of the proposed rule to augment the CLIA regulations in order to address laboratory quality control and assurance for genetic testing.

DR. CHARACHE: I'm going to talk about very briefly four items that were presented to CLIAC. Two, which I'll go into in a little more detail, pertain to waived tests, and I want to explain why this is now important and why I'm flagging it for this group.

These are the four things I'll talk about. First of all, the waived test, the current laboratory practices that are now in place for laboratories that do only waived testing. Then I want to talk about new policies that are being considered to change the requirements to introduce a test that's waived. A brief word about pre-market approval of laboratory tests. I won't go into details because that largely reflects what's been discussed here, and then I want to call to your attention a CD-ROM demonstration of genetic testing in clinical practice, which was an educational TV program that I would hope could be perhaps seen in part here in November.

Background is that the CLIA law classifies a waived test as one that is so simple and so accurate that erroneous results are negligible. If a laboratory does only waived tests or physician-provided microscopy tests or procedures, they have no oversight under CLIA. So if a test is waived by FDA, that's essentially the end of it as far as any further supervision of that procedure or that laboratory is concerned. Now, this is important because three-quarters of the laboratories in the United States are in that category. There's no review by CAP or CLIA or HCFA or anybody else because they do only waived tests.

I'm going to tell you about a study, which is one of a series of studies and the most recent one presented to us of approximately 436 laboratories. This particular study was done by Judy Yost and her group at HCFA, and they chose eight states and looked at 10 percent of waived laboratories in the states to see what happened when there's no oversight of waived tests.

Now, the importance to this body is that according to FDAMA, which is the FDA Modernization Act, in November of '97 the ability to classify tests to see which ones should be waived was moved from CDC to FDA, and all tests are now classified as high complexity, moderate complexity, or waived. The first two categories do have oversight with laboratory reviews. The waived does not.

There are new FDA guidelines proposed for waived tests that are very permissive compared to in the past, and industry is lined up with huge numbers of these tests that they want categorized as waived. Per CLIAC, the guidelines may emphasize tests that are analytically simple to do -- you drop a couple of solutions on a spot and can tell if it's pink or white -- but they don't necessarily, the tests that are being reviewed now and the proposals, consider the things that are important to SACGT. Namely, pre- and post-analytical concerns, such as informed consent and what have you.

Now, there is only one test right now that would classify as a genetic test that's been waived, and that's a test for bladder tumor, but you can see that as things become simple, even HIV tests are now being considered very seriously by CBER. It's the only test that's not reviewed by Steve Gutman's group, is HIV, and they are considering introducing waived tests for HIV, and that ignores the questions of documentation of consent and post-test procedures and results and so on.

Now, if a test is waived, again, there's no oversight by anybody. The lab is registered by paper application and no one documents that the manufacturer's procedures are being followed, and that's what is required in a waived-test lab. If QC, quality control, is required, there's not documentation that that or proficiency tests are performed or that the staff is properly trained.

Now, what happens? What do we know about it now? I'm going to give you just three slides that show the results of Judy Yost's report, and this was done by many people under her guidance and direction.

These are certificate of waiver. That's what a COW lab is. It's a certificate of waiver lab. A third of them did not have the manufacturer's directions, so they couldn't follow them. A third of them didn't perform quality control when it was required in order to make sure the test would work. Sixteen percent didn't follow the manufacturer's instructions when they had them and 7 percent didn't calibrate the equipment as it was required.

Additional quality control problems. Twenty percent, for example, cut their blood cards and urine dipsticks in half to save money. That means those 20 percent couldn't possibly get accurate results. Nineteen percent didn't train personnel or evaluate them, and so on. So what we're seeing is in these waived-test laboratories, approximately two-thirds of them had procedures and processes which would be likely to lead to error in results.

Quality control problems in physician-provided microscopy showed the same thing. Thirty-eight percent had no proficiency test when it was required for what they were doing, 36 had no maintenance of the equipment they were using, and so on.

So the point I'm making is that this group should be concerned about the simplicity of having a genetic test waived which removes them from all oversight other than the initial waiver review

by FDA.

There's a second study. This is the Office of the Inspector General, which found the same deficiencies. This is just a list of the deficiencies, but they're the same at about the same percentages as was found by Judy Yost's study. There's a third study as well, as well as studies by individual states, such as New York State, a group in Oregon, and so on. So what Judy has documented is that the waiver puts us at risk in three-quarters of the labs in the United States of no oversight and errors being made.

Now, the second thing I want to talk about is some consideration of the new guidelines, and this was discussed very extensively by CLIAC in their February meeting. They established a working group which met in April and reported to the body as a whole at its most recent meeting. I'm sorry. The waiver group met in May and Barbara Goldsmith chaired it, the working group. It was a group of 10 people, which were a mixture of current CLIA members, past CLIA members, and outside consultants who had no connection with CLIA, as well as representatives from the governmental groups involved.

A waived test, as we said, can be waived if it meets either one of two groups of requirements. The first is that it's been approved for FDA for home use. So by law, anything that's approved for home use is automatically waived. There's a disconnect here which I won't go into.

The other group are those which have an insignificant risk of an erroneous result, and this is a direct quote from the law, which has been changed. They "employ simple, accurate methodologies with negligible likelihood of an erroneous result by the user or HHS has determined that they pose no unreasonable risk of harm to patients if they're performed incorrectly." Now, that used to be no erroneous result and they determined no unreasonable harm. The new FDAMA changed it to or there is no unreasonable harm.

I'm going to point out two major differences between the guidelines that have been followed in the past and the current proposed rule by FDA. The first is the second line listed here, which is accuracy. In the guidelines proposed in September of '95 -- those are the CDC guidelines which have been followed to the present -- to say a test is accurate, you have to have reference material and a reference method that shows that if you do the test according to manufacturer's directions, you'll get an accurate answer.

With the new draft guideline, that has been changed, such that accuracy is defined as a trained technologist getting the same answer as an untrained technologist, which obviously has nothing to do with whether they both are getting the right answer or the wrong answer.

The second major change is that with the CDC guidelines, quality control that is required to ensure accuracy according to the manufacturer must be performed. With the FDA guidelines, if quality control is required to make sure that the results are accurate, it's recommended that you

do quality control, not that you are required to do it.

So there are other issues as well that CLIA expressed concern about in its advice to FDA for the classification of tests as waived tests.

The conclusions of CLIAC were that since waived tests are exempt from standards and oversight, that ensuring the quality of this testing is critical, that the quality of waived tests needs to be high to offset the inexperience of the testing personnel, and the directions for use of a waived test have to be readable and understandable at the seventh grade level. At least one manufacturer told us that they had seventh graders doing it because that way, they got a two-for. They got a test of the method as well as of reading it. Of course, seventh graders -- if they'd chosen ninth graders, they might have had more errors. And we felt that they should be cautious in increasing the number of waived tests, and I would say this would be particularly important for genetic testing.

The issue of accuracy we felt should be done by evaluating it and comparing the test to performance measure of truth, and that tests with no measure of truth should not be waived, and finally that the accuracy assessment should include the usual understanding of sensitivity, specificity, and predictive values where these could be obtained for a given test.

We found it impossible to assess risk of harm to patients, but in general we felt that if a test can't harm a patient, it probably can't help the patient either, and it probably shouldn't be done.

The next thing I'd like to comment on is the pre-market approval. We went over the proposed template for genetic tests. The reason I'm not going to discuss this is because it parallels the discussions that have already been held here as it pertained to FDA. There's also been discussion and concern about CLIA review of laboratories that are performing genetic tests and how we're going to ensure the quality of that review and whether there should be a difference in groups that have deemed status for genetic tests compared to those that have deemed status for other types of laboratory testing.

The final thing I'm commenting on is the last of these, which is the CD-ROM demonstration. The Division of Laboratory Systems is involved in a wide range of activities now that pertain to genetic tests. They have contracts out, for example, for developing proficiency test methods and processes, such as appropriate cell lines or what have you, for developing quality control reagents, for looking at result reporting and seeing what needs to be done about improving the way results are reported. There's an international initiative looking at tests that can't be done in the United States to see how many of these tests there are that are done only overseas and what the quality controls are for the tests that are sent overseas.

This is an educational thrust. It's a wonderful CD-ROM, which we walked through part of, which is of value not only for laboratory testers, but certainly for clinicians who want to use genetic tests, for the public who wants to understand genetic tests, and the star of the whole CD-

ROM is the Chair of this Committee, so I would like to suggest that we found this really inspiring and if there's time, I think it would be very helpful to see a subunit of this CD-ROM in November.

Thank you.

DR. McCABE: Thank you very much. Some brief questions, and then we need to move on to Joe Boone.

DR. LLOYD-PURYEAR: Did CLIAC take a position on the proposed changes?

DR. CHARACHE: Yes, they did, which was forwarded to FDA, who were also present, of course, and also were represented at the working group, which was held deliberately in Rockville. I think it was first working group that wasn't held in Atlanta because we did want to be sure that FDA could come and participate.

DR. BURKE: The conversation or the comment came up a little earlier when we were discussing the FDA template as to understanding the sort of interdigitation between the pre-market review process and then CLIA's subsequent review of genetic tests, and I'd like just a little bit more clarity about where CLIA is in this process.

DR. CHARACHE: There's been a lot of interest in CLIAC in this question. I think Judy's response that we have to see what comes out of FDA is certainly relevant. I think we have felt there are other areas that could be advanced in parallel. We know there's going to have to be an educational piece. We know we're going to have to see who's going to be reviewing genetic laboratories, particularly the home-brew type, and we're aware that some of the current reviewers from the deemed group lack a knowledge base that's really helpful to them.

DR. BURKE: It seems to me that there's a sort of gain of efficiency here, and I'm not quite sure how this should play out, but in our discussion yesterday I certainly got the sense that one of the ways that you make the FDA pre-market review template user-friendly is if you are asking for the same kind of information that will subsequently be required for CLIA review and, because this was such an important point of feedback in terms of regulatory process and what's going to be an acceptable standard, if we're clear that there's some sort of unity about what the CLIA review will consider an acceptable standard and what the FDA pre-market review will consider an acceptable standard, that seems to me a very important piece in making sure that we have the pre-market review process that we want, which is one that doesn't add extra burdens. And so it seems to me that it might be very important to understand how the CLIA process is proceeding and make sure that the CLIA and the FDA process dovetail. I'm not quite sure what to do with that, but that seems an important point.

DR. McCABE: Well, perhaps at the November meeting what we could ask is a side-by-side.

There's a template that's being developed in CLIA, a template that's being developed in FDA, and perhaps if we could have -- I guess it would be Judy and Steve work on a comparison of those two. If they're parallel enough, a side-by-side would be quite helpful.

Any comment, Judy or Steve?

MS. YOST: Steve, go ahead.

DR. GUTMAN: Judy and I, I'm sure, would be happy to do that, depending on how far along in the process it is. This is an awkward transition and there's been a lot of input and a lot of information. The story is still being written. It may be ready for November. It may take a little bit more time. We're anxious to sort through the intellectual issues. The laws are fundamentally different and they have differences in endpoints and differences in history and differences in culture, and while we would certainly like to marry them as best we can, you do have to realize that there are two different laws at play here, and so sometimes you don't have a perfect marriage. It's arranged and it grows.

DR. McCABE: One of my faculty pointed out that arranged marriages have the same life expectancy of non-arranged marriages, so there can be some benefit in this. So at least if you could inform us in November of where things are.

Judy, do you wish to comment briefly?

MS. YOST: Yes, just again to reiterate that same thought that Steve had given, as well as the fact that it is an evolving story, and so we can do what you folks say all the time, is we'll tell you what we know and what we don't know about that. But we been having, again, as I said about the data, the process also goes along with it. We really have to include the two together. You can't separate them and we have had discussions knowing that we need to talk. I have certainly approached and been approached by accrediting organizations and professional organizations about working with them on this process. We are very open to that. We are clearly not in denial about anything because we don't pretend to have the technical expertise within our program at this point, so the best way to go is let's use the experts where they exist, and that's where the efficiencies come in and that's again where the coordination will provide some efficiency as well as in the process.

DR. BURKE: Yes, just my quick comment is that even if it's mostly to help us understand what questions are still out there or what barriers there are, I think our understanding of what's happening, getting a progress report that enables us to understand that would be very helpful.

DR. McCABE: Thank you.

Dr. Boone, the last time we met, there was a discussion about whether SACGT should send a

letter to Secretary Thompson encouraging the Department to move forward on the publication of the proposed rule. Perhaps you could tell us whether this is an appropriate time for us to consider this step.

DR. BOONE: I'll address that as I move through our progress report. As you will recall, in May of the year 2000, we did publish a notice of intent in which we tried to describe what the issues were and we tried to determine what kinds of recommendations would be appropriate for a CLIA specialty of genetic testing. We had a number of recommendations from the Clinical Laboratory Improvement Advisory Committee, and we've taken those recommendations and the comments we had and finalized a set of recommendations. We're now in the process of preparing a draft notice of proposed rulemaking. Dr. Bin Chen is here, who has been very helpful in helping us craft that proposed rule.

The rule has to come in three parts. We have a preamble which describes what we're doing and why we're doing what we're proposing. We have to have also the proposed regulations, but we also have to have an impact analysis, so we have to describe what the financial impact and what the benefits are going to be of this proposed rule. So putting something like this together doesn't happen overnight, but we are in the process of getting a draft together. The next step is we meet with our colleagues at CMS, Judy Yost's group, and we try to make sure that we have an implementable kind of rule, because it wouldn't do us any good to have something that we couldn't implement. So we're talking about that, and when we had our last CLIAC meeting, we talked about trying to keep some consistency in what is currently being covered under CLIA, because CLIA does have provisions that do cover pathology, a lot of things that are done in pathology, and we really don't want to do any damage to those kinds of requirements that are already in place. So it's going to take some clever crafting to make sure that we don't do any harm while we're trying to cover the other groups.

To continue about the clearance process, once we get agreement with CMS, then it will go through a departmental clearance process and all of the HHS agencies will have an opportunity to comment upon the proposed requirements. All of this has to take place before we actually get to the rule being published in the Federal Register. I know everyone's anxious to know what the time line will look like, and I don't think at this point that I've got enough of a good crystal ball to tell you what that will look like.

I also want to remind the Committee that when we get into a rulemaking process, we're less free to talk about what the content is than we are when we're collecting information about what the content should be. So we're entering into a phase where we're going to have to be fairly silent about what the content of our proposed rule looks like until everybody has an opportunity to comment on the proposed rule.

In terms of your question about whether or not it would be helpful at this point in time, I don't think it would be because we haven't hit any unusual roadblocks. I mean, we're still operating as

business as usual and trying to expedite it as quickly as we can in getting something prepared and something that we'll be able to share with the Department and get through the clearance process. If we do run into a place where we think we're hitting a roadblock, I think then we might really could use a boost.

DR. McCABE: Okay. Well, let us know if we can be helpful.

DR. BOONE: Sure. Thank you.

DR. McCABE: Thank you very much.

Let's move ahead to the public comment. I'll remind all of the speakers that you're limited to five minutes. Our preference would be that you speak for three minutes or so and give us a couple of minutes for discussion, but how you use your time will really be your decision.

The first speaker is Michael Murphy, who's president and CEO of Gentris.

MR. MURPHY: Good morning. Thank you very much for allowing us to speak. I'll use my three minutes wisely by reading something that I've put together.

Gentris is a pharmacogenomics service and product company. We're located in Research Triangle Park, North Carolina. Our company was founded in March of this year and our management team includes individuals who were instrumental in the start of Intek Labs, which is the first international pharmacogenomic services company.

I am here today to tell you about Gentris and the important mission our company is undertaking to enhance the use of genetic tests that are designed to guide drug therapy. We believe that the health care system and the patients' lives will be enhanced when these tests are available at clinical diagnostic laboratories. Our ultimate goal is to provide the highest quality control standards, reagents and systems available in the marketplace.

As many of you know, after several decades of research, we understand that there's a large genetic component involved in the metabolism of drugs. Pharmacogenomic studies have confirmed now that mutations in drug metabolism enzymes, including the so-called P450s, result in deficient metabolism in a significant number of patients taking commonly prescribed drugs.

The safe administration of these drugs could be enhanced if patients were genotyped for these drug-metabolizing enzymes. Adverse drug reactions are now one of the leading causes of death. We believe that many of the cases of drug toxicity might be avoided if physicians and their patients have access to this kind of genetic testing.

In addition, there are now identified a number of genes that appear to correlate with drug

efficacy. Genes such as CETP, beta-2-adrenergic receptor, ACE, and ApoE all appear to be helpful in predicting efficacy in certain classes of drugs.

So, what do we need to initiate testing in patients? Two of the most important issues we've identified and feel we are facing include, one, the standardization of methods, protocols, and controls. In other words, a gold standard from which to start and to allow for the fair and reasonable assessment of a test's reliable performance. I would add also that these controls and standards and methods are not currently commercially available. And two, and not a small undertaking, the education of physicians and patients about why and when these tests should be performed.

Finally, I want to mention some of the characteristics of the tests that we're talking about today that we've targeted as initial products. Most of the products we intend to work on involve monogenetic or single-gene traits for which the correlation between an individual's genotype and the physical outcome has been well established. Many patients and volunteers have been tested during their participation both in clinical trials and population studies. Published studies demonstrate that these tests can be highly predictive.

There is also clinical utility fairly well established in some genes, such as the previously mentioned drug metabolizing genes, and more work to be done in others. There is a growing body of evidence that suggests that efficacy tests could be useful in aiding clinicians to choose the appropriate drug and dose.

We believe that these tests can easily conform to the necessary regulatory guidelines. Proper controls, quality assured reagents, and well-validated systems will certainly provide better consistency and reliability when compared to current home-brew testing.

Finally, one of the most important features of these tests is that effective intervention is easily obtainable now. That is, we could eliminate the risks associated with administering drugs to individuals with genetic predisposition that lead to adverse drug reactions. In most cases, individuals could be prescribed an alternative medication or a dose might be changed.

We feel that this Committee's guidelines will go a long way in guiding future genetic testing, we hope to work with many of the agencies contributing input to the Committee, and I think you for your attention.

DR. McCABE: Thank you very much. If there are no questions or comments, we'll move forward.

Our next speaker is Dr. Teresa Rhodes, Department of Health Administration and Policy, College of Health Professions from the Medical University of South Carolina.

DR. RHODES: Thank you. I appreciate your time and listening today.

The research that I want to briefly present to you today came about when we at the Medical University did some pilot calls to some of our OB-GYNs, and it was just a trial to see how prepared our state was for genetic advances. So we were particularly in the Health Administration and Policy Department looking at what we needed to do in educational changes. Of all those calls, 100 percent of the physicians were unaware of even simple BRCA1 and 2 gene tests that Myriad had available. So from that, we developed the study that I'd like to share with you.

We worked off the assumption and premises that there are some primary core competencies that we should assume that our physicians and other health care professionals know. One is be aware of the limitations and the advances that are occurring in genetics, understand the social and the psychological implication of genetic testing, and know when and where to make a referral. It was clear from our pilot that they didn't know that, so we proceeded.

We used a survey instrument that's been used by Georgetown University by Virginia Lapham with her permission, and basically it is a gathering of fill in the blank and Likert-scale data. It's an extensive survey, about six pages long. We pulled out some of the primary areas that we felt that they needed to be aware of in working with genetics.

Our particular population, we sent out surveys to about 896 primary care physicians. We got about a 24 percent return rate. We didn't do any callbacks since it was a Phase I study. In Phase II, we would have done a second contact with them. So we were pleased with the response, and if you look at their response rates, when we come from medical care, particularly in the advances in genetics, we want the best care possible.

No one wants lower than quality care or mediocre care. So we came from sort of a quality gap viewpoint of looking to see are we ready in our state, and we assume other states may be in the same situation that we're in.

A very few percent fell into high confidence levels that they could provide discussion with their patients about genetics, that they could provide counseling and referral for genetics, or even gather basic information like the family history tool. We went into deeper levels with them of specific core competencies that fell within the three primary ones that we were looking for, and once again we found statistics were 70 and 80 percent that fell below or didn't even know what response they should have regarding basic core competencies.

We also asked them about their interest in continued education. Their interest was high. We had 74 to 90 percent of them wanting specific topics. So they're very open and very interested.

We also asked them did they care to be presenters? And of that, only 13 percent felt competent

to even give training to their own staff regarding genetic advances.

We also brought in hot topic areas with social/legal issues, written informed consent, information from employers like in work comp testing, also individuals' information to teachers, and just gathered future initiatives in education of what we should provide them to help them make those tough types of decisions.

These statistics are available in a handout for those of you that are here, and also in the handouts that were provided to the Committee.

Basically, in summary, what we reviewed with them was how long had it been since they'd had a genetic course? Most of the respondents had not had a genetics course in over 25 to 30 years. Additionally, many of those reported that those courses were not even in human genetics, that they were in nonhuman genetics. So there was a strong need in our state and a strong interest in our state.

So in conclusion, we felt that there was a need to present to the Committee the urgency that we feel that as products begin to move through Phase I, II, and III and products hit the market, unless we work to bridge that gap, the quality and delivery of genetic services will fall too short when it hits the clinical practice application, simply because the practitioners are not ready. We came from the educational standpoint and we found that the educators don't even begin to know where to start to make those changes.

Our recommendations would be that it no longer be considered a specialty, that all health care professionals be aware of genetic implications, and thus that health care curricula be integrated into curriculums, that certification questions on exams include genetic questions, and additionally that continuing education units be developed and required, particularly of practitioners that have been out for a number of years already.

Thank you. Questions?

DR. McCABE: Thank you very much. I think we're going to move on.

Our next presenter is Paula Rieger, who is president of the Oncology Nursing Society and based at M.D. Anderson in Houston.

MS. RIEGER: Thank you, Dr. McCabe.

The Oncology Nursing Society is a national organization of more than 29,000 registered nurses and other health care professionals that is dedicated to excellence in patient care, teaching, research, administration and education in the field of oncology. ONS also has a Cancer Genetics Special Interest Group that currently has more than 90 members providing cancer genetic

counseling across the country.

We thank Chairman McCabe and the Secretary's Advisory Committee on Genetic Testing for the opportunity to testify today and to provide comments primarily on the education of health professionals in genetics and to inform the Committee and other interested parties about some of the initiatives in educating oncology nurses in cancer genetics.

As the scope of cancer nursing practice includes oncology nurses with specialized training and skills who provide cancer genetic counseling and contribute to the evolving body of knowledge within cancer genetics, ONS believes that educating health care providers about genetics and genetic testing remains an issue of paramount importance. Genetics will need to be integrated throughout clinical care to enhance prevention, diagnostics, treatment, and personalized care for many illnesses, including cancer. Nurses in all settings are involved in collecting, managing, sharing, and utilizing genetic information in their practice. They share with other colleagues the responsibility to educate the public and to provide safeguards against the misuse of genetic information.

An additional consideration is the education of those providing specialized services such as genetic counseling. Health care providers who perform cancer genetic counseling must have sufficient knowledge and expertise in cancer care genetics, hereditary cancer syndromes, genetic testing, and interpretation and communication of results. A diverse set of skills is involved in the process of cancer genetic counseling. Comprehensive counseling is inclusive of, but not limited to, assessment of both personal and family history as it relates to the risk for developing cancer, discussions of specific risks for developing cancer, and strategies for managing that risk. A significant proportion of the information discussed with patients relates to cancer and cancer care. Thus, in provision of such services, a clinician who is knowledgeable and skilled with respect to cancer issues and the associated care is every bit as vital as one who's knowledgeable in the field of genetics. This is an important consideration when decisions are made concerning minimum competencies for the provision of such services.

As health professionals, nurses also have a responsibility to educate the public. Individuals need to be informed about the implications of genetic information and their right to privacy and confidentiality of genetic information. They must understand that genetic information has implications not only for themselves but for their family. The public is often introduced to genetic technology through media, which can sensationalize their introduction to this subject. Hence, it is vital that all nurses and other health care providers can provide quality education and information with respect to genetic technology and its ramifications.

We face a significant challenge in ensuring that all providers of health care, both those that currently serve in the workforce and those that are being educated, can obtain adequate education in the principles of genetics and its integration into clinical practice. As a professional nursing organization, we have an obligation to educate our members, and thus ONS has its own

initiatives as well as partnerships with other professional organizations working towards this important and essential goal. ONS uses an educational blueprint that is revised annually to guide the selection of educational offerings for members. Cancer genetics is a high priority within our blueprint.

We held a special symposium on genetics in 1998 at our annual convention, and each year several education and ancillary sessions do focus on genetics and related issues. Within our fall convention, named the Institutes of Learning, we have included genetics tracks within the last two years.

We have a textbook on cancer genetics and its integration into practice that will be published this fall. The ONS Website features chat sessions and several of those have related to genetics topics. We've applied to the National Cancer Institute for a grant to provide education for advance practice nurses in genetics.

We have a videotape educational series that has featured cancer genetics as a topic, and lastly we have journals that have featured articles on cancer genetics, and our April 2001 newsletter featured cancer genetics and new roles in nursing.

We would offer the following recommendations:

Clinical genetics will become genomic medicine and will no longer be the sole purview of genetic specialists. ONS is supportive of the work of NCHPEG as it strives to promote education and access to education about advances in human genetics to improve the nation's health.

We feel that both intradisciplinary and interdisciplinary efforts are important to create partnerships to provide education products and programs in genetics. For example, ONS members also belong to and work with ISONG and provide educational programs for nurses in both societies.

We recommend that as standards of the minimum competencies are set for the provision of cancer genetic counseling, as well as genetic counseling in other specialties that may emerge, that all professional groups providing those services have equal roles in decision making. As certification efforts are created and implemented, it will be especially important to integrate the need for evaluation of continuing competency in a rapidly changing area.

A variety of resources are needed to meet the educational challenge and federal dollars must be allocated towards these efforts.

Also, specialty certification exams and licensure exams must begin to integrate genetic content into their exams.

On behalf of ONS and our members who are involved in the provision of cancer genetic counseling, I thank SACGT for the opportunity to provide commentary today. We continue to hold in high regard the comprehensive and challenging work you've done to date. It is work that requires significant thought and will profoundly impact the future of medicine and public health. We remain available to offer our support and expertise as you continue your work.

Thank you.

DR. McCABE: Thank you very much. I think we'll move on then. Thank you for your presentation.

Our next presenter is Sharon Olsen, who's assistant professor, Johns Hopkins University School of Nursing, and representing ISONG, the International Society of Nurses in Genetics.

MS. OLSEN: Dr. McCabe and the Committee, good afternoon. I am an educator, a nurse practitioner, and a researcher, and today I'm speaking on behalf of the International Society of Nurses in Genetics.

ISONG, as we are affectionately referred to, is a professional organization of over 300 registered nurses in genetics throughout the United States as well as Brazil, Britain, Ireland, Israel, Canada, and Japan. ISONG recognizes that all registered nurses, regardless of their practice setting, have a role in the delivery of genetic services and the management of genetic information. We recognize genetics nursing as a subspecialty, wherein nurses with specialized knowledge and skills provide care to clients who have or are at risk for known genetic conditions or birth defects.

In 1998, and in collaboration with the American Nurses Association, ISONG published a scope of practice and standard of care for genetic nursing, and there are three copies at the table here for the dissemination to the Committee members and review. Most recently, we've worked with the American Nurses Credentialing Committee to credential advance practice genetics nurses. These are nurses with master's degrees.

On behalf of the membership and leadership of the International Society of Nurses in Genetics, I'd like to thank the Committee for this opportunity to speak this morning. In this brief presentation, I'm going to underscore our support for your past, as well as ongoing, activities, and highlight some of the relevant concerns of our membership.

ISONG members regularly care for clients of diverse socioeconomic and cultural backgrounds, clients who seek genetic information and use this information to inform personal, medical and reproductive decisions to improve their health and well-being. Therefore, we commend and support your Committee efforts to develop and to recommend policies and procedures for safe

and effective genetic test oversight and development. We commend and support SACGT efforts to ensure universal client access to genetic testing, education, counseling and follow-up services.

We encourage and will actively support SACGT efforts to advocate for third-party reimbursement of all appropriately trained and educated genetic health care professionals, especially nurses. ISONG believes reimbursement needs to be available to all specialty genetic services providers working within their state practice acts and professional scope and standards of practice to assure access and consumer choice. We believe that genetic testing must occur within the context of genetic counseling, and that genetic counseling interventions therefore must be considered in any discussion of reimbursement.

We support your Committee efforts to ensure public and professional education about genetics. We will actively continue our own efforts on this front and we look forward to broadening the dissemination of your Committee-sanctioned professional and public education efforts.

Finally, we support SACGT efforts to influence and to help draft federal legislation to prohibit discrimination in employment and health insurance and to protect the privacy of genetic information.

In summary, the use of genetic information by health care professionals and the public for decision making and reproduction, health promotion and maintenance, and disease detection and management will continue to grow as the science base of the Human Genome Project expands. Nurses with specialized training and skills in genetics have much to offer at-risk clients and their families before, during and after the genetic testing and counseling sessions. The International Society of Nurses in Genetics wishes to continue its dialogue with the Secretary's Advisory Committee as it refines and moves forward in its mission to ensure safe and effective genetic test oversight and public access to genetic services.

Thank you for this opportunity to present these views, and I want to say as a bottom line, we will be represented at these meetings and we do ask that you please call on us if we can be of service. Thank you.

DR. McCABE: Thank you very much.

Just to clarify, we have certainly taken strong positions regarding genetic discrimination with both the previous and the current administration. We're not, however, involved in helping to draft that legislation.

MS. OLSEN: Thank you very much.

DR. McCABE: Thank you. I think we will move on. Our last presenter of the morning is Dr. Tony Holtzman from the Genetics and Public Policy Studies --

DR. HOLTZMAN: That's all right. I have nothing to say.

DR. McCABE: You have nothing to say?

DR. HOLTZMAN: For once.

DR. McCABE: I've been asked if that's a measure of the progress of the SACGT.

DR. McCABE: Well, thank you very much. That will help us get back on to our schedule. We will have then a half-hour for lunch. We will reconvene sharply at 12:45. There is a cafeteria in the A wing on the first floor, and for those of us on the Committee, we have lunches that were ordered by you. If you ordered a lunch, it's in Room 9.

Thank you.

(Whereupon, at 12:15 p.m., the meeting was recessed for lunch, to reconvene at 12:45 p.m.)

AFTERNOON SESSION (12:50 p.m.)

DR. McCABE: So we're going to take Kathy Hudson first for our update on genetic discrimination legislation.

At our meeting in May, we agreed to send a letter to Secretary Thompson expressing our support for federal legislation prohibiting discrimination on the basis of genetic information. A copy of that letter is in your briefing books at Tab 5. You will also find a copy of a letter from the Secretary to Congressman Cliff Stearns and a summary of a Senate hearing on this topic.

In your briefing folder, you will also find an analysis prepared by NHGRI that compares the key elements of the two major bills that have been introduced, the Slaughter/Daschle proposal, which is H.R. 602 and S. 318, and the Snowe proposal, which is S. 382.

There have been a number of important developments on this issue since our meeting in May and Dr. Kathy Hudson, director of NHGRI's Office of Policy and Public Affairs, who is also sitting in for Dr. Collins as the NIH alternate ex officio today, has kindly agreed to give us an update on the congressional actions since we last met.

Dr. Hudson?

DR. HUDSON: Great. Thank you very much.

Of course, the reason why the Hill is interested in this topic is in order to put in place effective prohibitions on what you see up here on this slide. In order to give you a little bit of background and context, as you all remember, and another illustration of what we're trying to prevent here, this is a cartoon where the prospective employer says, "You're lazy, you're unproductive, and frankly, you've got a lousy genome," with those genetic test results there sitting on the desk.

A year and a half ago, President Clinton signed an executive order that made it illegal for Federal agencies to use genetic information in making hiring decisions, and when he did so, he said that his purpose was to set an example for every employer in the country, and exactly one year and one day later, it was very clear that that example had not been so effective for everyone when we learned of the Burlington Northern Santa Fe Railroad case, which you all have been kept apprised of.

In mentioning this case, I do want to point out that this is actually not a genetic discrimination case per se, that the case that was brought by EEOC was under the ADA for unwarranted inquiries about medical information. So it was actually not a misuse of genetic information, but its inappropriate collection.

Burlington Northern Santa Fe Railroad has now become a very active advocate for legislative solutions to genetic discrimination and has communicated those in a number of ways, including letters to Secretary Tommy Thompson.

There has been a lot of discussion on Capitol Hill about genetics policy issues, and with the publication of the working drafts of the human genome sequence, Jim Jeffords, then a Republican, and Tom Daschle wrote an article in Science magazine outlining some of these issues, and we thought that was very meaningful until the defection shortly thereafter of Jim Jeffords.

When Jim Jeffords left the Republican Party and Tom Daschle became the majority leader of the Senate, his first press conference as majority leader was on the topic of genetic discrimination legislation, and he had a press conference in the Capitol that was attended by several people here in the room today. At that press conference, Dave Escher, who is an employee with Burlington Northern Santa Fe, spoke, and Tom Daschle, Senators Kennedy, Harkin, and a number of others indicated their commitment to moving genetic discrimination legislation in this Congress, and at that time Tom Daschle made the remarks that are shown here on this slide.

Shortly thereafter, President Bush, as you know, in his Saturday radio address also supported passage of genetic discrimination legislation covering both the health insurance industry and use of genetic information in the workplace. In making that announcement, we don't have a lot of detail about exactly what he has in mind, but in making that address, he did say that he wanted such laws to be consistent with existing anti-discrimination laws and existing regulations.

There have been a number of congressional hearings that have focused either directly or indirectly on the issue of genetic discrimination this summer, and I'll just quickly review for you some of those.

On July 11th, the Appropriations Committee had a hearing on the promise of genomics, but also that focused significantly on the impediments to achieving that promise, and what was notable about that hearing, in addition to the very high level of discourse among the committee members and the witnesses, there was an enormously high attendance at this hearing of committee staff, particularly young female committee staff, and that was because Ben Affleck was a witness at that hearing testifying about ataxia telangiectasia.

On the very same day, there was a hearing in the House on genetic discrimination and health insurance chaired by Cliff Stearns' subcommittee, and Mary Davidson of the Committee testified, as well as Karen Rothenberg, HIAA interim president, and Craig Venter on the subject of health insurance discrimination. The companion subcommittee in the House looking at the employment discrimination issues held a hearing about 10 days later, and so you can see that there's considerable momentum here in getting all the information that members need in order to consider this important legislation.

The Senate committee that actually has jurisdiction for this legislation, both in the insurance context and the employment context, held a hearing on July 25th. It was a very promising hearing, although there was considerable discussion among the members about lingering concerns that they have about whether or not there are conflicts in the genetic discrimination provisions and with existing law, the Americans with Disabilities Act and with the Health Insurance Portability and Accountability Act and its implementing regulations.

They have stated that they're going to have an additional hearing on September 13th to try to work through these issues, and we are trying to be helpful to them in that regard in trying to lay out how precisely the pending legislation interacts with the HIPAA privacy regs, because these bills were drafted in advance of those privacy regulations, and also how it interacts with the Americans with Disabilities and Rehabilitation Act.

What we provide in your folder is just a side-by-side comparison of the definitions in the two pending bills, and we'd be happy to provide you with our analysis of how those bills compare to other existing laws as those develop.

So there are some outstanding issues. As I mentioned, the consistency with existing law and regulations.

There's also been some confusion, I think, about the impact of anti-discrimination legislation on the ability of researchers to do biomedical research. There were earlier iterations in earlier

Congresses of anti-discrimination bills that would have had an adverse impact on the ability to conduct biomedical research. Those provisions have been corrected and in our analysis of the pending legislation, neither the Snowe nor the Daschle bill would have any adverse impact on the ability to do research, and in fact we would posit would have a beneficial impact on the ability to do research by removing the anticipation of prospective patients that their information might be misused.

Then we still have many outstanding issues with definitions, definitions, definitions.

I did want to mention that we are, in addition to working with the Administration and the Hill to try to work through these genetic anti-discrimination bills, we're also working to educate various target audiences about what protections are in place now, and we are having a meeting in September on September 12th where we are inviting in union leaders, with the expectation that like with the Burlington Northern Santa Fe Railroad, that it will frequently be the union that is first knowledgeable about existence of cases of genetic discrimination. So we're inviting those folks into town to learn about genetics, to learn about genetic discrimination, and what their rights and protections are.

And that's all I have to say. I'd be happy to answer questions you might have.

DR. McCABE: Thank you very much, Kathy. I'd just like to point out that we have a copy of Mary Davidson's testimony in our packet. It's the sheet on the Genetic Alliance stationery.

Any questions or comments for Kathy or for Mary? Do you wish to comment, Mary, since you testified?

MS. DAVIDSON: Well, it's an iterative process, just to use Elliott's phrase.

MR. HILLBACK: I'm not going to sit next to you anymore.

MS. DAVIDSON: It's definitely a process, and just speaking from the Genetic Alliance's perspective, I think it kind of took us by surprise. We didn't expect all of this really to happen, along with everything else that's happened.

DR. HUDSON: But you're happy.

MS. DAVIDSON: Very happy, and running fast to stay abreast of all this.
I think that particular testimony, it was frustrating because that was a committee that was really focused solely on health insurance and really wanted to focus only on predictive testing, and since you really can't talk about health insurance protections without talking about employment protections, it made it somewhat difficult.

DR. McCABE: It sounds like the legislation has made it farther this year than it did last year. Is that a fair assessment?

DR. HUDSON: It is. One thing I didn't mention was that in the last Congress, the health insurance anti-discrimination provisions actually passed the Senate twice in two different forms, but never saw the light of day, and in fact another health insurance provision was added as an amendment to the Senate patient bill of rights which was passed by the Senate, but we understand that that amendment, which came out of absolutely nowhere and which we think has problems with the definitions and other provisions, we don't think will actually see the light of day, but again, this is the third time that the whole Senate has passed anti-discrimination in health insurance legislation. So I think that we're certainly building momentum.

MS. DAVIDSON: I think, again, so much of this comes back to public education because there's a real urge -- I mean, almost a momentum -- that's built up to pass legislation, and all of it I think well-intentioned, but it really needs all of our input to be sure that these decisions are made with as much -- that they're informed decisions on the part of our elected legislators.

DR. TUCKSON: First of all, thank you. Excellent report.

I guess I'm looking for a little analysis. Is there a pushback here? I mean, is there anybody standing up and testifying and saying, "We believe in discriminating"? In other words, why isn't this just like flying through?

DR. HUDSON: I think part of the reason that this legislation hasn't flown through in the past is that Congress tends to react to crisis situations and we're not yet in a crisis situation. So this is preventative legislation and so there's not as much momentum to do that as if there were a crisis. That's reason one.

There is some pushback. Nobody would stand up and say to you, "We believe in genetic discrimination," but at the same time, the insurance industry, particularly the individual insurers, are concerned about not being able to use genetic information, and particularly not being able to use family history information, which they already collect and, to variable extents, use in underwriting. That would be a change of current practice for them. So they have some objections to that.

Employers have not, by and large, had any pushback. If you talk to large employers in general, they're favorable for this legislation. They don't want to have this information and they don't want to be put in an awkward position with it.

Recently, the Chamber of Commerce has come out opposing this legislation, and that's the first time that they've sort of weighed in on this, and of course they're a formidable force.

DR. McCABE: Why is it that Burlington Northern has now come around and is now supporting the legislation? Is the argument that if there had been legislation, they would have been better informed?

DR. HUDSON: In their settlement agreement with the union, my understanding is that they put on the table that they would, as a part of their settlement agreement, advocate for these prohibitions. I actually have not had any direct conversations with them about their motivation for doing that. Obviously, it was very clever of them to put it in the settlement agreement and to get on the side of the angels here.

DR. TUCKSON: One other follow-up. Are there discussions going on -- I mean, like there's so much in legislation, legislative policy. There are behind the scenes conversations that reasonable people can have to see whether you can work through the concerns. Is that going on to your knowledge or is this at the level of, essentially, with the health insurers? Is this at the level of intransigence, everybody's dug in? Is it hostile or are people just early on just starting to explore it? Or how would you assess it?

DR. HUDSON: Of course, as a government employee, I don't participate in those behind the scene conversations.

DR. TUCKSON: Let the record so state.

DR. HUDSON: I think that the insurance industry has been tuned into this issue long enough that they have pretty well-defined and pretty clear-cut positions here, and I doubt that those are going to change substantially over time. I think where we're going to see the most openness to negotiation is in the realm of enforcement and penalties. This has been the big debate between the Republicans and Democrats on every piece of legislation that has moved, and certainly on the patients' bill of rights, and very similar issues come up on the anti-discrimination legislation because there is a difference in what are deemed to be appropriate enforcement remedies, caps on damages, those kinds of issues. In my view, since that's not my specialty, those seem like areas where we could actually reach a reasonable middle ground.

DR. ZULLO: In my former life on the Hill, even though I'm a government employee now, when the Senate was Republican-controlled, my former boss, Senator Durbin, was on the Daschle bill and the health care lobby had really set their heels in, and I don't think it would have come up, but with the switch in the Senate and with Senator Kennedy being the chair now, the rumblings, certainly from their committee, is he plans to get it on the floor once they have support on those issues.

DR. HUDSON: And the President.

DR. ZULLO: And now with the President being on board as well.

DR. McCABE: Yes, I think I would encourage you to read the letter from Secretary Thompson, because I think that would be very helpful.

MS. DAVIDSON: The other thing is that there has been the formation of a broad coalition that includes members of BIO and all the patient advocacy groups and health professional groups, and that's really going to make a big difference in all this.

DR. KOENIG: I just wonder if there's been any interaction or negative fallout because of the embryonic stem cell debate on the genetic discrimination area or if they've really been separate.

DR. HUDSON: I don't think so.

PARTICIPANT: Just when they're mentioned in the same sentence.

DR. KOENIG: Yes, other than if you mention them in the same sentence. Someone will think they're the same thing.

DR. McCABE: Yes, just a very brief comment.

MR. GREENE: Sure.

DR. McCABE: And please identify yourself.

MR. GREENE: I'm John Greene from the National Association of Health Underwriters, and I've worked with the Chamber, HIAA, and Blue Cross/Blue Shield, and other organizations, and I can tell you that from our perspective, we really are trying to negotiate on the bills. We don't oppose genetics legislation. We think that some type of legislation's appropriate, but it's all in how it's crafted and in the details of the way you define. As you said, definitions, definitions, definitions, and you were absolutely right about the issue about remedies.

DR. McCABE: Thank you. We're going to move on. Any other comments?

DR. McCABE: We're going to move on to the update on NHRPAC and OHRP activities relating to genetics. The National Human Research Protections Advisory Committee, or NHRPAC, advises the Secretary of Health and Human Services, the Assistant Secretary for Health, and the Office of Human Research Protections on a wide range of human subjects issues. Last year, the SACGT recommended that NHRPAC be asked to review current Federal policy regarding the regulatory requirements for informed consent of secondary research subjects or third parties. You'll recall that after exploring the issue ourselves in June 2000 and realizing that the issue went well beyond genetic research, we elected to defer to NHRPAC, a committee with expertise in other research areas, for further consideration of the issue.

We are very pleased that Ms. Kate-Louise Gottfried, executive director of NHRPAC, could be here today to report to us on the committee's progress in addressing the third-party issue, as well as other activities that NHRPAC may take up in the future related to genetics.

Prior to becoming NHRPAC director in January of this year, Ms. Gottfried served as a senior health policy advisor in the Office of the Secretary. Her work there focused on children's health, Medicaid and quality issues, youth violence prevention, and mental health. She earned a master's degree in public health from the University of North Carolina and a law degree from Rutgers School of Law.

Ms. Gottfried?

MS. GOTTFRIED: Thank you for the opportunity to speak with you today, and thanks to Kathy for stepping in when I was unfortunately a bit delayed.

I'm going to assume that everybody here knows about NHRPAC, and if there are any questions that you have while I'm speaking, please feel free to ask, but we just have a short amount of time and I want to give you the highlights with respect to genetic issues.

As your Chair indicated, the SACGT had sent a letter to Dr. Satcher, the Assistant Secretary for Health at the time, indicating that the issue with respect to, as SACGT characterized it, secondary parties was an issue that exceeded the field of genetics and really was crosscutting within all of research, and I actually commend you for that decision. I'm not sure I'm happy that we have it now, but I think it's very important to indicate that in fact it is crosscutting, so it applies to biomedical as well as non-biomedical situations.

The National Human Research Protections Advisory Committee in April -- we meet quarterly and, as an aside, all of this information is on our Website, particularly the transcripts. And in April, we invited Dr. Collins to come speak with us and asked him to lay out his overview of contemporary genetic issues and what we might focus on in the future.

Dr. Collins did so, and his number one issue was in fact an issue that we have now recharacterized as third-party issues, and we have a work group on NHRPAC that addresses third-party issues. The other issues that he identified were community consultation, stored tissue research, the notion of blanket consent and open-ended consent by the individual, and disclosure of research results to individuals participating in research.

The committee at this point in time is not focusing on any specific genetic issues. What we've done is we've identified a group of people within the committee who are on a work group addressing third-party issues. We originally thought it was going to focus exclusively on genetics. In fact, we changed that and we're focusing on third-party issues, and that group may in

the future be revised to include other people who are interested in genetic issues and these other four issues that Dr. Collins mentioned may in fact be those that we look at.

I can say already that in terms of informed consent, which is a big issue, we did have speakers at the July meeting and we're intending to follow up with that at the October meeting -- October 30th and 31st, for anyone who wants to mark it on their calendar -- and I think we're going to focus on informed consent in the short term on the decisionally impaired and in the long term just in the general informed consent process, which of course will have implications for genetic studies as well.

But with respect to third parties, which is where we're focused now, that is the one area that really does have significant, I guess, implications for genetic studies, and what I can tell you thus far is that we in fact have two groups, work groups, working in tandem on this issue. We have a specifically identified work group on third parties. We have another work group on social science and behavioral research. That work group is looking at a number of issues, but one of which is third parties, because they identified that as a critically important issue in the non-biomedical area, with the understanding that of course it needs to be applied in both areas, and the hope of the committee is to in fact come up with recommendations with respect to third parties that apply to the biomedical and the non-biomedical context.

Where we are currently is in the process stage, if you will. There have been deliberations, there have been work group meetings at both ends, and there was in fact a joint work group meeting at the end of our last meeting.

I think the best way to characterize where we are now is as follows. There's a strong voice within the various work groups that are interested in changing the definition of human subject and feel that it doesn't appropriately address concerns and does not apply to third parties as human subjects. The fallback position, if you will, of that group would be to say if we can't change the definition of human subjects, then in fact we need to limit it.

I want to remind everybody that this is very much a process. There are no recommendations at this point that are in any way, shape, or form created as a final proposal. There were documents distributed at the July meeting which were draft documents specifically created to instigate a discussion.

Then there's a minority, but I would say it's a strong minority, and I say minority because I'm talking about within the context right now of the work groups. I'm not talking about the National Human Research Protections Advisory Committee as a whole, because that group has not discussed at length these issues and has not at all made any recommendations.

But within the work groups, there is a strong minority that feels that the definition ought not to be changed, that it is adequate as it's drafted at this point or as it exists as a regulation, with the

caveat that it should be clarified and that clarification would in fact address the issue of third parties as human subjects with, again, not so much a caveat, but with the analysis that most of the third-party research that goes on is in fact applicable to the expedited review process, and that the majority of third-party research would fit under an expedited review process, and that they typically qualify for expedited review and therefore a blanket waiver for informed consent with respect to third parties in the majority of cases, understanding that there are rare instances where informed consent should be required, and that of course would be the determination by the IRB with respect to the specific protocol or with respect to particular persons within a specific protocol. That would be protocol-dependent.

I'm just trying to think if there are any other examples I can give you with respect to discussion, but I don't really think there are. There are some people who think, well, if you look at genetic counseling in a clinical context, where you would counsel, say, a younger person to invite their family member to come and be a part of the counseling before a particular genetic test is done, that you might want to use a model comparable to that in a research context, and that has not been discussed widely, but it's just sort of a thought that it's to the advantage of the individual being tested, particularly if it's a minor or someone who's just above minority age, and beneficial, of course, to the family as well.

I'm open to questions.

DR. McCABE: Actually, I think we'll just ask Dr. Zullo if there are any activities underway within OHRP regarding genetics that you'd like to bring to our attention before we open to questions in general.

DR. ZULLO: Thank you for the opportunity to speak for just a couple of minutes.

Just to give you all an idea, I just wanted to let you know the relationship between NHRPAC and our office. The Office of Human Research Protections was a newly formed office within the Office of the Secretary of HHS a year ago in June, and our director, Dr. Greg Koski, has been aboard for almost a year now. NHRPAC, in relationship to us, provides advice for us. We can go to NHRPAC with issues and they actually provide advice to us. We are actually distinct entities, which sometimes gets confusing to people.

OHRP has not really implemented any new genetic-based policies or guidance, but we do have issues on our Website, which you can easily find. We do have issues to consider in research use of stored tissues. We have guidance on that available on our Website. We are awaiting NHRPAC's advice on third-party genetic issues.

The other committee that we work with quite closely is the Human Subjects Research Subcommittee, which is housed within the Committee on Science within the National Science and Technology Council, and we have a working group chaired by Phil Rubin that's looking at

some of the third-party issues in our Behavioral and Social Sciences Working Group. That is a Federal-wide group that Dr. Koski chairs.

I will briefly mention that we will be working with the haplotype population and ELSI Working Group on the aspect of human subjects protection, and I will defer to Kathy Hudson to give you a little more information on that at the end of the meeting.

The Human Subjects Research Subcommittee, HSRS, is also currently working on a Federal-wide handbook for human subjects protection, and this is chaired by Susan Rose from DOE, for use not only by IRBs, but more of a system-wide approach, so that institutions as a whole, researchers, administrators, and even community members could use this handbook. Obviously, of interest to the Committee is the chapter on genetics will be updated, and Susan has asked me to tell you that she would be more than glad for any of you to volunteer your services in editing or writing some of that chapter.

The September 13th hearing that Kathy also mentioned we have heard that Dr. Koski will be speaking at, and I'm not sure what level of genetic issues he'll be speaking on. We've haven't really gotten that nailed down yet.

But Kate or I will be more than glad to answer questions on NHRPAC, OHRP, or HSRS.

DR. McCABE: Thank you very much, Dr. Zullo, and thank you as well, Ms. Gottfried.

MS. BARR: I just have a general nervousness. I think you've attempted to address it with the handbook issue, but we generally move away from some of the tough issues by saying these are the responsibilities of IRBs, and then every time every commission sits down, it becomes clear that IRBs do not have the resources or training or staff to deal with these tough issues. So I heard IRB there and I heard IRB here, and I just wondered if people are taking perhaps a new tack in examining that very serious question.

DR. ZULLO: Well, I think our office is trying to be very aware of the fact that IRBs are certainly overburdened and underresourced and feel that there needs to be shared responsibility. I guess IRB is actually becoming an outdated term, since they're not really institutional. We try to call them human protections review boards.

But we are trying to spread out the responsibility by letting more people be involved and letting there be a handbook that all the congruous agencies can use, and so that people from the community could get access to, that would be on the Web, that we could update, because, as you know, this area is currently in flux and changing all the time, but it's a working model going that we could update.

But we need to provide IRBs, because of that situation, with a resource that they can pull off of a

shelf and our office is trying to help to supply that for them. We're also working with NIH to try to come up with mechanisms for funding for IRBs within the cost of a grant, which is a whole other story, but we are aware that a lot is being put on IRBs.

Kate, you want to add anything?

DR. McCABE: Ms. Gottfried?

MS. GOTTFRIED: I'd just like to add, of course, though, everyone recognizes that there's been a change in the past several years in terms of awareness of different incidents, et cetera, and I think that has had an impact on a lot of institutions, and in fact you will see more resources being shifted to IRBs or human protection systems within institutions. That's certainly our hope and, from what I understand, it's beginning to happen, albeit somewhat gradually, but I think it's going to in fact happen on a more widespread basis.

DR. McCABE: Thank you.

DR. KOENIG: I have two questions. The first is is there an update on the timing or the effort that's underway to try and get the human subjects protection within the direct cost budget in federally funded proposals? That's the first question.

Then, second, has your office, Susan, set any priorities or what are the list of things in the genetics arena that you're going to be taking on? Other than the third party, which we heard about, and I guess you're doing that in collaboration with a couple of groups. But are there any other issues that you have set as priorities that would be helpful for us to know?

DR. ZULLO: On the first, funding issue, we are working closely with the NIH and trying to come up with a mechanism, and there has been talk of -- let me back up and say that legislatively there are currently two bills being considered on human subjects protections on the Hill, one on the Senate side and one on the House side, and the House side is Congresswoman DeGette and Congressman Greenwood, and on the Senate side, and you'll help me if I stutter, on the Senate side it will probably be Kennedy and Frist out of the HELP Committee. That is not a standing bill yet. In those, and in conversations we've had with staffers, they're also trying to look legislatively at ways to make it legally possible to use IRB costs either within direct or indirect costs.

Dr. Koski is also working with NIH to maybe come up with a totally different category, because this isn't really an administrative cost. This is an integral part of the research that we're finding out. This isn't just an aside.

On the second part of your question, I know that the tissue banking has become very important or more important, more in the limelight. I think we're waiting a bit to see what the final ruling on

the HIPAA is on the privacy. We've been working with Julie Kaneshiro here at NIH, and that's been discussed also at HSRS, and the third-party issues and the handbook are the only thing I can think of right off the top.

DR. HUDSON: So on the chapter in the IRB handbook, who is it that's working on reviewing and updating that?

DR. ZULLO: Susan Rose from the Department of Energy is the chairperson of the committee. Elyse Summers in our office is also helping out. We have a whole list of folks working on that.

DR. HUDSON: And NIH is participating, I assume?

DR. ZULLO: I believe so. I don't know who exactly is on the working group.

DR. McCABE: If you wish to have that sent to Sarah, so that she could then distribute it out to the Committee, we'd be happy to handle it that way.

DR. ZULLO: I'm sure she would appreciate that. Thank you.

DR. McCABE: Any other comments?

DR. McCABE: If not, thank you very much, Kate and Susan.

Next we're going to hear a report on the Education Work Group. I'll turn the gavel over to Dr. Boughman to introduce presentations on the genetics education of health professionals. Dr. Boughman will also lead a discussion of planning for the November Education Summit.

DR. BOUGHMAN: Thank you very much, Dr. McCabe. I think I will sit here while Susanne Haga actually gets her slides together and so on.

I would remind you that in Tab 4, under the work group charges, that the Education Work Group had basically four charges. To gather information on initiatives ongoing, to conduct a literature review, to identify major gaps that might exist, and then bring back to the entire Committee our assessment of the needs and to make some suggestions, so that the entire Committee might make recommendations to the Secretary.

We had presented at our last meeting and in discussion that we were putting together a white paper and we, in our June meeting, proposed that we might have an Education Summit, if you will. Today, what we would like to do is in fact present the content of that white paper, which is in your Tab 6, many pages long, and Susanne Haga is going to present the core of that material to you, and I think after you hear what she has to say, you, too, will be incredibly impressed with the amount of work, the depth of the literature review, and so on.

Then in the spirit of actually gathering and presenting some of the initiatives that are going on, we are going to have two other presenters. Dr. Priscilla Short from the AMA and Joe McInerney from NCHPEG will be presenting some of the initiatives that are ongoing. The biographical sketches of the two visitors with us, Dr. Short and Mr. McInerney, are in Tab 1 for you, so I'm going to save time on their introductions. You can read about them, and the really good stuff can't be written or said publicly, anyway. I'll talk to you about those later.

But what we have up in front of you now is the membership of the Education Work Group. We have allowed the members of the Education Work Group to in fact spend more of their time on some of the other work groups during the last summer, but we've kept Susanne busy and she's kept me busy in rereading drafts of the white paper.

But Susanne, I would like to turn it over to you now, so that you can present the content for us.

DR. HAGA: There's a lot of material, as you may have seen, in the tab that Joann mentioned. There's actually seven sections, of which I'm going to try to cover six. I'm actually just going to skim the top, because there's way too much material and not enough time for me.

To begin with, and this is in Section 2 of the background material, there have been a number of recommendations made by three national committees in the past 25 years. The National Academy of Sciences in 1975 issued its report, "Genetic Screening: Programs, Principles, and Research." The Institute of Medicine in 1994 issued its report, "Assessing Genetic Risks," and the 1997 Task Force report, which we all know about.

In the 1975 report, the recommendations had focused on genetics education and primarily looked at or emphasize epidemiology and preventive medicine. They recommended that genetics be included in these courses, as well as course work in medicine, in obstetrics, and in pediatrics. They also recommended that continuing education for physicians have an emphasis on human genetics, and in particular on the practical application of population genetics.

In the 1994 IOM report, they also made a similar recommendation on continuing education and expansion of that into human genetics. They recommended that increased attention be paid to basic human genetics for health professionals, particularly in the areas of human variability, ELSI issues, and complexities related to genetic testing.

The 1997 report, again, they recommended the development of genetics curricula that would carry throughout medical school into residency training. They recommended that continuing education programs be developed by specialties that would place an emphasis on disorders with genetic components. They recommended that training programs be strengthened in genetics for schools of public health, nursing and social work, and lastly they recommended that administrators and non-physician personnel be aware of the risks and benefits associated with

genetic testing. So there have been a number of recommendations already made.

There are a number of professional organizations that are either devoted entirely or in part to genetics education and the issues they raise, and this is a partial listing. The first two organizations are devoted solely to genetics education issues, NCHPEG, which we'll hear from right after me, and the Association of Professors of Human and Molecular Genetics. The latter three groups each have standing committees that are devoted to genetics education: the American Society of Human Genetics, the American College of Medical Genetics, and the National Society of Genetic Counselors.

In a review of the literature -- this is moving on to Section 3 -- the data seemed to fall out into three areas: family history-taking, genetic counseling, genetic referrals. There have been a number of surveys that have been done with health professionals in assessing and evaluating their genetics and genetic testing and related issues. One of the recurring themes and one of the interesting themes is many health professionals have acknowledged, or more likely admitted, that their knowledge of genetics is poor or it's inadequate. However, they have reported that they have provided genetic services to their patients and have offered genetic services to their patients, even with that said.

With regard to family history-taking, this is just a partial summary of some of the literature on this subject. I've divided it into the survey groups in the medical specialties -- primary care, OB-GYN, internists. Overall, most physicians take family histories. They take them on the first visits. It's a much lesser percentage about how many physicians update that family history on annual visits. Some of the questions specifically related to family history of cancer, a family history of breast cancer and ovarian cancer in the Hayflick, et al. study. What the surveys did not report on was how far back the family history was done, how many generations back, and how much detail was taken.

With respect to genetic counseling, going back to the 1975 NAS report, what that group actually did was they did their own survey of primary care providers and asked a number of questions, of which the responses served as the basis for the recommendations. On the question of genetic counseling, they found that less than 2 percent of physicians believed that they were competent to provide counseling. However, most of them felt that their counseling was either partially or highly effective, and when they were asked whether additional training would help them improve in competency, only 13 percent felt that to be true. In 1998, a study done by Hunter, et al. found that 64 percent of physicians stated that they had provided some form of genetic counseling. However, more than 50 percent were either neutral or uncertain in their ability to provide counseling for chromosomal aneuploidies, single-gene disorders, or multiple malformations. Most of the physicians in the '98 survey that had provided counseling were either pediatricians or OB-GYNs, and to a lesser extent internists and family practitioners. In a 1999 study by Menasha, et al., most physicians believed it was their responsibility to do the counseling and to offer the counseling. However, one of the obstacles that they found was that they didn't have

enough time. Another obstacle was that they couldn't keep up with the literature. There were too many advances coming out and that prevented them from providing the most current information to their patients.

With respect to genetic referrals, in the '98 Hunter, et al. study, 70 percent of physicians had referred patients for chromosome analysis and counseling, but only 27 percent had referred patients for DNA testing. In the Hayflick, et al. study in '98, they reported that primary care providers rarely obtained referrals for family history of cancer, for polycystic kidney disease, for deafness, or congenital heart disease. So you wonder what they did make genetic referrals for. They did this mostly for individuals with dysmorphic features or for individuals with a family history of a genetic condition, excluding cancer. There were some other interesting statistics. Twenty percent of internists rarely reported referring individuals for genetic referrals for Huntington's disease. In the case scenario that was presented, 67 percent of pediatricians would order a fragile X test for a male who presented with isolated mental retardation, but in comparison, only 5 percent of internists would do the same and 11 percent of family practitioners. So there was a great difference in the practices between the medical specialties with regards to genetic referrals. One of major reasons that was cited for not obtaining a genetics referral was the lack of perceived benefit for the patients. Most of the physicians acknowledged that the major benefit was education in reproductive planning. However, the driving force behind getting a genetics referral was mostly driven by the patient's or the family's interest in the referral. Another obstacle to obtaining a genetics referral was restrictions placed by HMOs or managed care plans. A number of physicians listed this as an obstacle.

Another recurring theme that was found throughout the literature was that there was a positive correlation between the recency of graduation and the level of confidence or the likelihood of a provider to offer or provide genetic services, such that if someone had graduated three years ago, they were much more likely to offer a genetic service or make a genetic referral than someone who had graduated 30 years ago, and this is a hypothetical slope here.

Moving towards some nitty-gritty education issues, and this is in Section 4 of your handout, the Association of American Medical Colleges, the AAMC, conducts a survey every year of U.S. medical school graduates and they ask a number of questions, of which I have some of the responses listed here. When they asked graduates to rate the importance of math and science premedical courses in their preparation for medical school, genetics ranks third. Pretty high, right behind biochemistry and physiology, with a steady 75 percent, and this has remained constant over the last three years since 1998. So in the eyes of recent medical school graduates, genetics is pretty important.

Now, medical school training remains the most traditional source of genetics education and knowledge. If you don't get it in medical school, it's unlikely that you're going to get it in the residency training or somewhere else. In the NAS report in 1975, only 25 percent of physicians stated that they had some type of formal course work in genetics during medical school. In

comparison, in the Hunter, et al. study in '98, 69 percent of physicians stated that they had some type of course work in medical school and, similarly, 57 percent in the Menasha, et al. study. So this, with the previous graph, signals that there has been a change of emphasis on genetics in medical education for the better.

Back to the AAMC survey, they asked graduates to rate whether the time devoted to genetics was either appropriate or inadequate. Most students thought it was appropriate. Eighty percent thought so. The same question with regards to genetic counseling was a much lesser percentage with 58 percent, and when graduates were asked to rate how well genetics prepared them for clinical clerkships and electives, the responses fell on a bell curve. Most graduates thought it was fair to good, 10 percent excellent, and 13 percent poor. So overall, they're rating the genetics course work and time devoted to genetics during medical school as pretty good.

The AAMC also maintains a database on medical school curricula for schools in the U.S. and Canada, and I asked them to query their database to find out how many schools have genetics course work and what were the courses that were offered in these schools. Ninety-three medical schools have some type of genetics course work. In these 93 schools, there were a total of 178 different courses that were offered or provided that had some kind of genetics content within them. Most of these courses were offered during the first and second year of medical school, and to a much lesser extent during the third and fourth year, which are primarily the clinical training years.

What were the topics that were taught? Basic genetics, cytogenetics, cancer genetics, nonhuman genetics, either bacterial or viral, clinical genetics, and immunogenetics. In Table 2 in Section 4 of your background materials, there's a much more extensive list of the different types of course work that is offered. Population genetics is another popular one. Developmental genetics. You know, a number of courses that were systemic. Neuromuscular, cardiovascular, endocrinology, a variety of courses. With that said, though, in all of these 178 courses, it varied between medical schools. Some schools just covered the minimum of having the basic genetics, cytogenetics, the standard Mendelian genetics, and so forth. Other schools were much more extensive in the number of courses that they offered and the topics that they covered.

Turning to looking at nursing programs and genetics content in these programs, there were two surveys that have been done that have evaluated genetics content in nursing schools. One was published in 1984 by Monsen and the other by Hetteberg, et al. in 1999. The surveys were done in 1980 and 1996, respectively, and there are some interesting differences between the two surveys which were essentially very similar. One of the interesting differences, and somewhat unfortunate, is that the number of average hours devoted to genetics in nursing programs has dropped between 1980 and 1996. In 1980, the average number of hours was 10 and a half. In 1996, it is six. In 1980, less than 1 percent of schools did not offer genetics in nursing programs. In 1996, 34 percent of nursing programs did not offer some kind of genetics content.

This chart is from a Hetteberg, et al. study and it looks at the three types of nursing programs -- the bachelor's, the associate's degree, and the hospital programs -- and the different ways in which genetics may be taught, either a full quarter or a semester, a lecture/lab in genetics via a basic science course, a lecture/lab via a basic nursing course, or a combination of the two. You'll see that genetics is most likely taught through a lecture/lab course via a basic nursing course. Seventy-one percent of bachelor programs offer genetics that way. The average number of hours devoted to that is four, but it ranges anywhere from one to 80 hours. You see a wide range again.

If you'll look at the genetics content of nursing programs in the same format that I presented for medical schools, 879 programs, of which 66 percent include genetics in their programs. What are the major topics? Fetal development, teratogens, chromosomes, genes, cell division, risk assessment, ELSI issues, and genetic counseling.

What are the top five major reasons for not including genetics in nursing programs? There's too little time, it's not essential, it's not applicable and it's not relevant, it's not seen as necessary, and it's not on the boards.

In a lecture given by the dean of Harvard Medical School in 1998, he spoke to the impediments to change to enhancing genetics education in medical school curricula, and he categorized those changes into three major groups: structural, functional, and special considerations to genetics. The structural I've already mentioned. One, there's too much material and there's too little time. The other is historical departmental boundaries. Genetics does not have a home in any one major department. It almost overrides a number of departments. Some of the functional impediments to change. The lack of interest of science-based faculty. In many medical schools, there is Ph.D. science faculty and there are graduate assistants, as I've done, that teach genetics to medical students, and there is often a disconnect between teaching the scientific advances in genetics and connecting that to the clinical framework and then communicating that to medical students. Economic time constraints, lack of incentives. There's a lot of time it takes to plan lectures, to write questions, to grade exams, and there's not much incentive. Some of the special considerations to genetics are both conceptual and pragmatic challenges. Genetics is often associated with preventive medicine, which often does not rank high on the list of curriculum committees. Another one is the shortage of faculty, and this is particularly acute in nursing programs.

With the advent of informatics and the computer revolution, the question arises. There's a lot of information that's available, it's easily accessible, it's searchable, it's portable, it's point of service, and schools and administrators and deans ask the question what do students have to know and what do students have to know how to find? Do students have to memorize all of this information, as they often do in the first few years of medical school, or is it good enough to teach them how to find a lot of things on genetics, and know when to refer and know when to ask for a consult, and know when to get a counselor and seek advice? So it becomes an important parameter to consider not just for genetics, but for a number of medical specialties when looking

at curricula and making changes.

If and when they do make changes, the question arises what do we include in genetics education and what do we emphasize? There have been a number of core competencies and guidelines that have been developed over the last 10 years, of which there is a sampling here. The American Society of Human Genetics in 1995 developed medical school core curricula. These were primarily focused for the first two years of medical school. The NCHPEG most recently has developed core competencies for all health professionals, of which you have a copy in your blue folders. The American Academy of Family Physicians has core educational guidelines in medical genetics. This is targeted towards residency programs and enhancing genetics in the training requirements for residents in family practice. The American Society of Clinical Oncology has its cancer genetics curriculum guidelines, and the Association of Professors group has developed clinical objectives in medical genetics. This is primarily focused for the third and fourth year of medical school, which are primarily the clinical training years.

Now, as I've stated, the farther back in which you've completed school, the less knowledge you are likely to have of genetics, and so continuing education plays a critical role in teaching and updating physicians and health professionals in genetics and in the newest and latest tests and advances. There have been a number of studies on the effectiveness of continuing education programs, and unfortunately they found that the most current and traditional methods of continuing education are not the most effective. Those of lecture format teaching, formal conferences, annual meetings, unsolicited print material, including clinical guidelines, don't seem to have an effect in improving the clinical practice of health professionals.

What they have found to be more successful is that when learning activities are linked to clinical practice, that when there's a relevance that has been demonstrated between a new material that is being taught and the daily clinical practice of health professionals, is when continuing education activities are most successful. Interactive educational meetings and strategies involving multiple interventions, follow-ups, reminders, reinforcements, those are what seem to be working and are making a difference in the daily clinical practice.

AMA not too long ago looked at how much clinical genetics is included or offered or provided by medical societies, and they found that 65 percent of medical societies include some form of medical or clinical genetics in their programs at their annual meetings, 36 percent of them have some form of continuing education materials in genetics, and 32 percent of them are currently developing some type of materials in continuing education in genetics for their members.

Looking at the nursing groups, in a study by Monsen and Anderson in 1999 that evaluated the genetics content in nursing groups, 70 percent of nursing organizations were not planning any programs in genetics, but 30 percent were planning on developing or offering some content in genetics within the next two years, which is now.

Moving quickly through workforce issues, this is Section 5 of your background. There's a lot of data in this section of which I am just going to skim over.

Genetic specialists. These are M.D.s/Ph.D.s that are board-certified in genetics by the American Board of Medical Genetics and genetic counselors that are certified by the National Board of Genetic Counselors. If you look at the purple line in the middle, that is the M.D./Ph.D. line. Board certification examinations are offered every three years. It starts in 1992. If you go to the high peak in the beginning, it's relatively flat during the '80s. There is a peak in '93. The reason for that is because a new subspecialty was offered in molecular genetics, and so there was an influx of individuals becoming certified in that. So minus that increase, you're back to a more expected number. However, in 1999, we've dropped to the lowest number of individuals that are becoming board-certified in M.D./Ph.D. genetics.

Looking at the genetic counselor side of things, it's relatively flat in the '80s and '90s. However, in 1996, almost the exact same number of genetic counselors were being certified as the M.D./Ph.D. side, and in 1999 they are proportionally increased above the M.D./Ph.D., so that if you combine the two professions, it's a flat line of just over 500 individuals that are becoming certified in genetics or genetic counseling over the last nine years. So it'll be interesting to see -- the next boards are in 2002 -- whether this drop continues and whether that rise continues or whether these are freak years.

There are some data in the AAMC survey of recent graduates. They've asked graduates to indicate what their first choice of medical specialty was. In 1999, 14 graduates listed medical genetics as their first choice, and in 2000, 28 graduates listed genetics as their first choice. Now, this isn't encouraging, but genetics often isn't the first choice of medical specialty, and they didn't ask about second choices.

So what do clinical geneticists do? Most of them, most board-certified clinical geneticists who are M.D. board-certified geneticists are also board-certified pediatricians, 63 percent. The other areas that geneticists practice in are OB-GYN, 13 percent; internal medicine, 9 percent; and 9 percent are board-certified only in genetics. This graph represents 16 specialties in which clinical geneticists are also board-certified. Psychology and neurology is another popular one. Family practice, ophthalmology, dentistry, pathology, and so forth. You can find a few geneticists in each of the specialties, and there is actually a vet that has been board-certified in medical genetics, but most geneticists are pediatricians. Not surprising.

When you look at nursing geneticists and you ask where do they work and what departments or specialties, again, most of them work in departments of pediatrics or in OB and women's health divisions. A number of them work in specialty clinics, however, many of these specialty clinics may be located in departments of pediatrics. These are clinics like on cleft lip palate, metabolic clinics, endocrinology clinics, general genetics, cytogenetics, and so forth.

Section 6 focuses mainly on training programs and board examinations. I skipped going over training programs because I just cannot do it justification with one slide. There's a lot of information and there's a lot of history in the background material about how we ended up where we are today, and the different programs that M.D.s take, the different ones for Ph.D. medical genetics, and the different ones for genetics subspecialties. There are joint ones that pediatricians can train in dually and become certified in both pediatrics and genetics. So there are a number of different programs.

So I thought I could talk about examinations a little bit. You've already heard that one of the reasons that genetics is not included in nursing programs is because it isn't on the boards. Now, if you talk to people who are familiar with board examinations and how they are administered and written, many will say that the content on boards does not drive curricula, that what's in boards is separate from what's in curricula. But we know that there's a definite connection between what are the test questions on the board and what's going to be taught during school.

For M.D.s, the USMLE, or Medical Licensing Examination, is a three-step examination that fulfills the requirements for medical licensure in the U.S. Step 1 is offered midway through medical school between the second and third year. This exam, medical schools will receive back the aggregate scores for a number of topics on the exam, so that they can rank or rate their students' performance against the national average and know where they stand. Genetics was added to that list of aggregate scores just a few years ago, so schools are now aware of where they stand with respect to genetics against the national average, and it is this exam that has the most number of questions on genetics.

The Step 2 and 3 exams are offered post-medical school during the training and afterwards, and it is these two exams that have the fewest amount of clinical genetics questions on them. One of the major reasons for that is that questions for Step 2 and Step 3 have to be presented in a clinically relevant context that is applicable to the practice of general physicians today. It is not applicable to the practice for physicians tomorrow, which many probably perceive of genetics to be true, but work is being done to increase not only the quantity of the questions on genetics, but the quality of them as well.

In particular, the Association of Professors work group is working on developing better questions and more questions in the Step 2 and Step 3, but as you can imagine, this is a long and tedious process that goes through several reviews and several revisions, but hopefully we'll be seeing an increase in questions and hopefully that'll indirectly or directly drive the inclusion or emphasis of genetics education in medical schools, as well as in nursing programs.

One more word on examinations. If you look at the pediatrics board examination, you'll see there are a number of questions on genetics, but if you look at internal medicine or family practice, they're hard to find.

Section 7 covers initiatives in genetics education. Again, there are a lot of tables in Section 7, of which I will readily admit I've only scratched the surface in listing programs out there that deal with a number of issues in genetics education. There are federal and state initiatives. A number of academic institutions have their own Websites that you have in the slides that I've just had to cut out today, since there's not enough time. Medical professional organizations play a role in educating the members and the different specialties in genetics. Consumer groups and private sector groups and industry.

Last, but not least, acknowledgements. There is a lot of data here, and I wanted to give credit to those that have helped me gather some of it. Suzanne Goodwin on our staff; our two interns, Aaron Goldenberg and Kate Heineman; and I had two reviewers of some the sections, Dr. Bonnie Pagon and Dr. Mimi Blitzer.

DR. BOUGHMAN: Okay. What I think we'd like to do, Reed is just about ready to jump out of his seat, so I would like to ask if there are any very specific questions. For more general questions, I think we'd like to have the other two presentations and then we go to the general ones, but if it's on a specific content issue, you can go ahead and ask.

DR. TUCKSON: Just one quick one. I just want to make sure I understand. First of all, that was an outstanding presentation. The data you presented from AAMC, you said, I think, it had 79 medical schools reported. There are more than that in the country, so can we actually literally say that in the year 2000 there are medical schools in the United States that do not teach or they simply did not report that they taught?

DR. HAGA: Right. I asked the same question of AAMC. I said I need a denominator. I've got 93 schools here that are offering genetics. Are you telling me that 93 out of 141 is the percentage that are offering genetics? And they said, no, I could not make that conclusion. The reason for that is that the medical schools use the database to varying degrees. Some of them are very detailed and will give them every course work and hour devoted to medical education, and others just skim and say biochemistry, and if genetics falls within biochemistry, it won't see it. So I would hope that number or percentage is higher.

DR. TUCKSON: It would be fun to go back and the ones that did not report, I would love to find that out, and as part of protecting the public, I think somebody ought to let somebody know that if you live in Wisconsin or wherever the heck it is, that you've got a problem.

DR. LEWIS: I think the same issue is true of nursing schools and I think it would be really important to look at the National League for Nursing or the American Association of Colleges of Nursing that do similar surveys, because the article that you presented on the nursing schools is one that was written by a couple of individuals, but I do believe there's been systematic data that you'd be able to compare, because I think that that would also be important in terms of numbers.

DR. BOUGHMAN: Yes. Recognizing that that is true, in fact Susanne and I had talked about

this, and it was determined that it probably was not the job of this Committee or the staff to do the really comprehensive data collection per se, that what we were after at this point was more of a snapshot, and not an in-depth study per se.

However, that begs the question about how far do we want to go and how much do we want to learn and how much does this Committee need to know, and in fact whether we should be doing it by going out and getting that information or how should that dovetail with the Education Summit and invitations for people to come and share the information they think is important for us to hear. So we will come back to that issue as we talk about the Education Summit.

What I'd like to do now, if we could, is to move on to Dr. Priscilla Short and have her present some information. Dr. Short is the program director for genetics at the AMA in the Division of Science, Research, and Technology.

DR. SHORT: Thank you for allowing me to present some of the work that we've done this summer in collaboration with NCHPEG. I found it easier to say NCHPEG than to say the National Coalition for Health Professional Education in Genetics, and if you've talked to about 40 or 50 people this summer and you try to get that out, you appreciate being able to say NCHPEG.

This survey is really a preliminary survey, so I don't want you to despair. But NCHPEG and Joe will tell you further about NCHPEG, but what we did was look at the coalition members and sort of divide them into the categories of genetics organizations, nursing organizations, primary care physicians, medical specialties, dental groups, allied health, consumer groups, federal, and other. These all received an e-mail survey. The survey was a slimmed-down version of the survey that was used that Dr. Rhodes presented and that was the basis of the HuGEM Project. We followed up by a major nudge campaign by e-mailing them again and then started calling them. We also thought, for purposes of completeness, that we would take a look at the organization's Website, knowing that sometimes the right hand does not know what the left hand does.

Now, we did fairly well with our response rate, and the response rate actually is growing. The number of organizations is actually incorrect here. The number of organizations that were actually sent e-mail was 114, and we heard back from 41 percent.

This graph is somewhat detailed, but it gives you some sense of what are the number of different types of organizations that are actually included in the Coalition and, if I can use this without killing myself, what you will notice here is that there are a number of Federal agencies involved in the coalition. Actually, it numbers 27, and then coming after that is actually the nursing organizations, and there are a smaller number of physician groups. One of the major focuses, obviously, is allied health organizations. So this sort of breaks it down in terms of who we actually got responses from and who felt that the survey was remotely relevant to them. Luckily, we got a lot of surveys back from the allied health organizations. The typical, sort of poor

response from physician groups, much better response from nursing groups, and the genetics community kept saying, "Why'd you send this to us?" And then a number of consumer groups and dental groups.

So I'm just going to go through the questions. I believe in the handout that we provided we actually gave you a copy of the survey. Most of the organizations that we sampled, and these are the 46 now who actually replied, the majority of these are involved in clinical issues. So most of them do deal with clinical issues, and they felt that the important issue for them was really redefining their roles and competencies with regards to genetics, something of a set-up question, and then we looked to see whether or not they generally had an accepted curriculum. We've already heard a little bit about various curriculum that have been out there, and so it was good to know that there was a generally accepted curriculum from which one could work for most of these organizations.

The amount of genetics, as we heard from the AAMC data that Susanne presented, varies, and that the level of training among the members in a given organization also varies. So some of the folks that are in the Coalition and in various organizations are working from the standpoint of baccalaureate degrees and some of them are working from the standpoint of Ph.D. degrees, so that the curricula is actually quite variable that we're actually trying to assess.

Where the most consistency is is actually obviously in the medical arena. The medical schools do, as we know, have some variable amount of genetics that can be ascertained, both through the AAMC's permit program, as well as the LCME survey material.

This is an interesting question that we wanted to see whether or not there is some opportunity in terms of leveraging licensing boards, that actually most of the organizations are regulated by a state licensing board, and then we looked to see how many of the organizations actually have genetics currently that they know of in their curriculum, and actually, as you can see, it's not that many, only about 30 percent and a variable amount in another 18 percent.

Now, to look and see whether or not there are additional opportunities in which genetics can be integrated, we focused on the arena of continuing education, and saw that generally the majority of them do have a requirement for continuing education, and so we looked to see whether or not any of them have actually gone the extra mile to actually require a certain amount of genetics in their continuing education and, as you can, rarely is 22 percent, and actually it's a very small percentage that actually currently have any requirement, and I suspect that represents the genetics community answering that survey question. However, we do think that perhaps, given the somewhat stone-like or concrete-like quality of a lot of curricula, that perhaps there are greater opportunities in the continuing education arena and in chipping away at the stone curricula.

And we looked to see what sort of areas of genetics were actually covered within continuing education, and it seemed to depend upon the specific organization, and it also seemed to depend

on the flavor of the year or the focus of the year for that organization. So that this is an interesting graph, somewhat, perhaps, difficult, but we actually looked to see what was being covered in the continuing education offerings in terms of basic genetics, clinical genetics, genetic testing, ELSI issues, and the latest genetic research, and actually we were somewhat encouraged by the fact that this was relatively low compared to clinical genetics. In previous survey work that we had done with medical specialties, that generally this was relatively high and there was very little in terms of clinically relevant CME genetics content, and even less of the ELSI issues. So I think that in the time frame in which we've done this survey, there actually has been some movement towards more clinically relevant aspects of the continuing education.

As I said, we wanted to make sure that we gave the organizations credit for work perhaps their representative to NCHPEG did not know about. We looked to see whether or not they actually had some information on genetics on their Website, and generally the organizations do have some information. Frequently, the representative was unaware of their organization's genetics information. The information that appeared on the Website was variable. There was a fair amount of policy statements and general information, and so I think we're looking at perhaps a gap in terms of yes, there are a lot of good resources, and we've actually heard about some of them and some of them are included in Susanne's handout. There are resources, and how do we get the folks to the resources?

We also asked them, from the standpoint of NCHPEG, if they needed additional resources and what kind of resources they would like and whether or not they would find them useful, and the majority, as you imagine, said that they felt it would be useful to have some more resources.

Other ideas for NCHPEG specifically itself, and I think this is specific for any sort of attempt at any national coordination of genetics education, that there do appear to be guidance for the use of the curricula that are already out there. I think that from our own experience that a lot of people are unaware of these curricula that have already been developed, and so the actual implementation of the curricula for the different organizations would be helpful. Whether or not that would constitute a call for a buddy system, I'm not sure, but I think clearly greater communication between the genetics community and the other organizations who are trying to come forward to meet this challenge would be helpful.

This is the acknowledgements. I don't know if you folks can hear the little clapping in the background. Simon, Susanne, Joe, George, and Catherine. George and Catherine were our student interns for the summer, but for whom we could not have done any of this work.

Any questions?

DR. BOUGHMAN: Okay. Maybe we can have Joe McInerney come up, and Joe is currently the executive director of NCHPEG, and will continue on with describing the NCHPEG coalition and its efforts.

MR. McINERNEY: I actually just realized how good it is to stand up. So, with your permission, could we take 30 seconds to stand up and stretch?

DR. BOUGHMAN: I'll stand up and stretch for 30 seconds, but you have to put the microphone on. That's the trade.

MR. McINERNEY: About 100 years ago, the great Irish playwright and novelist and poet Oscar Wilde said that "Experience is the name we give to our past mistakes." About 80 years after that, Henry Wallach, a governor of the Federal Reserve said, "Policy is the name we give to our future mistakes," and in the interest of trying to limit policy mistakes for NCHPEG, and perhaps for the Secretary's Committee as well, we have in fact undertaken to collect some data about what we ought to be doing.

Most of you I think know what NCHPEG is. I'll just take a second to explain that we now have 120 member organizations, and you can find at least most of them listed in the back of this document. We've distributed now almost 1,800 copies of these core competencies, most, of course, in the United States, but we've had some interesting requests from Singapore, from the Chinese Academy of Sciences, from Belgium, from Japan. So these competencies are beginning to have some impact in terms of the restructuring of curriculum and continuing education programs.

Now, most of our members are from the nonprofit sector and they comprise the list that Dr. Short shared with you. Allied health professions, medical subspecialties, consumer groups, government agencies, and so on. We also have a small number of members from the commercial sector. Pharmaceutical organizations, companies providing genetic testing, for example, and we sent out a survey to eight of those members and six other commercial organizations that we just chose at random.

Now, it's a very small N, and so you will not see graphs and charts because parsing an N of 6 on graphs and charts -- actually, you'll find out that it's an N of 4, because two of the responses were unusable. One individual responded as a representative of his own medical specialty with respect to genetics education, and another organization simply said that the questionnaire was not related to their core business. But I want to share with you very quickly some of the responses we got from the commercial sector because I think they're important not only for NCHPEG, but for this Committee.

We did provide this questionnaire for you as a handout as well. It's in your packet. Now, the questions were slightly different from the questionnaire we sent out to the commercial sector, but here I think one of the most important issues is to look at the diverse audiences and markets that the commercial sector is trying to reach with information about genetics. It's an extraordinarily diverse group and it presents a challenge to this group and to NCHPEG, certainly, as we think

about what kinds of information we ought to be presenting.

We did ask our colleagues in the commercial sector what they thought their constituents ought to know, and you see that this generally varies with the product and audience, and you'll also see that this is directly related to what they said about targeting genetics education very carefully. This came through again and again.

I did have an opportunity to talk in detail with two of the individuals who submitted these surveys. Again, a question about what knowledge ought your constituents know? And remember the broad range of constituents they're dealing with. What ought they to know when ordering genetic tests? I think it's particularly interesting that they would like to focus on what the test will and will not tell the health care provider, and the patient, for that matter.

A similar question on knowledge required for effective use of products and, of course, then what they're trying to do is develop educational programs internally and externally to address these kinds of issues, and you see it's a fairly complex and comprehensive list, in a sense, particularly the notion of how one approaches the use of a particular product or a test in the context of overall health goals for the patient.

We asked a specific question about genetic testing. What do you think your constituents ought to know about genetic testing? Now, remember that these constituents are not the general public. These constituents are health care providers that the commercial sector is reaching out to for education about its products.

This might be difficult to read because the type is a bit small, but we did ask a question about the kinds of vehicles they're using for internal education, and I was intrigued to see that one organization provides ethics seminars four times a year. One organization is about to launch an e-learning module on genetics for all employees internally, and I asked a little bit about the content of that. It's going to include information on basic genetics, the relationship of genetics to the core business of the corporation, relationship to specific products under development, and then relationship to education of their staff and their constituents.

Now, with respect to internal education, what kind of feedback are our colleagues getting in the commercial sector when they run these programs for their employees?

And let me just digress for a second to tell you that I had one particularly interesting conversation about the disconnect in the genetics side, the science side, of the corporation and the sales side, and I heard the noun "niche" turned into a verb in this context. The sales people said to the genetics people, "You're trying to niche my products." In other words, you are trying to make them so carefully targeted to specific populations or individuals that you're going to cut down on my sales, and so the sales people are a little leery about what the genetics troops are trying to do. I think that's an interesting message for us, aside from the fact that we have a new verb, to niche.

Now, again, the message came through loud and clear that the education for the internal staff has to be very highly targeted. There was resistance to educational programs for internal staff that was trying to tell them what genetics was about in general. And that's not very different, by the way, from what we're hearing when we talk to health professionals, and I'll come back to that in a second.

Now, there are a lot of slides that deal with how can we help, and I'm only going to show you a couple of them here just to give you a sense of the range of issues that our colleagues in the commercial sector think are important for us as individuals dealing with genetics education. How can we help?

And again, the first bullet, answer the question what's in it for me? Do not assume that what we want to tell them is what they really want to know. Now, this is a very interesting line to tread because if you have a group of individuals who don't know any genetics, how do they really know what they need to know? So it's a double-edged sword, but the question here or the issue here is that we have to be open to what they want to know and then tell them, look, that's really interesting, but based on our experience, there are some other things we think you need to know as well. So this obviously has to be a collaborative effort, which all good educational programs should be. They should be focused on the learner, not on the instructor.

Now, it's a little hubristic to tell you what these preliminary data mean with an N of 4, but nonetheless, I'll plunge in, and I will tell you that in roughly the year since I became director of NCHPEG, I've been traveling around a lot, talking to a lot of individuals in the health care community about genetics education. So some of what you see here is informed by the data from the surveys and some of it is informed by my own discussions.

Obviously, we need a lot more data from the private sector, but over and over again, we hear we have to define the audiences more carefully, and there are some very interesting and knotty issues here, including the future of genetic medicine. Who is going to be doing genetic medicine? To what extent is it going to move into primary practice and what does that mean for us? Who will be involved in other ways? Are pharmacists going to be involved in some other way? Who knows?

Who will deliver the educational messages? Is it going to be primary care docs who are going to be delivering educational messages to patients? Who is going to deliver the educational messages to the health care providers?

This is something I've been saying for a very long time. We need some general agreement on the content of genetics education. Now, we do have these core competencies, but they're competencies and they don't really specify content. One of the things we're trying to do is follow up with another set of core principles in genetics and we're trying these out with a small group of

individuals working on a project funded by HRSA.

We also have to address this issue of immediate impact. Over and over again, I hear not only from the commercial sector, but from the health care professionals, listen, all this stuff about the Genome Project is very cool, the technology's cool, the biology's cool, but what do I do now? What do I do tomorrow? How does it improve patient outcome right now? Not five years from now. Otherwise, why should I know it?

And we need some sound coordination and leadership because we run the risk of wasteful duplication of effort.

So that's it from the commercial sector with some insights thrown in from discussions with others as well. Thanks.

DR. BOUGHMAN: Thank you very much, Joe.

Maybe we could have the people who presented go ahead and come up to the table -- Susanne, you, too -- close to a microphone because there may be additional questions.

There is one more point from the white paper that I thought would be important. One of the issues that we have come back to as an entire Committee and as a work group several times is the multifaceted approach to genetic care and the fact that the consumer or the patients themselves are going to be a member of that team and in some situations driving the foray into genetics, and on page 2 of Section 1, there is also a reference to an AMA survey conducted awhile ago that reported that 70 percent of the respondents stated that their primary care doctor would be the first choice for information on a genetic disorder, and about 80 percent of those people said that they were very confident or somewhat confident that their primary care provider could advise them regarding a family member's risk of developing an inherited cancer, inform them about the availability of genetic testing for that cancer, and interpret the results of the genetic test.

So we've commented here on both the presence and lack of adequate knowledge on the part of several of our professional groups, but we may have a challenge among the patients and general consumers as well.

What I would like to do now is open the presentations and the content of the materials in your book for some general discussions, knowing that we're going to end up focusing on what does the SACGT need out of both the written presentation and the focus on the summit in the fall.

DR. BURKE: I'd like to first of all thank all the presenters, and state very clearly my position that I think we need genetics education. We need to make great efforts to reach out. The reason why I state that as a preface is that I think we have to be very, very careful to ask ourselves why is it that we've been worried about this problem since 1975 and we're still worried about and

we're not clear that we're making any progress.

I suspect that the core answer to that is in some of Joe's comments, it certainly reflects some of my own experience involved in a HRSA primary care genetics education project, and I think may point the way to where SACGT may be able to provide leadership. Specifically, we are used to thinking about genetics, geneticists, people with expertise in genetics having a lot of really useful information that we really want to get out, and that as the body of genetic knowledge grows, we feel more urgency to get that information out.

I think that's true. I think that's a correct perception, but it's only half the story. It turns out that there's a whole lot of really useful information that any given target audience has that comes from its own experience taking care of the patients that it takes of.

A simple sort of corollary there, for example, is what a medical education colleague of mine calls "bad doc examples" are a bad way to go. Even though we want to show people how they missed an important genetics diagnosis, it's a bad genetics strategy. What we really need to do is not talk about guidance, but talk about partnerships, talk about how we begin to have to have the initial conversations with whatever target audience it is -- and I suspect that's a multitude of different conversations, because there are different target audiences -- that helps us to understand where they're coming from, what it is they perceive they need to know, and perhaps we give them a little window of why it is that we think we have something to offer and the partnership, if it starts in a positive way, may go forward.

I don't think we're going to succeed if we don't take that kind of approach. I think we're going to do what we've been doing for 25 years, which is creating wonderful genetics curricula that the people we want to have using it don't particularly find useful.

DR. BOUGHMAN: Thank you.

DR. LEWIS: The other thing I really wonder about is if people really have a good understanding about what is genetics and what isn't genetics, and I believe that there's some education and some behavior that people take for granted as just part of their own specialty or part of their own generalist knowledge that really is genetics, and so that we're not giving people credit for doing what they're doing. For example, when nurse practitioners do triple screening, at some level they're doing some genetics work, but they may not see it as that. They may define it as prenatal care. When the nurse in the nursery does PKU and some of the other newborn screening, they see that as normal newborn care. They don't necessarily define it as genetics, and even though it is and even though they're doing the appropriate level of patient education and counseling, I'm not sure that they see it as that, because they just see it as a routine part of their practice. So that may be a piece of it, and people may see genetics as the "new genetics," as opposed to some of the basic stuff that everybody's already doing.

DR. BURKE: Or they may see it, as Susan Hayflick's data suggests, as dysmorphology or some limited -- but I think there are two very, very powerful things about what you say. One is we should start where people are already. The other thing is, in the spirit of true partnership, if we discover that a non-genetics group is using triple screen in a little bit different way than geneticists are using it, if their counseling standards are different, I think it's very important for us not to assume that we're doing it the right way and they're doing it the wrong way. Rather, that we should have a discussion about isn't it interesting that we both have this interest and pursue it from there.

DR. LEWIS: Absolutely, because the bottom line is I think, rather focusing on the professionals, we need to focus on making sure that the clients are getting the services. I couldn't agree with you more.

DR. McCABE: I think, and it was mentioned in presentations, and that is that it's perceived that we don't do anything in genetics, that we make diagnoses, but the value of that diagnosis is almost an intellectual exercise for the physicians and what benefit does it really have to the patients. And I think that's something we've got to deal with and as a genetics community.

It's interesting that at the American Society of Human Genetics meeting this year, there's only one session on genetic therapy, one of the symposia workshops, and that was rejected as a symposium and added on as an educational workshop.

But as a community, we're not interested in intervening and looking at what our options are, and in fact where therapies are deriving from genetic discovery, they're being turned over to non-genetics specialists.

DR. BOUGHMAN: That's an interesting point. Are there additional comments from the Committee as a whole?

DR. BURSTIN: Just one thought, actually, building on Dr. McCabe's point. I think one of the other issues is I think a lot of it depends on, again, this issue of what people think they're actually doing when you're calling it genetic testing, and I think a lot of primary care physicians in particular, the group I'm most familiar with, for example, will do things like check a homocysteine level without actually being cognizant of the fact that in and of itself that's actually understanding a complex issue around genetics and its influence on a complex disease like cardiovascular disease.

So I think, again, the more we can link it directly to clinical care, it's going to be a much easier case to make that practicing physicians need to pick up this knowledge set, and I think simply knowing something you can't do anything about is the thing that I think is the difficult link that providers in general feel there's so much I need to learn, but I can actually immediately turn around and have something actionable about doing something about a genetics issue for which I

test and then can't have an effect on to do something I think is increasingly a frustration.

So I think the more it's tied directly to clinical care, the better off we are, and in fact for the things that are sort of ready for prime time, not so much in terms of genetic treatment, but more so even diagnoses that can make a difference, like a homocysteine level or a BRCA1, the more you can embed it in decision support systems that primary care providers use increasingly, like computer electronic records and decision support, the better off we'll be. So if somebody gets a cholesterol level back, they can be cued to, for example, check a whole series of other important tests that might have important genetic implications.

DR. SHORT: In other work that we did at the AMA that would be of interest in terms of going to the issue of it having direct impact on clinical management is that to actually look and see what's on people's radar screens clinically in terms of then also looking to see what they said were their top five clinical issues, and then look and see what genetics topics they actually covered at their annual meeting, and don't be surprised that only five people showed up to that workshop, because it wasn't anything remotely near the radar screen, so that in terms of our sort of efforts to recognize the integration is, as we said, go where they are. You know, walk a mile in their shoes and walk where they spend most of their time, and in some cases, we have very important genetic information that will change the management and in some cases we don't, and to acknowledge that we don't.

MR. McINERNEY: Just to follow up on that, one of the questions we've been asking the dozen participants in the program that's funded by HRSA -- and this is a dozen different health professions and they are developing curriculum for graduate training and in some instances continuing education programs as well -- we've tried to ask them or press them to answer the question how does genetics manifest itself in your discipline?

And sometimes they can tell us and sometimes we need to help them a little, but in one instance I can think of at least, the person said, "It doesn't. It simply doesn't, and no matter what I do, it's not going to manifest itself in my daily practice, and in fact there's a sense in which the guidelines under which I practice absolutely preclude my discussing those issues anyway. I can't discuss those kinds of issues with the people who come to see me, and so is there any reason I should know this?"

DR. BURKE: You know, I think we're honing in on what I think is a critical issue when genetics goes out to other disciplines, and that is what really is clinical utility in the context of genetic information? What makes that hard is, first of all, that we have relatively few options that fit into a simple definition of utility. We've got PKU and then a PKU diet, but we don't have a lot of examples like that.

We also have a very powerful tradition, and I think a legitimate tradition in genetics, of there being profound utility in the information itself. The information itself can inform people about

an inheritance pattern in the family. It can provide crucial information for making reproductive decisions. It can sometimes stop what otherwise would have been a prolonged diagnostic pathway and provide people with very important information about prognosis.

So I think we have a lot of experience with that kind of value, intrinsic value, to information that's relatively foreign to many clinical disciplines, and indeed many clinical disciplines are accustomed to fending off information that's not going to change management, to defining good practice as making sure that you don't go after that kind of information.

So what I think, again in the spirit of partnership, is that efforts to reach out should include efforts to engage in that conversation, for genetics educators to be very open to understanding why there's a great concern with not pursuing irrelevant information, and hopefully doing it in a respectful and interactive kind of way that allows us the opportunity to explain why that can look different from the perspective of making a genetic diagnosis in a family, and I think that it's a core issue in terms of reaching out to other constituencies and it can be, I think, an interesting, rewarding dialogue if approached in the right way.

DR. GUTTMACHER: I just want to point out it's important the Committee be cognizant that the experience of I think probably everyone who tries to educate health professionals about genetics and, for that matter, educate the public, but it may be even more true of health professionals, is to underscore the point that Joe made that health professionals want to learn what they can use in the office tomorrow.

But because of that, this Committee has I think a particular responsibility, advantage, opportunity, which is that genetic testing is over and over again one of the very few items that at least health professionals perceive as being something they might use in the office tomorrow. Now, they may overperceive that in fact, but that gives us an entree into their offices, into their minds, and also of course an opportunity to discuss the more subtle aspects of genetic testing with them as well.

The other is, genetic therapy, because it's not something that they're going to be thinking about doing in their office tomorrow, is not that kind of entree. So I think that it's important for the Committee to think about this. In fact, genetic testing and maybe, to a lesser degree, pharmacogenomics, are among the very few things that really give us an opportunity to go in there to educate health professionals not just about genetic testing per se, but around larger issues in terms of genomic medicine and genomic health care, but that testing's really a very important way to get our foot in the door.

DR. PENCHASZADEH: I would like just to throw also a couple of additional hurdles in getting genetic medicine into the mainstream. That is that medical education is traditionally focused primarily on the individual, not on the family, and although by reading what we read we think that genetic medicine will be similar to individualized medicine and according to your genotype

and so on and so forth, the truth of the matter is that today that is not yet a reality, and I think that the focus on the individual at the expense of the family is something that makes most physicians or older physicians not -- they don't avail themselves to consider all the ramifications of the genotype of an individual with respect to the family in terms of prevention possibilities or information to the rest of the family, and so on and so forth.

The same is true with prevention vis a vis treatment or therapy, because most of the applications of genetics are in prevention, and that's not something that takes much hold on the training of medical students or physicians. I mean, physicians are trained to fix things today, period. It has to do with the fact that they may not be interested in anything that may appear in the horizon for the near future.

I think that we probably as a Committee would do ourselves and genetics a favor if we, at the same time that we strive for introducing genetics throughout medicine, we would also convey the notion that physicians and health professions in general, for that matter, should have more components on prevention and on family and community and not only individual.

DR. CHARACHE: I'm struggling here with a different piece of the education on medical genetics. I'm thinking of the model, for example, of sickle cell anemia, in which in the first year in clinical chemistry, they learn about the amino acid substitution and the effectiveness on the folding of the hemoglobin molecule and oxygen transport and what have you, but what they don't learn is, in the third and fourth year, how you take care of a patient who has that particular genetic disorder.

I think that there are many examples of this, where you have diseases where there are -- cystic fibrosis I think is an exception, but plenty other. Hereditary oncodema. I can think of a lot of the ones I've been concerned with in which there's no education on what happens to patients who have a given category of genetic disorder and how they can be managed.

DR. SHORT: One rather odd comment coming from AMA, but one of the aspects of genetics education that we actually haven't talked about, and I think Judy is probably the strongest proponent for this, we don't teach how to provide genetic services as a team sport, and the fact that the genetics workforce time and time again we see is relatively small, but we don't say, well, how do you manage the fact that there are very few of these folks and how can you do this and how do we think about the educational challenge from the standpoint of the team, that this is going to be a team sport.

DR. LEWIS: Absolutely, and I think part of it is sort of looking at who are the field workers and who are the tertiary specialists, and I do think there's a fair amount of turf that might be involved. At the risk of sounding somewhat iconoclastic, I think a lot of times knowledge is power, and as much as we say we want to share our specialized knowledge, for all of us, I think there may be a concern that if we let too many people know too much, then maybe we won't be needed, and I

don't think we have to worry about that in this field, but really, you know, the more you give away, the more there is left because then you become the wise mentor.

I think that, while we don't say that necessarily, it's something we need to pay attention to. If everybody can do it, then how important is it? But the more that people do it, the more empowered it becomes.

DR. BOUGHMAN: Elliott, you had your hand up.

MR. HILLBACK: I don't know. This is a very funny conversation and we've had it before. We sit here, we constantly comment as we talked about testing and the work we did yesterday about how we need users that understand what we're doing, we need users that understand genetics, and then it sounds to me like the users are saying, "I don't need to know this stuff. Why do I care?"

I guess I'm wondering, you know, how do we change that fundamental issue or do we? I mean, one way to do it is to do some shocking, aggressive thing and really get their attention. It may not be possible. The other approach is to do a slow burn over 20 years and hope that by the end of 20 years, when there's lots of genetic tests, there will be lots of people interested, or wait until we have a disaster and then have to do it in a hurry. But it doesn't feel like we're making progress or that we've figured out how to bridge this gap between a group of people on one side of the ocean and a group of people on the other side of the ocean who feel like pilgrims, feel like we've done the right thing, and nobody else wants to join us. So how do we change that? I don't know where the heat is to do that.

DR. BOUGHMAN: Well, I think Wylie actually addressed that a little bit earlier, and it's almost like a stealth approach, which does sometimes work, wherein you ask or you find out that the receiver of the information knows a little bit of information or thinks they know what they know, you acknowledge that and add to that information, and then in fact more questions may come back, developing a real give and take in a partnership. I think that in fact was where Wylie was coming from before, and I think it's being demonstrated in fact in the private sector in some of the data that Joe provided about how organizations are in fact capitalizing on new products, new services, or whatever, and as soon as the sales people or the testing people know that they need some information, it's given.

DR. LLOYD-PURYEAR: And I don't think that they're saying they don't want to know. I think they're saying tell us what's relevant.

And going back to the project that Wylie is talking about that we're sponsoring, one thing that was very interesting to me with the primary care providers, initially people did not want to know about molecular biology, sort of the nitty-gritty genetics. They wanted to know sort of very traditionally primary care things. However, when we began teaching, they wanted to know the molecular biology, and that was a demand -- there's not enough genetics in this course -- and so it

was completely the more they got into it, the more they wanted to know, and became very demanding to know it, and said that it was missing from that curriculum. But we did not approach them that way. We approached them through a primary care lens. They had made that very clear. You know, do not expect us to look at primary care through a genetics lens. You need to look at genetics through a primary care lens, and that was said over and over again.

MR. HILLBACK: But is there a groundswell within the average physician community, the people that we all go see when we're patients, that says this is really getting exciting or I'm even starting to tune in, or are we in sort of the pre-wash cycle here in this thing? We're just trying to get it started and trying to get a few people interested, and we ought to accept that, that that's the best it's going to be, that there's no way to sort of accelerate this cycle.

DR. BOUGHMAN: I'm going to call on Wylie and then on Ed, because I think Wylie might be able to answer that, or Bonnie wants to say something also.

DR. BURKE: Yes, I think probably everybody who's been involved in genetics education will have a little bit different answer, but my impression is that it would be very hard to say there's a groundswell. What there is, if you go looking for it, are pockets of people within other specialties who have the vision that this is important, and that's another principle of medical education that I think is well-established. The interactive point was the point that Joe made. Another technique is find the local leader who has credibility, get that person engaged, and then let that person engage the people within his or her environment.

I would say that's the strategy we need to do. The dialogue needs to be reaching out to those folks that have begun to be interested. Figure out that dialogue, get them engaged enough that they really want to go deeper, as Michele said, which is something that happens, and then from there let them be your ambassadors.

DR. BOUGHMAN: We have Ed and Judy and Bonnie Pagon.

DR. McCABE: Why don't you take Bonnie first?

DR. BOUGHMAN: Okay, Bonnie. You want to introduce yourself, too?

DR. PAGON: I'm Bonnie Pagon. I'm a clinical geneticist and I'm involved in the GeneTests and GeneClinics projects which organize genetic information for clinical use.

I would say the groundswell has come, aside from the geneticists, who know about the value of the information, who know what they know and who know what they don't know and go to look it up, the neurologists are the ones who are very interested in genetic testing because they can use it, and most neurologists now realize they can't practice medicine without knowing genetics and knowing -- not knowing genetics. I mean, knowing genetic testing.

MR. HILLBACK: Outcome research.

DR. PAGON: Yes, and it's really gratifying, because the neurology community really has embraced genetic testing information and access to testing information, and I think it's because it's useful to them directly and, as Alan Guttmacher said, not only tomorrow when they go to their office, but today when they go to their office, and I think until genetic testing is a reality, where a clinician has to be comfortable with it and versed in it to communicate and take care of their patients, we're going to continue to be butting our heads against a brick wall. So it really needs to be useful to them.

DR. BOUGHMAN: Thank you.

DR. McCABE: I think that it's good that we try and educate our colleagues and those who are interested. We've been talking about this for a couple of years here, and since 1975, at least.

I think one of the things is that we need to increase public literacy in genetics, and I think that's happening. If you read the New York Science Times, the level of writing has improved dramatically over the last 15 years. So people are interested in these issues, the public is interested, and a lot of us geneticists get our news from our various newspapers, as well as NPR, so it's important that we improve the level of literacy more generally in the public, so that the individuals who come to university, who come to medical school, already have a working knowledge and an interest in it.

Then I think we've got to work on undergraduate education. The genetics that's presented in undergraduate education, some of it can be quite interesting, but some of it is the kind of thing that would probably turn people off, and I know with Joe down there and his past life, I probably have just stepped on all 10 toes, but I think that it's very important that we present genetics to the undergrads in a way that will be broadly interesting not just to the science nerds, but also to those who are going to go out into the real world and do other things other than science. And then, hopefully they will come to medical school, health profession schools of other kinds, with an interest in learning more about this and be more receptive to the opportunities presented to them.

MR. McINERNEY: If I may just respond with a point of information, there is a subcommittee of the Education Committee of the American Society of Human Genetics that actually is now developing a set of core principles in genetics for undergraduate biology. They're looking at four different courses in undergraduate biology, and I'll be happy to tell you about that later.

DR. LEWIS: To respond to some of the comments about do people want to know it or is there a groundswell, I directed a dissertation and then there was a second dissertation in nursing, both of which were looking at deployment of genetics information by practicing nurses. The first was by Shirley Jones, the second was by Jean Jenkins, and both of them used diffusion of innovation

theory, sort of looking at the fact that in the world there are some people who are early adopters, who go out and are risk takers and are willing to take new information, try it out, and see how it works, and then there's a whole bunch of people who sort of tag along after things are proven and well-known. Part of what Shirley Jones did is she developed a tool, and she was looking at nurses, and I would be willing to venture that it would fit other health care professionals as well, is that we're not big risk takers, and that big risk takers aren't necessarily the people who go into our disciplines, and so you don't have huge numbers of early adopters. You have people who want to see what the random trials look like and you have people who want to wait until this is proven and well-known and as common as Kleenex. So that part of it isn't necessarily the information. Part of it is the nature of the people we're trying to teach, and their whole rationale and their whole of way learning and their whole way of being and their whole way of making decisions, and I'm not sure we would want rash risk takers out there with every fly-by-night idea trying to apply that to patient care. So I'm not sure that that's all bad, but I think it's the nature of the beast and I think we have to remember that, as we design educational interventions, that we're not talking to the type of people who are out there inventing the latest new computer toy, but we're talking about people who we want to have rational, reasoned thinking. Maybe we could be a little more innovative, but that that's a piece that we need to just come to peace with.

MS. DAVIDSON: Yes, I kind of wanted to change the metaphor a little bit from groundswell to leveraging and thinking about leverage points and pick up on Ed's comments. There have been some interesting articles written recently in the British Medical Journal that looked at the patient consumer community, particularly with all of the information that's available on the Internet now, and really looking at the power that will come and the pressure that will be on the health care delivery system to begin integrating a lot of the tests and science. But I think if you look at it as a market model and we also think of public education in that sense, that there may be some other leverage points that could also be used to really excite, and to excite when there's no groundswell is an overstatement, but at least to provide some rationale. I think particularly it's the concept, and again, this is from me sitting at the other side of the desk, but the concept of the importance of understanding, the importance of knowledge, even if, at this point, there isn't anything that medically can be done, and I think to be able to help health professionals really understand the importance of that from the family perspective, you can't put that in words.

MR. HILLBACK: Yes, I guess I'd just like to translate what I've heard in response to my comment and others as we think about this educational summit. We could do a really nice theoretical event. It probably wouldn't have any impact on the whole shape of the world and total entropy wouldn't move, but I think we really ought to try and find a way to do something that reflects the reality of what we live in today and not some dream about what we'd like it to be, because we could use up a lot of resources between now and then and at that meeting on a lot of things that are so far away from reality that they won't have any impact. So I'd like to make sure, as we plan that, which is one of the things I think we wanted to segue to for a minutes at least today, that we make sure we realize the environment that we're in and not the environment we wish we were in or not hope for the endpoint we'd like to get to, recognizing it may take years,

and see what we can do that's practical and how to attack it that way.

DR. BOUGHMAN: Well, there's no time like the present.

MR. HILLBACK: You can pay me later for that transition.

DR. BOUGHMAN: Thank you. It's going to be an expensive one, too.

DR. BOUGHMAN: We are thinking about the presentation of a one-day meeting and it has been suggested that I ask about calendars for November the 14th, which is the day before our next two-day meeting, and if in fact we could get the members of the SACGT to join us there, then we could talk for a few minutes about the challenge that Elliott has just given us. What could we do that is new, different, and what could we walk away with that day that might lead us to some conclusions or some recommendations, as well as sharing information among the participants and possibly changing some of their plans as well?

DR. LEWIS: One of the things that I think would be really important, in line with what Wylie was saying about partnering, is really to encourage people to bring any exemplars of what they've done, so that we don't have to recreate the world, but that we can put together a comprehensive list of what has been done and be able to provide that as resources, so that then people can pick and choose. So if we could develop a compendium, I think that would be really nice, and also that would make people feel really good about the fact that they're not at ground zero, but that they've done a lot, and to encourage some sharing.

So I think that asking people to come and making sure that we issue a y'all come, even though it's going to be somewhat invitational, to make sure that if people know other people who are interested that they feel comfortable in bringing them, space permitting.

DR. BURKE: Judy, I would just add, we need to know what worked and what didn't work.

DR. LEWIS: Okay.

DR. BURKE: I think we should feature interventions that we feel comfortable have had success and also interventions that we tried that didn't seem to work.

DR. PENCHASZADEH: Would you just recount for all of us the goals and the target audience for the summit?

DR. BOUGHMAN: In our meeting in May, we had in fact talked a little bit about this. I think the goals relate to in fact the objectives or goals of the Education Work Group in and of itself to get a better picture of what is happening out there, the snapshot, and this would be a different kind of opportunity to hear from the stakeholders themselves.

Today, I've heard a little bit differently, a question to open the door and say what is it that you need or you think you need and don't have access to or aren't getting?

But also, for the Committee itself, by the end of the day, through presentations and/or discussion groups, to have a better idea of ideas, suggestions, conclusions that we might share with the Secretary if there are any action items or recommendations that we could make in finding gaps and/or helping fill those gaps.

MR. HILLBACK: I'd like to suggest, and just to kick this around to get something going, I mean, can we spend time at a meeting like that talking about how to make these people thirsty? You know, how do we get them to want to know this? Instead of talking about what programs we can bring them to educate them, how do we get them drooling? How do we get them realizing that maybe they need this? I mean, maybe that's the most important thing we could do, is to try to help increase the need, the feeling that there was a need, rather than trying to jam education down their throat with yet one more sexy approach. Again, it's just one of the topics, but it would seem to me that that might be an interesting area, is to say, well, what has worked in terms of getting people's attention? How do you get people interested?

DR. BURKE: And I think we shouldn't talk about it amongst ourselves. I think we should ask them.

MR. HILLBACK: Yes.

DR. BURKE: So I think it might be interesting to have a neurologist come and talk to us about what's evolved in their practice. We could probably identify some primary care program leaders from the GPC project who've sort of been on the receiving end of our efforts to educate and then have gone back to their institutions, and I think what they have to say would be very interesting and provocative.

MR. McINERNEY: I have two comments. One is that it might help if we think about how we can use the NCHPEG annual meeting, which will then be in early February, as a follow-up to what this Committee might do with the Education Summit.

The second point is that because of questions from NCHPEG members, we have been thinking about making the scientific focus of the NCHPEG meeting genetic testing, the science and technology of genetic testing, with some discussions of the ELSI issues as well.

I wanted to go back to the comment that Alan Guttmacher made earlier that that might be a way, actually, to raise the level of interest, to indicate to people that something is here very concretely, but also provide some insights into what is likely to be coming in the future.

So just a couple of things for you to think about.

DR. McCABE: We mentioned the neurologists. Another group are the endocrinologists, who are getting very interested in this, and Bill Crowley, who's the current president of the Endocrine Society, has identified the theme for their meeting next June as the genome and its impact on the practice of endocrinology. So it might be interesting to invite Dr. Crowley or one of the other leaders in endocrinology to that as well.

DR. LLOYD-PURYEAR: As we go forward with this with the design, a lot of our talk has been around health care professionals, and I think we need to open it up to considering public health professionals and keep that in mind, because there are a lot of --

DR. BOUGHMAN: Well, if you remember, we had a list in front of us in May, and in fact that list has been modified to make sure the APHA, schools of public health, and so on were heard and added to the list of organizations to make sure that --

DR. LLOYD-PURYEAR: No, it was just in conversations that we had absolutely focused on health care providers.

DR. BOUGHMAN: No, you're absolutely right.

DR. BOONE: I just want to reiterate what Michele is talking about in terms of the public health workforce. We've got some of the same kinds of problems you're talking about in terms of articulating what the message needs to be to bring the public health workforce into the new arena of genetics. They only think of newborn screening at this point in time and they've got to go beyond that if they're going to ever be really effective.

We have a project at CDC that's trying to look at public health workforce development and they're looking at four broad areas. One is informatics, one is public health law, another is environmental science, and genetics is the fourth area. We have made some progress. We developed a set of competencies for the public health workforce looking at it from the perspective of six different job categories and what are sort of the crosscutting issues for competencies, as well as what are the specific competencies that each of these particular areas of the workforce might need to know, and those include administrators, clinicians, environmentalists, laboratorians, epidemiologists, and so on. Educators are another group.

So I think it would be nice to see how these compare with what NCHPEG and the other groups have put together, because I think they're going to be very similar, but the key thing is how can we can articulate what the message needs to be and how can we make it relevant to the people?

DR. KOENIG: This may be something that's already been addressed, but to also perhaps include in the summit someone who is actually an expert on the medical education. For example, when

I'm trying to figure some of these things out, I will go talk to one of my colleagues at Stanford, Kelly Skeff, who's an M.D./Ph.D. in education, and so he often will have some kind of particular take on how to do this, because one of my observations, which I didn't make before, about one of the barriers to getting this across is I totally agree with Wylie and all the things about going to where the people are, but my own observation is that one of the biggest barriers that we don't recognize is how people inside genetics just are in love with the aesthetics of the field, and that that's the main endpoint.

We had it in our room. In February, at the February meeting, when Francis Collins came in and unrolled the Chromosome 1 on the table, it was like -- see, and this is where my interests get in the way of my communication, too, because I'm interested in genetics as a cultural phenomenon, but nonetheless, you have to be able to --

MR. HILLBACK: You've been studying us?

DR. KOENIG: Of course. That's one of the things that we anthropologists do. But working with Kelly, for example, that's been one of the things that I've discovered, is that often the thing that you're the most passionate about is what gets in the way of your trying to educate someone about a particular topic.

DR. McCABE: Actually, I'm going to defer to Michele.

DR. LLOYD-PURYEAR: Well, another group that probably I don't think is on that list, but we need to consider because they're the funders often of education at the state level, and we've been doing a series of workshops with state legislators, and actually -- oh, ASTA's not here -- are continuing that on with actually NCSL and ASTA, but I think they would be a very good group to include because that's where you're going to get the majority of funding for allied health professions, public health professions, but it's also those that can actually influence licensing. It can influence CME requirements within a state for licensing. So I think they're a group to bring there.

DR. McCABE: And as somebody who participated in one of those projects, I was quite impressed at how quickly the state legislative folks and people from the governor's office, as well as the legislature, really grabbed on to the economic consequences to their decisions, and it would be interesting to have some of the participants identify why it was that they were interested to begin with and what really attracted their attention, but they're very quick studies.

DR. LEWIS: Another group I've been thinking about, in light of what Ed said earlier about getting people turned on before they get to the professions, is maybe high school and college biology teachers, and I believe there are some professional associations of those groups, so that maybe if we can get the interest there, then we'll end up having our students teaching some of the faculty, and that always works out in a very interesting way.

DR. BOUGHMAN: Well, we've heard a lot of ideas. I saw a few people bring out their calendars to check about November the 14th. Does that seem to be a time, a date, that would be feasible for any, all, most?

MR. HILLBACK: Well, just to go on for a second about the meeting -- it's actually Mary's idea, but I got the microphone first. No, one of the questions was what kind of meeting are we talking about? Is this a big lecture hall which is sort of mostly one-way communication? Is this a bunch of smaller working groups for part of a day that then get back together, so there's a lot of arguing and fighting, which generally leads to better results in my opinion than listening to lectures all day? You know, have we thought a bit about what the format of the meeting will be yet or is that next steps?

DR. BOUGHMAN: Well, I believe that in some respects that's next steps. We had had some brief discussions, but I think that we had wanted to find out from this group today what the thoughts were, and then the Education Work Group itself would be the primary folks that would be pulling this together. I thought we could have a conference call pretty soon so that we could set the absolute agenda, unless somebody wanted to put one out on the table in the next five minutes.

MR. HILLBACK: I think some of the experience we've had with the group yesterday and actually the preliminaries to that -- therefore, the meetings that Steve's people had with representatives of various labs and lab organizations -- it was a lot of busy work, but the nice thing about busy work is it generated meat, not just verbiage, and I think the reason that we got comfortable with the templates was that there were all the samples. Someone had done a lot of homework that gave us tangible things to debate and talk about, and I think that's much better than going to a meeting cold and having a bunch of people stand up and give you speeches and you sit there and listen. I find it a very expensive use of my mental time to just sit and listen to other people's speeches and not feel like we've had any interaction.

So whatever we do, I'd propose -- and I'd like, again, since I'm on the committee and I'm going to have to help do this, to get the sense of the whole full SACGT of does that make sense or what kind of meeting do people want to have?

DR. BURKE: Yes, it seems to me that what would make most sense, and it I think dovetails with what Elliott's saying, is that this summit should serve the purpose of helping SACGT to understand what its role is in this area, and SACGT is an advisory committee to HHS, and so it would make sense to me that the information that needs to be chewed over in this summit, so as to help us as a Committee to inform ourselves, has to do with understanding what are the needs, what clues do we have at the present time for successful versus unsuccessful ventures in this area, because then what it seems we would do next is use that information to provide advice to HHS about where the needs are.

And I agree that I think we need probably some presentation. As I've said earlier, I'd love to see it focused on here's what we know that seemed like a successful experiment and here's what we know that seemed like an unsuccessful experiment, because I think information about both is useful, or here's what we know about barriers. People from public health and health care workforces might help us to be informed of that, and sort of an iterative process between those kinds of presentations and discussion about what they mean.

MR. HILLBACK: I mean, I thought your comment about having some of the groups like the neurologists come, but maybe someone else say before we'll listen to you, here's what we need. Here's what we need. Here's what the world has to be like before we'll listen to you.

DR. BURKE: And here's how I have trouble with your paradigm.

MR. HILLBACK: Yes, right, and they're commenting over here that there's certainly a view held in some sectors of the world -- I'm sure it's not totally accurate -- that the script is fairly paternalistic about control of genetics and its information, and so maybe it has to do with attitudes, relations, as well as it's our anthropological subjects or whatever.

So I just think we ought to spend some time really thinking about how to make this meeting work for us.

DR. McCABE: We need to come up with a roster of things that we might be able to recommend to the Secretary, and we need to remember that this is the Secretary of Health and Human Services, not the Secretary of HEW. That doesn't exist anymore. So Secretary Thompson doesn't really care about education. That's somebody else's. It's really education with the goal of improving health.

DR. LEWIS: I was just going to suggest that perhaps we look at the model that we used for the meeting in Baltimore when we were trying to reach out to the public to gather information on our oversight document that was a mix of presentations and then an opportunity for many small working groups, so that everybody felt that their voice was heard, and we might want to build off a model something like that that's a combination, because the other thing I think that's real important, even though we want to hear from people, is we've got to give people a level of where it is we're at and bring everybody to a level where they can participate.

DR. CHARACHE: I'm wondering if we could perhaps combine a few talks about specific topics that can get people thinking, combine that with some questions which could be provided in advance that we'd like the divergent groups to consider addressing, such as what would get your constituency interested in genetic testing? What would be useful to you for your purposes? And this type of question that they can think about in advance and bring to the table and then discuss among these divergent populations.

MR. HILLBACK: The other question I have is we've been spending most of our time on the professional audience, rather than the public. I assume that we want to separate those two topics for now, just because we only have one day and we've got a lot of other issues. If you start talking about how do you educate the public better, you could go on for a month. So were we going to focus it down to the professional user of genetics first and then come back at a later date on the public?

DR. BOUGHMAN: I think that's where our initial focus has been, especially given what Ed just said, reminding us that this is the Secretary of Health and Human Services and we are really coming from the services provision direction, although, as you know, our Committee has had as one of its key points all the way along that the consumer is a part of this team and is key to the integration of this into general health care, especially as we move into the preventive models and talk about changes in lifestyle or whatever that are going to make a difference.

DR. McCABE: I would just comment again, though, that even though it's professional education, it really is public education. If you look at where most of my colleagues get their information about genetics, it's NPR. It's "I heard this story on NPR this morning," and then want to follow up on it.

MR. HILLBACK: Or one of Mary's people came in and bugged me about it.

PARTICIPANT: Should we invite NPR?

DR. PENCHASZADEH: I just want to comment on the question of the public and the consumers regarding the summit specifically. I think there are two different subjects. One is if you take as a topic education of the public, I would agree with what seems to be the theme of Elliott that that would take us from the real focus.

However, I think there is a consumer perspective on how educated are the health professionals, and what the consumers or the patients require from the health professionals, and I think that that perspective may be useful in the summit.

DR. BOUGHMAN: Well, if you'll remember, to me that was one of the most interesting comments that came out of the white paper, is what the patients -- who they would go to and the fact that they expected their primary care physicians to know. I mean, I think that that's who they would go to to ask the question and they expected them to know.
I think that that kind of interaction and the inclusion of consumer groups to make some of those points very clear would be a very important thing in the context of health professionals providing services around these topics.

DR. LLOYD-PURYEAR: You know, this is a little esoteric maybe, but as a health care

professional, I mean, we do use the drug labels. You don't think we read them, but we do, and they do inform you of what to prescribe, what's going to happen, and you do go back and look at that all the time. So it's good that you work hard at it, Steve.

So we're developing this template, and it sort of gets to the provider summaries, too. What are we educating primary care providers for? Why do we think they need to know anything? What are we trying to engage them in?

And part of it is, going back to what Alan said, it's the genetic test, but that template becomes essentially that label. I mean, that may be one thing that you could present to them that's very concrete and get some feedback on, and I think it might explain or, I mean, a light bulb may go on about what kind of educational curriculum needs they need to have to address that label that's coming down the pike.

I mean, that just sort of brings it down to a concrete thing. It's a little esoteric, but it's a reality that we're creating here that we need to make sure health care professionals are prepared for.

DR. BOUGHMAN: You may think that's esoteric. In some respects, though, I think that brings us full circle on the day, and I would suggest that we might be ready to turn the microphone back over to Ed, saying that the discussion not only had presented by Susanne the incredible amount of work that the staff did, but having Priscilla Short and Joe McInerney join us with the information obtained by the largest of the coalitions, anyway, focused on education and some of the interesting data from the survey, and I think that the Education Work Group would be ready, based on the discussion, to go back for a conference call and get the invitation list ready for the 14th of November.

MS. CARR: It was your intention, wasn't it, that the November 14th summit would be a public meeting?

DR. BOUGHMAN: Yes. It would be open to the public. We want to make sure that there is a list of people that know about it and are specifically informed.

MS. CARR: Right. We'll have some targeted invitations, but it will be open and we'll invite public comment during that meeting.

DR. BOUGHMAN: Yes, absolutely, and we would, as always, I guess that is an assumption, simply based on the way that this group operates, that there would be time reserved for public comments. We would ask people to sign up and all of that.

MS. CARR: And just from the conversation, it sounded like the Committee is interested in having maybe perhaps presentations of the invited and public comments and maybe facilitated or breakout sessions in the afternoon, and maybe you can even think about, if the Chair would allow

it, to spill into the next day, where you could have a roundtable, not unlike what occurred yesterday for the kind of discussion Elliott's looking for, and that might be where you could actually articulate some recommendations and get a broader consensus than just the Committee maybe.

DR. McCABE: Yes. As Wylie said, what did the day's proceedings mean to SACGT and really then focus on some deliverables to the Secretary.

Thank you very much.

DR. BOUGHMAN: Thank you.

DR. McCABE: So we're going to be meeting from November 14th to the 16th. Is that right?

MS. CARR: Yes.

DR. McCABE: Before I wrap up finally, we've asked Kathy Hudson to give a brief report on the haplotype map conference that NHGRI sponsored July 18th and 19th. There's a New York Times article in Tab 7. Again, getting back to where people get educated. The conference participants were asked to consider whether data on population differences should be collected as haplotypes or identified and maps created. The conference question seemed quite relevant to SACGT's interest in exploring how population data should be collected and classified, and if you could just briefly -- I've seen various reports, and it was unclear. The reports were all over the place in the media that I saw, so perhaps you can give us your impression.

DR. HUDSON: We did have a meeting on July 18th and 19th to discuss the development of a haplotype map and, talking about public education, I think educating the public about what a haplotype is is going to be a significant challenge for us.

The meeting was an open public meeting, which is why there was so much press coverage of it, and we appreciate it. Most of that coverage actually was very accurate and very helpful for us.

There were about 160 people who came to the meeting, ranging from scientific experts to community representatives, ethicists, et cetera, and the purpose of the meeting was to discuss the usefulness of developing a haplotype map for disease-gene mapping, to discuss existing data on haplotype structure in various populations, to talk about what kind of data we need to embark upon this new project and the technology that's needed, and then, probably most germane to this Committee's interest, what kinds of populations and samples would be used in such a project and what are the associated ethical issues.

So just briefly, we have the reference sequence in hand, we have 2.5 million SNPs, or single nucleotide polymorphisms, identified within the human genome, where your sequence and my

sequence differ from one another approximately once every 1,000 base pairs, and the idea has always been that you could use these variants to be able to take a group of affected folks and unaffected folks for Disease X and look at all of those SNPs and see which ones correlated and do whole genome association studies to see what regions of the genome are correlated with that disease.

Of course, the technology is very expensive to do that, and so a number of studies have indicated that there's an underlying structure of the genome, that there are patterns of variance. So there can be a chunk of chromosome that has a particular set of variants in it that can range from 3,000 base pairs to 50,000 base pairs that seems to be sort of chunky in the genome. So if you knew the right variant to look for, you could actually be assaying that entire chunk in one fell swoop by looking at a single variant.

So that's the notion here, is that you would be able to do whole genome association studies for common, complex diseases that are of limited penetrance and be able to do that much more economically and high throughput.

The chromosome haplotype structure in different populations appears to be quite variable, and it appears that the chunks in African populations are smaller and in European and Asian populations are a little bit larger and even larger yet in American Indians, and so the question of who you sample to generate this map is of considerable import.

So at the meeting the topic focused on what populations would be sampled, one or many, how would you define the samples, how would you obtain the samples, and would the samples be identified, and if they were identified, that should be done with great care. I think there was a consensus coming out of the group that multiple populations should be sampled, somewhere on the order of three to six, that they should be identified populations, and that they should be as specifically identified as possible.

The overarching goal of this effort is a medical one and there was a lot of discussion about how this data being in the public domain will be free for use by anyone and concern about other kinds of non-medical uses of that data.

We set up two working groups at the conclusion of the meeting, one to work on study design and technology needs and the other to look at population and ELSI issues, and I think Dr. Zullo mentioned that earlier. So that group is going to be looking at those issues, and I'm not entirely sure on the time frame for those reports back. The final report of this workshop will be ready shortly and we can share that with the Committee and then give you updates as this moves forward.

This will be the first time that we have used identified populations in work that we've undertaken. In the past, all of our work has been ethnically and racially anonymous or

deidentified.

DR. McCABE: Thank you. I think it would be very helpful for you to share that report with the Secretary's Advisory Committee, if you would.

Any questions or comments for Kathy? Yes, Barbara?

DR. KOENIG: Can I just ask, is that already a firm decision? I mean, that's a decision that's already been taken or that's the direction that this is moving in terms of the identifiability?

DR. HUDSON: That was what I heard as sort of the majority opinion of the people who came to the meeting, and certainly we will take that input quite seriously. I don't think any final decisions about the construct of the project have yet been made.

DR. KOENIG: Since this was a public meeting, do you know if there are transcripts on the Web?

DR. HUDSON: I wish dearly that we had transcribed this meeting. "Nova" was there shooting for a series that they're doing on race, and race and genetics is a subset of that, and I have paid for them to transcribe that and I'm getting those transcripts, but they're only partial transcripts, and I'd be happy to share them. I don't have them in my grubby little hands yet.

DR. PENCHASZADEH: Question. Is this an NIH project, is this a Human Genome Project project, or under whose umbrella is it?

DR. HUDSON: NHGRI was the convener of the meeting and we will be the lead on this project. In many of the efforts that we've undertaken recently, we've solicited contributions and co-sponsorship from other NIH institutes, and we may do so in this case as well.

This particular project has some appeal across NIH right now because we are on this course of doubling the budget, and that ends up putting you in a squeeze in the year's past doubling because of the commitment to ongoing grants, and the appeal of this project is that it's fairly short-term and cost-intensive, so it's a way of short-term expenditures of money.

DR. PENCHASZADEH: So it is a U.S. project, in contrast with the Human Genome Project, which was international.

DR. HUDSON: This has nothing to do with the Human Genome Diversity Project. Let me repeat that.

DR. PENCHASZADEH: It is U.S. government-sponsored. Thank you.

DR. McCABE: Any other comments?

DR. McCABE: If not, let me conclude by just reminding everyone that the next meeting now is scheduled for November 14 to 16 in Washington, D.C. We will be returning to our usual dress code for that meeting.

Just to remind everyone, the February 2002 meeting date has been changed. Please be sure that you have this changed on your calendar. It's changed to February 13-14, 2002 to accommodate scheduling conflicts.

I want to thank all of you for a very intensive and productive meeting, and please have a safe trip home. Thank you.

(Whereupon, at 3:28 p.m., the meeting was adjourned.)