

*Preliminary Findings of the Genetics Workforce Study*  
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Now we'll hear from Dr. Cooksey, who is the PI of the Genetics Workforce Study funded by HRSA with support from NIH and CDC, and I thank you for participating in this meeting.

Please proceed.

DR. COOKSEY: Thank you. I'm delighted to be here. I'm presenting work that has been carried out and planned for for the last three years by a multidisciplinary group of researchers and consultants across universities in the country.

I'd like to give you a brief overview. I'll begin with a discussion of what is workforce research. I consider workforce research as one type of health services research, and we'll briefly describe what HSR, health services research, is.

As we've done this research, we have encountered problems in the field with some of the terminology that's used, and I think there may be time, as others have discussed, to really clarify some genetics-related concepts and address some of the issues that were discussed yesterday. I think Dr. Willard brought this up several times. What is special about genetics? Is genetics services considered special or is it becoming part of health care?

In that vein, I'll discuss an Institute of Medicine study on primary care. I'll present the type of workforce research that we have engaged in, which I would call functional workforce research, which looks across professional groups and pays less attention to categories of providers, but looks in the context of the health services being delivered. I'll describe the University of Maryland-Baltimore study and propose some priority areas for future research.

Traditional workforce analysis tends to be somewhat quantitative. It's done by professions. It is also done by medical geographers, medical sociologists, and health economists.

Some purposes are to assess whether we have a shortage situation. Is the supply greater or less than the demand? With shortages, supply is less. With surplus, supply is greater. That's an unstable state and is usually corrected by market forces.

Some of the most difficult workforce research to do, and usually the questions people would like answered, is forecast the supply and the demand by 2010. Will we have enough genetic counselors, geneticists, well-trained primary care providers, or others? I'll show you some examples of some of the best forecast work that's done and some of the limitations.

Most workforce research looks at a specific health professional group. I conducted this study at the behest of HRSA and particularly the Maternal and Child Health Bureau. They had a specific question. Should they support funding of expanding genetic counselor programs?

This was an easy one to do in some ways because the genetic counselor group, which you'll hear about with Robin Bennett's talk this afternoon, is an articulate, fairly homogenous group that has studied itself through survey research, has written about its professional activities and professional roles, and was very interested and has a strong sense of professional identity and plays a very important role as one of the

genetic specialty groups providing services.

But the market had not been kind. The study was done in 1999 and published in 2000. Genetic counselors were underemployed in some market areas. Reimbursement from health insurers and managed care was uncertain, and they worked in academic health centers, which have continued in the last eight years or more to see financial crunch.

We expected demand to increase, but could not come out with a recommendation at that time to support expansion of programs when people coming out of programs faced underemployment, but that profession could not be studied in isolation and we recommended a further study. We also felt it extremely important to educate health insurers and managed care plan payers about this, and the SACGT committee had some wonderful panels that brought groups together.

Another study that we conducted at HRSA's request, but really at Congress' request, was to look at whether there was a shortage of pharmacists in 2000. We confirmed that there was, that the demand outpaced supply, despite supply growing.

A useful measure of demand there was prescription volume. Sixty percent of pharmacists work in the outpatient area. There was data on prescription growth, which has been phenomenal. Prescription expenditures have been phenomenal.

When we began this genetics study, we thought it would be wonderful if we could find a measure that would be countable and would measure demand for genetic services, and we somewhat naively thought we would look at genetic testing volume, which, as mentioned yesterday, is not a number that's available, but I think it's still something worth looking into.

Other useful health workforce reports simply give counts and information about who is going into the profession and who is being trained. This is a wonderful resource that's been produced by HRSA by the New York Health Workforce Center that looks at for every state and for the District of Columbia information on about 25 professions, mostly on the supply question, and a new report has come out by the Washington Workforce and Rural Health Center that looks at state-level supplies in rural areas, chronically underserved areas for many professions.

The Bureau of Labor Statistics does the most complex forecast of workforce demand for all occupations of the nation. They collect state-level data through surveys of employers on hundreds of occupations. They organize it at the industry level. They use complex economic modeling to look at where growth is expected by industry and then by occupation. They present information that looks at the current employed workers and the projections for 10 years out. A primary user of this sort of information are guidance counselors in high schools and in other areas because they're projecting workforce need at 10 years.

We've met with them. They've been very involved and very helpful with some of the work that we do. They cannot use their data sources to predict shortages very well and they cannot zero in to very small professional groups, such as genetic counselors or geneticists.

Health services research, which I think health workforce research fits into, has been recognized as a field of research for about the last 15 years. The issues that are studied by health services research -- and the researchers are principally social scientists, although you're seeing clinicians get more involved -- is the way health care is organized, how it is financed, the different delivery models, and the staffing and the workforce.

Access to care is an important component of health services research, and outcomes and quality of care is an area. With the outcomes and quality work, AHRQ, the Agency for Healthcare Quality and Research, is one of the funders, although, as we looked broadly at the national meaning for health services research, their abstracts presented and their talks for about the last 10 years, very, very little coverage of genetics. Occasionally, there would be a paper or an abstract submitted on genetic counseling and a few papers on pharmacogenomics, but no real health services research in genetics. So there's an immense void in health services research in this area.

Switching to genetics now, I think in the field there's a lot of confusion. When we start thinking about talking to people, oncologists, nurses in oncology, many other groups don't consider what we call genetic tests as a genetic test. They think of it as a diagnostic test, a test to help evaluate genetic conditions.

Hemophilia, which is a clotting disorder that's X-linked in inheritance, sickle cell anemia, which has been recognized as an inherited disorder, are hematologic conditions to the world by categorization, by billing, by which specialty manages this condition, and yet they're genetics conditions. I think that issue needs to be clarified in the work that we do with workforce and the work that's done with health services research and in thinking about how the greater world sees this integration that's happening. Similar issues will come up and have been discussed by this group.

In defining and describing genetic services now, I put on the table for your consideration an Institute of Medicine study that was commissioned and completed in 1996 after two years of work. This was on the topic of primary care. Primary care was a very hot policy issue around the Clinton health reform movement, and the market responded despite the lack of passage of health reform.

Barbara Starfield is a Johns Hopkins researcher, a pediatrician by training, who did some important pulling together in a book that she wrote about some of the concepts of primary care. The Institute of Medicine conducted a study that looked at primary care, and one of the handouts has some of the findings and recommendations from that study.

What I see as some of the issues that you've been discussing, in that summary you could substitute the word "genetic services" for the word "primary care services" and see that a lot of similar issues were addressed by this group that has the ability to conduct more comprehensive studies.

As was mentioned by Dr. Boughman, in 1994, IOM reported on an extremely helpful study that looked at assessing genetic risk. It focused heavily on genetic testing. It helped clarify definitions. It had a wonderful chapter on the genetic personnel. We've not been able to find evidence that IOM has done a study specifically focusing only on genetics since then, so it's sort of a decade later look.

The Institute of Medicine is charged by Congress to look at public health and medical issues, and they cover a broad array of issues and they do superb work. They tend to take a little while to get the projects done. That's one of the downsides, but they're excellent.

Now, shifting to clinical genetic services, what I'd like to cover very briefly is how we've looked at what are the services included, how are they organized, where are they provided, and who provides the services? The more difficult questions that we're touching on with our work are looking at emerging models of services, information generated, and we're not really addressing cost, but it's out there. I'll start with some preliminary findings and then sort of show you how we got to this place.

Clinical genetics is a very, very small specialty area of medicine and health. It has been extremely small, and that explains a lot of what we're seeing right now. Numbers of specialists are small. Training programs and trainees produced each year are small. Geographic distribution tends to be in urban areas.

It's been a quaternary or tertiary care function, although it has had a strong public health component, and that's helped get services out to rural and less-served areas. There is limited diversity in racial/ethnic and just backgrounds among the professionals and the specialists.

What we've found and others have identified is genetic test availability is influencing demand for services. So if we had some ways to keep tracking that, and we're trying to get to that, that would help one get a little heads up.

Diffusion of medical innovation and technology. Much discovery and translation work occurs in academic medical centers, which train specialty physicians, fellows in cardiology, in GI, in neurology. They learn the new technology, whether it's lithotripsy or genetic testing for neurologic conditions. That's learned in academic medical centers and the group that learns that are the specialty groups.

So the diffusion of using this information technology will be in academic medical centers and out. So it will be with specialists. Principally medical specialists, but also nursing specialists, pharmacist specialists, and others. The diffusion out to primary care physicians takes longer and needs a lot of support and help.

The fourth concept that is extremely important is you can't beat the market. Market factors are extremely important drivers of how health care is organized, where it's provided, who does what. Financial incentives or the lack of financial incentives have a lot to do with the providing of services. There's competition in the market and that affects it. Reimbursement design is critical, and our reimbursement design system is flawed for health care.

Settings for genetic services. This is a structural look that helps us organize our thinking. The number of ovals has been growing over the last year. Different places. Academic health centers are in the center because that's where you have the specialists of all sorts. That's where people come who have had rare conditions or they come to outreach clinics that are sponsored by state programs, by Medicaid often, that are located more.

So there's a lot of outreach work that's going on in genetics that's highly admirable, but you have commercial labs getting more into more full-service operation. You have freestanding diagnostic clinics happening, particularly in the neonatal area. You have market-driven -- i.e., financial incentive-driven -- change that's happening. You have policy change, particularly with state-sponsored and Medicaid conditions, and you have a lot of community-based services coming up, as you've recognized. Hospitals are a major source as well.

So anyhow, we've taken a bit more of a functional assessment of the workforce. Who's qualified? We're not judging that, but the professional associations do. What roles do various providers say? In other words, we're looking at what's happening. And do the roles differ by the categories of services? We've identified five broad categories of the local. Who else is there?

I'll go quickly through some of the categories of genetic services and just ask you with each of these to look at the provider and identify the profession. Is this a medical student? A pediatric neurologist? An ophthalmologist? A family physician, pediatrician, geneticist, genetic counselor, physician assistant, nurse practitioner? It could be any.

Genetic counseling as a skill set and a counseling service has been well-organized in defining and consideration by the genetic counselor community, but they and others recognize that genetic counseling is a service that many providers provide. Is this a nurse midwife? A nurse practitioner? An obstetrician? A genetic counselor? A family physician? You know, what is the profession of the person providing

genetic counseling?

Genetic testing. The laboratory direction is extremely important. Pathologist, Ph.D. or M.D. geneticist, the staff that are involved. This is a little more defined.

Another important phase of genetic services right now is diagnosis and risk assessment, and then management plans. We don't have curative therapy for many genetic conditions, so management becomes important.

The people who make the diagnosis and help with the risk assessment again are not always physicians. There can be many different professions, and it's changing. We're seeing less focus on genetic conditions in children, such as Down's syndrome. You know, historically, Down's syndrome was an important condition to recognize and to offer treatment for. It didn't need a genetic test to confirm it. I mean, a clinician can identify it, but the management is extremely important and early intervention and looking for system involvement.

Family cancer risk assessment is an emerging area that many professional groups are taking up, and then we've discussed the rare and complex conditions where you need specialty team involvement.

Other services. Sadly, there are not yet a lot of specific therapeutic interventions. As those come available, the market will take them up and it will have an immediate effect on demand for services.

Care coordination. There's an important role for nursing and others. Also, the supportive and rehab therapists. So how far do you define genetic service providers? And then family-related genetics issues and follow-ups is extremely understudied and underprovided at this point, I believe.

What factors really determine who can provide services? What I'd like to say is we're used to thinking about the first and second factor, but I think all of the rest are extremely important. These are some of the areas that our research is looking at. Local market factors, setting and organizational structure. Reimbursement has certainly been discussed. Interprofessional collaboration. The political strength and vision of the profession and advocates and public interest. Advocates can change reimbursement policy.

Specifically, our study looks at the way genetic services are now delivered across the country. We want to describe models. We'd like to look at how it's organized, who staffs it, and how it differs, identify factors driving change, and establish a foundation for further services research to inform educators, policymakers, and professionals.

Some of our research studies specific professions as entities. We've conducted a study, and I'll show you some of the data, of the medical geneticists, which are M.D. and Ph.D. board-certified geneticists.

The National Society of Genetic Counselors conducts biennial surveys of their members, and Robin is going to present some of that information this afternoon, extremely important time/time data available.

Very little research done on nurses in genetics and, as was mentioned yesterday, this will be one of the key groups that we look at, but we'll look at a very tiny group of nurses. Nurses who are in ISONG, who are self-identified nurses, in the U.S. maybe number 300 who provide research, education, services, and policy service as well.

We will also look at primary physicians, and we've not been funded to look at medical specialists and subspecialists, although I think this is important, as are looking at other professional groups.

The first study, and I'll try to just go extremely briefly, looked at the medical geneticists. These are Ph.D. and M.D. certified physicians, certified specialists. The bottom line, very small numbers, somewhere between 900 and perhaps 1,000 active board-certified geneticists practicing in the U.S.

Five-hundred or so are Ph.D.s. Many of the M.D.s, a quarter of the M.D.s almost, in addition have a Ph.D. Fifty percent women. Mean age 52. Few members of minority groups. Highly educated. The M.D.s, the first level of training is pediatrics, much less internal medicine and OB and pathology. Then the laboratory genetics, these are the three subspecialties of laboratory genetics.

We looked at the aggregate time that this workforce indicates they spent with various efforts, and I think that one of the most telling numbers there is patient care. You see the M.D. geneticists, 43 percent of the time aggregate of the M.D. geneticists is in patient care. The rest is in other activities. That's their service function, their patient service, whereas Ph.D.s, the equivalent would tend to be clinical lab time. So the M.D.s spend about 50 percent of their time in clinical patient care or lab and the Ph.D.s also about 50 percent. The other 50 percent is spent in other activities.

Where do people work? This helps explain why we see the time spread the way it is. The M.D. geneticists are not M.D.s working in a private practice office, where 80 to 90 percent would be patient care. They tend to work in academic health centers, where they have many roles that they're required to play, or they work in lesser amounts in laboratories and practice in other areas.

When we look at just the geneticists who say that they provide patient care, we see their patient mix, which is the first three boxes, for all M.D. geneticists -- and we also looked at this 70+ percent that are pediatrics-trained geneticists, and then the internal medicine and OB geneticists, because we thought there would be differences, and there are -- about 74 percent of the care that's provided in aggregate is with children and infants and 11 percent with reproductive. That's the history. The history of genetic services has been with children and reproductive areas. Adults is a fast-growing area.

Waiting time. If you're concerned about shortage right now, you look at issues of waiting time to see new patients. Fifty percent can see a new patient within a month. Several of that can see them within two weeks. I don't know how to interpret that. We can look at this further to tease it out by location, by setting, by other things.

The most striking number on this chart to me is the number of new patient visits per year, 240. Robin will give data on genetic counselor visits per year, which was about 350 and has gone up quite substantially. You can do the math to figure out about how many new patients are seen by geneticists. Some of those new patients are also the patients seen by genetic counselors, so you can't sort of add those together to get how many new patients.

So we have a professional group that is small and has limited patient care time. The majority are pediatrics-trained who provide direct, hands-on patient care services. Their productivity is very low and, from a workforce perspective, that's a concern.

They are time-intensive visits, 75 minutes for a new patient. You know, you hear the 10 minutes per patient, maybe 20 minutes to 30 minutes for a new patient for a family practitioner or an internist. So there is potential there for efficiency gains.

To compare numbers, these are board-certified. About two-thirds of the physicians in the U.S. have at least one board certification. All physicians, and this is AMA data, in 2001 numbered over 800,000 and 560,000 were board-certified. So you can see the numbers there, 97,000. Again, for geneticists, active board-certified, we're using maybe 1,000 M.D. geneticists.

The second part of our study, which we really feel is the core study, is looking at what is going on now in delivering genetic services in several areas. It doesn't matter who is providing the services. That's what we're trying to find out. The methodology that we use is based on a really well-grounded research that also uses survey research and in-depth case study of representative communities in the U.S.

This project is called the Community Tracking Study, CTS. It is sponsored by the Center for Health Systems Change. This is a group that's based in Washington, D.C. and has been entirely funded by the Robert Wood Johnson Foundation, over \$100 million in the last eight years, an extremely important group that grew out of the failed Clinton reform plan when leaders of health services research said we need timely information to look at how health care is changing across the country. We think it's changing in different ways in different communities because of the history of providing health care, the strengths of insurance companies or managed care, and other factors, and we'd like to study that.

So they study it with survey research in 60 communities and they select 12, three from each region of the country, where they do in-depth case studies with interviews of people principally from physician groups, hospitals, managed care, health insurance plans, public sector, sort of the safety net providers, state Medicaid programs, community health centers, and others.

They report. Their website is extremely useful. They make their survey data and this data publicly available. They report. They have done these in-depth case studies since 1995-96, so they're in their fourth series of interviewing originally 40 people, now 90 to 100 people, in each of these communities and writing up these interviews, so they can look across communities, they can look across time, and they can see what's changing and why it's changing, some of the underlying factors. We've modeled our research after that.

We think that genetic services is grounded in overall health care organization, finances, and policies. We think that genetic services is a specialty service that's going to infiltrate across, but the way it develops is going to be based on it is one of many types of health services.

What's special about it are some very significant issues. It crosses all population groups. The genetic technology advances and clinical applications are potentially paradigm changing in the way we think about health, disease, health promotion, managing conditions, diagnosing conditions, but professional practice and a varied adoption of the genetic framework is what is evident now. Consumer awareness and interest, as you've discussed, is varied, and we think local health market factors are extremely important to study. So that's what we've looked at.

We've conducted at this point about 100 interviews, and some of them have been national to get a perspective. The four communities that we are focusing on, based on sort of a random selection of the 12, are Cleveland, Miami, Orange County, California, and Boston. We've done most of our interview work so far in Cleveland and in Miami, and we see differences in the way genetic services are organized for a variety of reasons. Certainly, across all communities, new genetic tests affect things.

Individual leadership and institutional vision makes a huge difference. Sitting at the table is someone who gave that leadership and institutional vision to Cleveland, and he moved and there's a big hole there, and Duke and North Carolina are doing some exciting things.

We've seen that in other places. Someone has moved into Miami to bring sort of a new vision to genetic services. Genetic services in Miami have been underdeveloped, and I think Skip Elsis is going to make an impact there. It's still a little bit early.

Geneticist roles. To me, as a workforce researcher, it was a little weird to hear pediatricians counseling on adult breast risk assessment. These are pediatric geneticists, but it kind of goes against the conventional, very much silo-organized, that breast cancer assessment would be done by an oncologist of some sort or an internist or a family practitioner. A pediatrician was a bit of a stretch, but pediatric geneticists have stepped up to that and certainly genetic counselors have stepped up to that, the change that's happening.

But the other thing that we're beginning to see within the geneticist community is genetics is complex and they are subspecializing in specific conditions, and that's a very important issue. You lose boundaries to some extent. Are they the expert for the country, for the region, or for the condition? I think that's an interesting observation we'd like to learn more about.

Laboratory competition. Clinical genetics laboratories, to a great extent, started out in academic health centers and they fund some of the genetic counseling work and other provider work that's done. They have the potential and have been revenue generators for genetics programs in academic health centers.

That revenue is going to commercial genetics laboratories. It's a market factor. Large commercial, large national or regional genetics labs, can cost-compete with academic health centers, and particularly when there is managed care contracting involved, they can direct, and people literally overnight can lose half of their laboratory test volume if a contract happens that shifts things one way or another. So I think that's been an extremely important issue for academic health centers and has undermined some of the limited funding that was there for clinical genetic services sort of fund sharing.

The other thing is genetic services is an outpatient service to a great extent. There's work done in the newborn nursery and other things, but you sort of look at hospital services or outpatient, and it's heavily in the outpatient arena.

It's a cognitive service. It gathers information and shares information. It doesn't have high cost and high revenue-bringing-in procedures, except the testing, which is gone, which is leaving now. So it gets low reimbursement, and that's a real issue.

Safety net funding and services, just from looking at a couple of states, are there. I think that needs to be looked at more, but I think some of the funding that's happened from a variety of different federal agencies have helped bring genetic services through regional programs that are organized within states to have geneticists actually go out and see patients, and there is some telehealth happening, but other things. That becomes very vulnerable when Medicaid programs and other state budget cuts happen, as are happening now. So I think that's going to be changing.

Lab tech and biotech strategy models are out there and interesting. We don't have enough to say about it.

We're struck with the interviews that we've done how genetic counselors play such an important role in providing services, how they're flexible and take on and create jobs, but the market challenges, particularly for reimbursement, are there. Some programs laid off genetic counselors eight years ago and have not hired them back yet.

Most services still relate to counseling, testing, and test interpretation. There are small numbers of genetic specialists. The people out in the field -- so far, very preliminary -- aren't saying that's a problem quite yet.

A mixed forecast from the people we've talked with about the timeline for therapeutics.

A restrictive market. We're seeing some interesting market responses. With procedures such as amniocentesis for prenatal diagnosis, money is to be made and there are freestanding diagnostic prenatal centers opening up.

It's my understanding that obstetrics and gynecology physicians tended to be one of the groups that went for genetics training. They compose about 10 percent of our sample now. What we're hearing is that maternal/fetal medicine or perinatology, the specialty of obstetrics that deals with high-risk pregnancies, has taken the genetics piece into their practice. So in many ways, it's a positive thing. It's been integrated into the subspecialty of obstetrics practice.

So those OBs are not getting genetics training now, which means some people would say there's less specialization and in-depth work, but the specialty has taken it and they have a procedure to do and they manage high risk. They have an important procedure to do that pays better. So there's a very dynamic happening now with OB and genetics.

We've not tended to find from the people that we've spoken to much of a big picture view or expectation so far. They're dealing with their issue, their practice, their institution.

Future research recommendations, kind of quick thinking to put a few things on the table.

At the policy level, the Institute of Medicine does studies when it is asked to do studies and when they're funded to do studies, and I think that they could be asked to help study the issue of genetic services broadly, along the lines of what they did with the primary care model. There are important questions that could be answered and would need in-depth study of the sort that they're able to do.

You've heard about the federal agencies, so I'll skip over that. Some are involved. Some are not.

Priority workforce-specific research, and I tend to shy away from specific research, but there is a void of information that I think we need to fill.

Some sort of assessment of supply and demand for clinical geneticists, M.D. geneticists, Ph.D. geneticists, and genetic counselors I think is needed.

As I think about the specialist professions in any area, we need specialists. This will be an important area for specialization and the market doesn't seem to be working right now. The number of new applicants, physicians in training going into clinical genetics fellowships or residencies, is very small. The number that sat for the last board exam, which is only offered every three years for M.D.s, was 69. So that's 20 new M.D.s certified. Now, people don't have to sit for that, but that's a strikingly low number.

You have geneticists reaching retirement age. It's a little hard to assess the demand right now. We can't do it from the work that we've done, but my sense is that this is such a complex area -- like cardiology, intensive cardiology, tough, complex patients -- there's no doubt we need cardiologists. All internists, all family medicine physicians, do cardiology with what they do, but for tough cases for training the future professions, for many, many reasons we need a substantial number of cardiologists. The market has helped fill that because it's a very lucrative specialty, it's procedure-oriented, it's respected, hospitals like cardiologists and cardiac surgeons, whatever.

That has not been the case for geneticists, but this is complex stuff that I think we need a cadre of people going into and serving that specialist role. The same for genetic counselors and the same probably for nurses in genetics. I put that down as sort of a second level, but I think that's probably because we haven't studied it enough.

The fact that has been unrecognized that I've seen so far is that genetics is being taken up by medical specialists and medical subspecialists. Oncologists are the most notable example. That's part of their practice. When I was a medical oncologist, back then the black box was, 25 years ago, you have a strong family history of breast cancer. Wow, you have a really strong family history of breast cancer. We have to watch you carefully.

That was about all we could offer. Now, we're beginning to be able to offer a little bit more risk assessment and management thinking, at least, there.

The same with neurology. We're seeing talk about neurogeneticists within practices or within academic medical centers, people trained as neurologists who have an interest in looking at the genetics association. I think that area needs to be studied more.

Nursing, I think it's particularly that advanced practice or advanced training nurse who's a specialist in oncology. The Oncology Nursing Society has nurses who have a special interest in nursing and oncology, and that nursing group has 29,000 members. ISONG has about 300 members in the states. The ONS special interest group in genetics is 100 now, and we don't know about all the other subspecialties of nursing where this could be very important and has to be looked at.

I think we have to look a lot more. I talked with the people from the CDC yesterday about public health genetic services providers, genetic epidemiologists and others. There are therapists who help manage patients. Pharmacists will become more involved and are not yet greatly involved. So I think there's a lot of important workforce research to do, but I would frame it as a type of health services research, not solely workforce research.

These are my colleagues from universities across the country. Five of the six HRSA-funded Workforce Centers are very much involved with our project and HRSA just funded a very exciting project at the University of Texas Health Science Center in San Antonio to look at the access and providers of genetic services in the Texas-Mexico border area, which is an extremely important group.

Thank you very much.