RECORD OF SOCIETY OF ACTUARIES
1991 VOL. 17 NO. 4A

NEW TECHNOLOGIES IN UNDERWRITING

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- Genetic testing
- AIDS -- Update and alternative testing technologies
- Legal implications?

MR. GERALD KOPEL: One of our two panelists is Hank George, Vice President of Home Office Reference Lab (HORL), the world's largest insurance testing lab. Our other panelist is Dr. Robert Pokorski, Vice President of Medical Research at North American Reassurance Company, who will be our first speaker.

DR. ROBERT J. POKORSKI: Recently at an Association of Life Insurance Medical Directors of America (ALIMDA) meeting, Hank George made a presentation. He was talking about some aspects of medicine that were applicable to the medical directors in attendance. And on the same platform was David Holland, who I'm sure is very well-known to all of you. We are having a great deal of sharing between our two organizations.

For the first part of my talk I'm going to do an easy introduction into some of the basic sciences. It'll be fairly straightforward. Then I want to talk about legislative and industry concerns in the genetic testing arena.

There was a previously held concept that those people who had genetic diseases were unusual, strange looking or maybe institutionalized. And if you look to the left and right of you, you may see some people whom you think ought to have a genetic test themselves! It's said that we all have some genetic skeletons in our closet. And if we just happened to marry someone else who has these same genetic characteristics, we may have an offspring who has a very serious problem. In the future, we're all going to have genetic tests performed, even though we think we're very normal and very typical people. It'll become standard practice.

Here's a case I presented to ALIMDA. As actuaries, put yourself in this position as well. Suppose you were sent the biggest case you were going to see all year. It was for $10 million of life insurance, and $15,000 per month of disability income. The applicant is a 30-year-old male in great health. You can see the case will sail through and maybe make your business for the whole year. Then you find out the family history is problematic because the father of this applicant died of Huntington's disease. So you shuffle off to the medical library and find out that half of these

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people are going to have Huntington's disease as well. They will develop this terrible disease at age 40 and die 10 years thereafter. If this individual was insured and he was the unlucky one, there would be a devastating experience in your claims at some time in the future. Fortunately the agent comes to your rescue (as they so often do). He says, "Don't worry. This individual had the Huntington's disease genetic test performed. It was negative. And by the way, I need preferred standard to place the case." I'm not sure this has occurred yet, but it certainly will occur in the future. This test could be done now. This could happen any day now.

As the actuary, you say to yourself, "What am I going to do?" Here are some of your options. First, you can say, "I'll take the case preferred standard because after all, the test was negative." Second, you might try, "I will decline it since I don't understand the medicine and the individual may still get Huntington's Chorea." But this probably won't work here because maybe the wife or the husband of the agent plays bridge with your CEO, and there's too much pressure to take the case. Third, you can rate it Table D for "don't know." I'm not even sure the actuaries know that we do this in the underwriting and medical arenas. Maybe I shouldn't have let that out? Option number four, my favorite, is send the case to the reinsurer. Isn't that what reinsurers are in the business for? But they may or may not know what to do either. Finally, the least appealing option is, you're going to have to learn about what genetic testing really means.

Things can be devastating or reassuring when you receive genetic news. Consider two individuals. One person is delighted about how well things are going since he's had his genetic test. It was negative and it shows he's going to have wonderful longevity and probably die after being hit by a car at the age of 100. And then there's the other individual. Yesterday he was healthy. He felt great. He was on top of the world. He had a wonderful job. Now he's learned that in 10, 15 or 20 years he's going to come down with some horrible genetic disease, or at least it's very likely that he'll come down with it. So he's just devastated. This is intended to point out that doing genetic tests is not business as usual. It's not similar to other tests that we traditionally perform. When certain genetic tests are done, people are going to find out that maybe they have to worry about future offspring, or maybe they've had offspring and now they're saying, "Has this same disease passed on to my children already and I didn't even know about it?" They're going to say, "Is this going to affect my career because I'm in competition for a very important job with someone else and he or she doesn't have this terrible genetic risk factor that I do? Would my bosses promote me if they knew what was likely to happen in the future?" Insurance concerns are of paramount importance. All kinds of medical concerns are as well. When you do these tests, it's not business as usual.

There are two types of genetic disorders: genetic diseases and genetic predispositions. In the first type, the genetic diseases, the genetic component is so strong that it's going to affect the individuals regardless of what they try to do to avoid it. They can jog, stop smoking, and watch their cholesterol. They can get attending physician's check-ups very frequently. But they're going to get the disease. It's almost certain. Environment doesn't play much of a role in these types of disorders. Fortunately, they are, by and large, unusual disorders such as cystic fibrosis, polycystic kidney disease, hemophilia, and Duchenne's muscular dystrophy. They're not

common conditions, but if you would add them all together, they still add up to a significant concern with respect to morbidity and mortality in our claim experience.

With respect to these disorders, it's unlikely that insurers would ever consider ordering these tests, at least for a decade or more. The diseases are so rare it would cost more money to try to ferret them out than we would save by identifying these individuals. So I don't envision that we will be ordering these tests. Yet, we would like to know about this information if the tests had been performed by attending physicians and the individuals are applying for insurance.

The second group is completely different. These are the disorders with a genetic predisposition. They may or may not occur depending upon a lot of factors. Some are within our control, some are not. Environment is one factor. These diseases tend to be multigenetic, meaning that multiple genes interact, and depending on how they interact, you may or may not develop the disease. These are big ticket items from our perspective: coronary heart disease, atherosclerosis, stroke, hypertension, diabetes, epilepsy, cancer. They are the primary causes of morbidity and mortality. These individuals often have some control regarding whether or not they develop the disorder. For example, if you had a predisposition to cancer (these tests are not available yet), you may never get the disease if you do something as simple as just not smoking cigarettes. It is conceivable that insurance companies may want to order these tests sometime in the future. And I usually qualify this by saying "distant future" because we certainly don't want to give the impression that we are interested in ordering these tests now or soon. There are critics of the insurance industry who are very concerned that we will use these tests to unfairly discriminate against applicants. But in the year 2000, some think that it will be standard medical practice to order panels of these tests. I'm not sure 2000 is the year when this will appear. But it's certainly going to be within our working careers.

I'd like to spend a few minutes on a very quick overview of some of the basic science that's involved. It's worth trying to come up to speed on the vernacular because you're going to open your daily newspaper and see articles that talk about deoxyribonucleic acid (DNA) chromosomes and genes. It will be the common vernacular of society.

The structures we're going to be talking about are the genes that are located inside the nucleus, which, in turn, is found within the center of the cell. Proteins are manufactured in other parts of the cell. Chromosomes are found inside the nucleus. They are spindle-shaped structures. The genes are located along these chromosomes. Scientists are now looking at the individual genes and trying to determine their exact chemical sequences.

Amino acids are small molecules comprised of atoms of carbon, hydrogen, oxygen, sulphur and nitrogen. They're the basic building blocks. We have 20 different amino acids within our bodies. When you hook them together you build proteins. Proteins become enzymes, energy sources and structural materials. So much of what we're going to be talking about is how genes make new proteins.

Next, there are nucleotides. These are small molecules made from three basic materials: a sugar, either ribose or deoxyribose; a phosphate group; and an organic

base. If you hook three billion nucleotides together you have our genetic material, DNA. The other important structure is ribonucleic acid (RNA). Ribonucleic acid acts under the direction of DNA. DNA exists in a shape known as a double helix, which looks like a ladder where you've held one of the supports steady and given the other one a strong twist.

Not all DNA is genetic material. Some of it's extraneous. We have about 100,000 genes, and this represents only 5-10% of our DNA. The rest have probably developed and been discarded as we evolved. Each gene is several hundred to several thousand nucleotides long. The biggest discovered to date is the gene for muscular dystrophy. It's about two million bases long.

The term *genome* refers to the complete compliment of our genetic material. There's a big effort under way in the United States, Canada and worldwide to sequence all of this information. Scientists are going to try to put all of these three billion bases in their proper order. As an analogy, this is like trying to shake hands with everyone on the earth.

The United States government is committed to spending $3 billion on this project over the next 15 years. It will be directed by the National Institutes of Health (NIH) and the Department of Energy. As genes are discovered, people are going to realize that there are insurance concerns with each discovery. For instance, when the gene for cystic fibrosis was discovered, people asked about insurance problems. You saw the same thing when the gene for neurofibromatosis was found. As these genes are discovered, people immediately asked, "Are these people going to be able to get health and life insurance?"

Here's a very simple overview of genes work. Suppose tonight you're being entertained and heaven forbid you drink too much! I think it's unlikely. Nonetheless, you're coming back to the hotel, fall down and break a leg. Well, I can't speak for the rest of you, but it's been a long time since I was 18 and still making new bone! To repair the fracture, you must activate a gene that hasn't functioned in this capacity for several decades. In this scenario, you give a signal to the gene that is responsible for making new bone, and that gene becomes activated.

The gene for new bone formation conveys this chemical signal to messenger RNA, which carries this genetic information into the outer parts of the cell to make bone protein. The chromosomes contain three billion bases. Part of one chromosome begins to unravel, but only the gene for a new bone is going to be activated. The DNA unwinds. As you recall, DNA is double stranded. The gene for new bone becomes activated on one of the two DNA strands, and conveys this information chemically to messenger RNA. Messenger RNA now leaves the nucleus and goes into the outer parts of the cell, where it starts to recruit all the necessary amino acids. The chemical code is a three-digit code which mandates that one and only one of the 20 amino acids can fit in that location. Each new amino acid is dropped into place in the newly constructed protein. After this has occurred, your DNA ravels up again. So you see it's very simple. Chromosomes unwind. The DNA information is transferred to RNA, and RNA makes new protein.

According to Mark Guyer of the NIH Human Genome Office, people may eventually have access to a computer readout of their own genome, with an interpretation of their genetic strengths and weaknesses. This is not a wild dream at all. I don't have to tell this group that this could be of great interest to us when this becomes standard medical practice.

Now I want to overview some of the more practical issues we face. I have four points. One is industry activities. The second is legislative concerns. The third is problems with information access. And the fourth concerns specific problematic areas. With respect to industry activities, we have been very active to date. In 1988, we recognized that there were going to be problems in the future with information access, public relations and governmental relations. The Medical Section of the American Council of Life Insurance (ACLI) formed a genetic testing committee. This group submitted a report on June 10, 1989. It's a very good overview of this subject, called "The Potential Role of Genetic Testing and Risk Classification." You can get it from the ACLI. It has been sent to all member companies already.

Because of this and other concerns, a joint ACLI/Health Insurance Association of America (HIAA) CEO-level task force has been studying these issues. This task force has working groups as well dealing with the different legislative and privacy issues. I believe their report will be released in 1991. It's a preliminary statement of how the industry plans to react to many of these issues. I haven't seen the finalized report, but I understand that it will address items such as our concerns with risk classification, fears that this information may be used to antiselect against us, the need to safeguard confidentiality, and privacy. I believe that it will also advocate an active industry role in these discussions, since we can't really sit back and let people talk about insurance without standing up and speaking our minds.

With respect to some legislative concerns, I'm going to talk about two different areas: state legislation and federal legislation. I will be the first to say that I'm not an expert on this subject. If you want such advice, talk to your own counsel or the ACLI. But let me overview what I think is going on to date. There aren't many laws dealing with specific genetic disorders. A smattering of states have laws dealing with cystic fibrosis, sickle cell anemia, PKU.

Two states, Montana and Arizona, have passed broader genetic testing laws. A third state, California, is on the verge of passing a law as well. In Montana and Arizona the law reads: "Insurers are prohibited from unfair discrimination unless the applicant's medical condition and history, and either claims experience or actuarial projections establish that substantial differences in claims are likely to result from the genetic characteristic." In other words, the law is saying that we can't underwrite these disorders unless we use sound actuarial principles. This seems to be something that we can live with.

Now the legislation in California, House Bill 1888, is much more restrictive. It may have already been signed by Governor Peter Wilson. It's on his desk. Life and disability insurance products are completely exempted. However, it drastically affects the health insurance industry in both group and disability underwriting. An eight-year moratorium has been placed on insurer use of information that is gleaned from genetic

tests. It basically states that health insurers cannot use information dealing with unfavorable genetic characteristics until the year 2000. It is thought that we can carry on our standard practices for health insurance. For example, we can continue to use information from application forms dealing with family history and other traditional risk selection practices. But if an asymptomatic applicant with an abnormal genetic test would want health insurance, you cannot use that information in your underwriting. Needless to say, there was a hard fight waged by all of the trade associations to prevent this, but this was the best compromise that we could find. This type of legislation is very important because it may be adopted by other states. I'm sure those of you who have followed AIDS know exactly what happened after California's AIDS testing law. There was renewed interest in similar legislation by other states and insurance commissioners. I want to read a quote from *Nature Magazine*, September 5, 1991, from Steven Brown of the Council of State Governments. He expects many states "will regulate the use of genetic information over the next few years. It's likely that the California bill will be watched carefully by other states." I'm not sure everyone is going to follow California, but there will be renewed interest in this topic.

Let me move on to the federal level. I'd like to read a quote from *USA Today*, October 18, 1991, from the front page of the Living Section. The headline reads, "Ethics of Genetic Screening Debated": Congress must begin enacting laws to prevent employers and others from possibly discriminating against people who carry genes for inherited diseases. "People may be unable to obtain jobs and insurance because of the stigma of having undesirable genes," said Representative Robert Wise, Jr., Democrat from West Virginia, at the Congress' first ever hearing on ethics in gene research "As knowledge grows, so does the potential for bias."

So you can see there is a definite interest in genetics at the federal level. It's my understanding that there is no current legislation now that affects insurer's use of genetic information. The "Americans with Disabilities Act" has passed, but insurers must simply use genetic information in accordance with their other risk selection practices.

Let me now comment on some of the problems with information access. I foresee three or four different concerns. The first has already occurred in California (if HB1888 passes). This is the worst possible scenario where a state rules that insurers cannot use any genetic test information in their underwriting. The second possible scenario exists if laws are enacted saying that insurers could not order genetic tests to evaluate risks. Right now, it's a moot point because there aren't any tests available even if we wanted to order them. But genetic testing by attending physicians is going to be the standard of medical care in the future. As a third point, informed consent and confidentiality will be very important regulatory issues. States are going to have different ways of approaching this. Some will just stipulate that general informed consent is needed. Others will mandate use of a specific informed consent form. Next there will be varying laws throughout the country dealing with confidentiality. Some states may say that, if you order tests, then you will have to provide counseling as well. This could be problematic because counseling is expensive. But as I said, I don't anticipate insurers will be doing any of these tests for the next decade or so. And the final point regarding information access is that it will become commonplace for attending physicians and applicants to misrepresent

regarding prior medical history. In fact, this is already very common. It's flaunted in the medical and lay press, and people are openly advised in public forums to not tell their insurance companies that they've had these tests performed. One physician is quoted in *Medical World News*, January 1991, saying, "I believe this [not sharing information with the insurance company] is a relatively widespread practice in clinical genetics. Rather than trying to purchase a $250,000 life insurance policy they [his patients] buy 10 $25,000 policies which don't get scrutinized as closely." This is in a medical journal. Physicians are openly advising their patients not to tell the insurance companies that they've had a genetic test because they know it's going to be years or decades before anything deleterious actually happens. One of the biggest genetic societies in the world, the American Society of Human Genetics, has an ethics subcommittee. The Chairman of the ACLI Medical Section Genetic Testing Committee, Dr. Sandy Lowden, was asked whether or not the American Society of Human Genetics should recommend to anyone getting genetic tests that they first get their insurance coverage and then go out and have their genetic tests performed!

My final major point regards areas of specific concern. The medical directors in your companies are the best sources of information about genetics. We've had enough information exchange within our medical director organizations that it's very likely that they have some expertise on this subject. You need to consult them to bring you, the underwriters, and your public relations people up to speed. So use your medical director as a good source of information.

Next, risk classification is going to be even more vulnerable and under more attack. I think we're all getting tired of hearing this. It's the same old argument that "it's unfair discrimination if it's not one's fault." There's a real move to prohibit insurers from using genetic information because it's something that's not within one's control. It's okay if you underwrite a smoking risk because you can choose to smoke or not smoke.

Here's a quote from Larry Gostin. He's written an article in the *American Journal of Law and Medicine* (1991), called "Genetic Discrimination: The Use of Genetically Based Diagnostic and Prognostic Tests by Employers and Insurers." He's talking specifically about the Americans with Disabilities Act, but reflecting a common belief of some people:

> If the insurance industry is regarded strictly as a business, it is difficult to question the ability to discriminate on the basis of sound actuarial data. If, on the other hand, the health insurance industry [he is talking only about health insurance in this article] is viewed as an instrument of social policy, then the ADA's exemption of underwriting becomes worrisome. Ultimately a political choice will have to be made by Congress as to whether insurers and self-insurers are merely businesses or facilitators of wider social goals.

I will close with a final brief point as a lead-in for Mr. Hank George's presentation. It regards certain laboratory issues. In the whole country, in fact, in the whole world, we're being driven (I think prematurely) to use these tests. The money to be made by industries other than insurance is just phenomenal. People say there's going to be a brand new billion dollar industry in a few years that doesn't exist right now. My

comments regard clinical laboratories. Manufacturers can do some of these tests cheaply. So they work with clinical laboratories, and both operations can make a great deal of money. They approach physicians and say, "You need to start ordering these tests." I have heard of literature inferring that if a physician doesn't order genetic tests for cystic fibrosis and something adverse happens, he or she could be liable! There's a premature push to use this information. Doctors aren't ready! Society is not ready! People don't know anything about genetics or probability! But we're all being pushed along, and through the clinical world, it's going to get into insurance as well.

There's a real feeling that genetic information is infallible, highly accurate, and highly predictive. There's nothing farther from the truth. Genetic tests are like any other test. There are going to be false positives and other problems. Let me run through a quick scenario. Suppose a 40-year-old male applies for life insurance, a genetic test has been performed, and it's positive. It's a test for cancer. Now let's suppose you had to make the decision. First, you're going to say, "Well, the test is positive. Is it a true positive or a false positive?" Let's imagine somehow you get over that hurdle. You research the subject and find out that, of all the people who have a positive test, only 20% of them are actually going to get cancer and the average age of onset of the disease will be 60. So 20 years in the future there is a 20% chance of cancer. You complicate the scenario even more by saying there's a five-year survival of 50%. But there's a huge spectrum. Some are going to be cured, some are going to die immediately. But these are 1991 figures. In 20 years, there's going to be early detection and better treatment. So the individual really has a lot lower chance of dying from this cancer in the future. If you had an attending physician's report showing that this test had been done, what do you do? You can see the complexity of these issues. So with that introduction to laboratory issues, I'll turn the program over to Hank.

MR. HENRY C. GEORGE: It's terrifying, but someone has probably worked out the math while you were talking.

I'm President of the Home Office Life Underwriter's Association, (HOLUA). I am also the editor in chief of *On The Risk*. I'm sure a lot of you in this audience do not see our journal. It's about 80 pages long. It's a quarterly. It has a potpourri of topics on medical underwriting, financial underwriting, underwriter/agent interface, mortality studies, and so on. The journal is extremely inexpensive, something like $15 a year to subscribe. And if anyone in this audience has never seen *On The Risk* and would like to see it, if you'll give me a business card and write "OTR" on that card, I will send you the next copy of our journal with our compliments. We have about 200 actuary subscribers. We'd like five times that number.

Health habits and underwriting is the topic I have chosen to talk about. This was originally conceived to be a presentation about alternative testing modalities for HIV. And I will spend a fraction of my time talking about urine and saliva HIV tests and telling you the good news and the bad news. In the United States at present, the use of urine and saliva HIV tests is on hold. The Food & Drug Administration is currently evaluating these tests. It has the data. So at this moment, my company is not doing urine and saliva HIV testing in the United States. As I understand, it is being done in Canada.

I do want to tell you just a little bit about saliva testing as an introduction to the methodology and to the science because, as you'll see from some of my citations, there are a lot of people in clinical chemistry who believe that the collecting of this bodily fluid will be a dominant part of lab testing by the 21st century.

First of all, the test is not saliva. The test modality that we're talking about does not use saliva as you normally think of it. In fact, we call it "mucosal transudate." You knew this would get scientific sooner or later, right? Mucosal transudate is a fluid rich in immunoglobulins, which is most easily accessed by stimulating the gum line. So the fluid we collect technically is not saliva. I will refer to it as saliva because after all, everybody knows what saliva is and can differentiate it quite readily from fluids of other colors. But the collection of the saliva sample is done with a toothbrush-like device which is used to stimulate the lower gum line. And you stimulate the gum line by rubbing the little device back and forth, and that causes the mucosal transudate to be elaborated. It's picked up on the pad. The pad goes in a bottle. The stick is broken off, and the bottle is sent to Johnson County, Kansas, the Bodily Fluids Capital of America! And it is analyzed. So the collection methodology is extremely easy.

In the late years of the 20th century and into the 21st century, "saliva" will be a larger and larger fraction of total laboratory testing. When you think about it, it is a fairly easy method. We don't have the problem of venipuncture. It's user-friendly, if you will. And collection can be observed, so no substitutions!

These are the three things for which we have the technology to test saliva at this writing. First, we can do HIV testing. All of the studies that I have seen, clinical studies done at different facilities, matching saliva to blood have had 100% concordance between the HIV test protocol on blood and the HIV protocol on saliva. There may be studies I have not seen, but all the ones that I have seen have been perfect, in terms of saliva's reliability for HIV testing.

Second, we also have the capacity to test for metabolites of cocaine. Cocaine testing for life and disability insurance is fairly universal in the North American industry. Finally, we also have the technology to detect that amnestic state certain insurance applicants develop when asked by an agent, "Do you smoke?" or more correctly, "You don't smoke, do you?" Which is the phraseology often used. The smoking test measures cotinine. When you smoke tobacco or put tobacco in some bodily orifice, eventually the tobacco's nicotine is metabolized into a psychoactively inert chemical called cotinine, which stays in the body much longer than does nicotine. So testing in insurance is not a nicotine test. It's a cotinine test and the cotinine test can be done on the saliva sample as readily as it can be done on the urine sample.

So all of these three things (and I would hesitate to guess some other tests as well, once saliva testing is approved) will be accessible to us, which is why saliva-based testing is so alluring. The results are reliable, and it's user-friendly. We don't have the problems that we have with blood collection because there's no venipuncture or fingerstick. We don't have the problem with urine collection; obviously observed urine collection is not possible. So you never really know whose urine it is. With saliva, you can observe the collection -- even the most modest people will allow you to watch them brush their teeth. And it is extremely cost effective because collection is

so inexpensive. And finally, it is agent collectable. That, of course, greatly reduces the unit cost of the testing process.

That's all I intend to say about saliva. I'm not even going to talk about urine HIV testing unless you have a specific question about it.

Now let me turn to health habits and underwriting, which I used to call "Lifestyle Underwriting." Some people read in the word *lifestyle* the possibility that one might extend the concept to include, for example, sexual orientation, which it does not. What we do mean is, for example, people who freebase cocaine, who abuse alcohol, who do other drugs and who have an unhealthy lifestyle which should be considered when they seek insurance.

My theme will be that lifestyle is a desirable approach to risk appraisal and will become increasingly popular as the century winds down. It wasn't me that invented this idea. Robin Leckie, then Chief Actuary for Manufacturers Life, said to the 1980 meeting of the Canadian Life Insurance Medical Officers Association, "Lifestyle factors should be given more consideration in the underwriting process." Eleven years later, Robin has turned out to be a very accurate forecaster of reality.

Quoting another famous actuary, Ian Rolland said, at the HOLUA's meeting in 1990, "People don't want to pay more for insurance for factors beyond their control." You'll see this from the ACLI's annual survey called the Monitoring of the Attitudes of the Public (MAP). The ACLI asks a cross-section of insurance buyers, "Do you like your agent? What do you think of universal life? Do you think it is fair for nonsmokers to pay less for life insurance?" Two out of three respondents to the surveys think it is fair to smoker/nonsmoker differentiate in terms of premiums. That just happens to be about the number of people who don't smoke. But when you compare this answer, for example, to the answer the ACLI gets when it asks if it is fair for a man who's had a heart attack to be charged more for insurance, you get a majority of respondents saying, "No!" I think what you see here is that the public accepts underwriting based on voluntary, health habit decisions.

We have the technology to solve the problem. We can increasingly orient ourselves to health habit, or "lifestyle," if you'll forgive the term, underwriting. Take, for example, tobacco. We mentioned cotinine. We have the ability to detect individuals who consume tobacco products or use tobacco surrogates like nicotine gum. We have the technology to detect those individuals very, very effectively.

Consider individuals who consume large, unhealthy quantities of alcohol. We have the technology to identify those individuals. I have probably spoken and written more on the subject of the liver enzyme gamma-glutamyl transpeptidase (GGT) than anyone in the insurance industry. That is a test that's been around since the mid-1980s as a screening test to identify individuals who exuberantly consume ethyl alcohol or have sustained bodily damage as a result of long-term abuse of alcohol. There are now some second-generation tests. I'm going to tell you a little bit in a moment about one of them. There is a test called hemoglobin acetaldehyde, or HAA, which is a very specific test for drinking enormous quantities of alcohol. There's another test called carbohydrate-deficient transferrin, which is currently available from several labs. In the area of alcohol abuse, one medical author two years ago in a medical journal called

alcohol "the third leading cause of death in our society." If you add up all the deaths attributable to alcohol, this author said only coronary heart disease and neoplastic disease (cancer) kill more Americans than the effects of alcohol. And we have the technology to find a substantial portion of these alcohol-abusing individuals. We also have drug screening that is state-of-the-art. At the present time, the industry is almost exclusively focused on cocaine, but the technology to screen for everything from heroin and its synthetic analogues to PCP exists.

Now to being overweight. We underwriters currently underwrite obesity by build, which is height in relation to weight, which as my former colleagues from Northwestern Mutual remember from some of our agents, will often lead to the argument, "But my client is a short, muscular guy. It's not fat, it's muscle!" We come back with some snake oil about how the heart doesn't know if it's fat or muscle and you still die, which is not entirely true. In fact, we have technology to really identify that subset of people who have a problem with weight, who are truly at risk. You've heard of android obesity versus gynecoid obesity, characterized by epidemiologists as a difference between apples and pears. Android obesity is that sort of "beer gut" type of distribution of body fat, carried around the waist. It is typically a middle-aged male-type of obesity. This is opposed to gynecoid obesity, where the weight is carried mainly in the buttocks, hips, and thighs. Gynecoid obesity has a much lower association with the cardiovascular problems of being overweight, as compared to android obesity. Well, the waist-to-hip ratio looks like a very effective user-friendly, easy-to-do test to identify that fraction of people who are overweight, who have the android distribution and thus should be rated more severely. We could even do other tests, subscapular skin folds or body mass indices. So we have the technology in the area of obesity to do a very good job for a factor that is largely lifestyle-mediated among North Americans. And, we have the technology through blood lipids to look at people who preferentially live off high fat foods.

Overall, we probably underutilize motor vehicle records. In fact, I'm going to present a paper in November 1991 at a Society seminar in Florida on the subject of impaired risk driving and its consequences because I believe that our industry prices this incorrectly and doesn't take full advantage of what motor vehicle records offer in the way of mortality and morbidity information. And we, of course, have traditional things like inspection reports, and so on. So we have literally a litany of tools to focus on lifestyle decisions if we choose.

A prospective mortality study was done by Kaiser Permanente, by Arthur Klatsky and his coworkers. This study was a 10-year prospective study: 2,500 teetotalers, 2,500 actuaries, 2,500 underwriters and 2,500 general agents were followed for a decade to correlate daily alcohol use with overall mortality, and deaths from myocardial infarction (MI), cancer, and trauma. There are two ways you can read this. The teetotalers were preferentially killed off in huge numbers by MI; 3.3% died of MI over 10 years compared to 2% of the people who drank temperate quantities of alcohol. And a lot of people said, "Does that mean that drinking alcoholic beverages is cardioprotective?" And there is some evidence that, in fact, this may be true. We also have some evidence that doesn't agree with that. But I would say if you looked at the last 10 years, the thrust of the literature, including a very recent paper, is that it is, indeed, true to some extent.

But what I rather would show you is the enormous increase in mortality, doubling if you will, if you compare temperate social drinking to those who drank six or more alcoholic beverages a day. Klatsky and his colleagues were criticized for this study. They said that in the teetotaler group were a number of exalcoholics who had already done irreversible injury to their bodies and now count themselves as abstinent, thus as "zero drinks." So Klatsky redid the study. In the *American Journal of Cardiology* in 1990, the new study had four cohorts, abstainers who were never drinkers, light social drinkers, moderate social drinkers, and people with double vision. And Klatsky followed them. Again there was the same distribution. There was some improvement in the all-cause mortality and substantial improvement in the cardiovascular-relative mortality, as compared to absolute abstention from alcohol. And the very worst mortality is in the heaviest drinkers.

This brings us to a conclusion that the "cut point" for harmful drinking, in terms of long-term health consequences, is around 80 grams of ethanol a day. And for those of you who do not carry metric scales to cocktail lounges, 80 grams is about six drinks. If we had the technology to identify people who were regularly consuming six to eight to ten alcoholic drinks a day, we would be identifying a subset of people who are at substantially increased risk of dying, not to mention becoming disabled or racking up major medical claims. That technology exists and there are several alternatives.

One new test is called hemoglobin acetaldehyde, or HAA. Hemoglobin is a circulating protein, which is in red blood cells. Hemoglobin's function is to transport oxygen from the lungs to the tissues of nonsmokers and carbon monoxide to tissues of smokers. Hemoglobin binds preferentially with certain substances, as do many proteins in the body. One test that's been around for years in clinical medicine and insurance medicine is called glycosylated hemoglobin, a test for diabetic control. The same concept applies here. The hemoglobin molecule attaches to a compound called acetaldehyde. When you drink alcohol, your body uses enzymes that break down the alcohol into a toxic intermediate compound called acetaldehyde, which is further metabolized essentially into water in a multistep process. The acetaldehyde attaches to hemoglobin and you can actually measure in the blood that percentage of human hemoglobin that has acetaldehyde attached to it. We call that test HAA, and it is a very specific test for drinking eight, ten or twelve drinks a day, as opposed to temperate social drinking. So the scientific basis for identifying this population exists and is being refined currently within the insurance community.

According to *Scientific American* back in March 1991, 5.5 million people in the United States are currently addicted to illegal drugs of abuse. That number could be augmented by legal drugs of abuse, barbiturates, and so on, that are also being consumed illegally and/or in inappropriate circumstances. So we have a large group here that we are concerned about. There is a myth among many lay people or people who don't study drug abuse that most of these people are not in the insurance-buying population. One of our client companies a few years ago did a study on this, and you would be surprised at who tests positive for the use of cocaine. It is not whom you would expect. It is diffuse across all segments of our population, as is the use of amphetamines, heroinlike designer drugs, and so on. So, we've got a substantial fraction of this 5.5 million who are buying life insurance products and who can be screened out.

As far as the clinical community's response to health habit testing, I offer you this letter from a Johns Hopkins Ph.D. which appeared in the *Journal of the American Medical Association* two years ago. Dr. Brant said, "We're aware that the insurance industry is based on the concept of differential risk. Tobacco smokers often pay higher life insurance premiums. This discrimination, we would agree, is fair and just." In fact, there was a very nice article in the May 8, 1991 issue of the *Journal of the American Medical Association* called "Cause Specific Mortality Among Physicians With Differing Lifestyles." It looked at doctors trained at USC, which has a cross-section of different groups, as compared to doctors trained at Loma Linda University in California, which is a Seventh Day Adventist Institution, and it matched their mortality prospectively to the general male U.S. population. When you compared the doctors at Loma Linda to the doctors at USC, the doctors at Loma Linda had a 25% lower overall mortality over the period of the study. When you compared those same doctors to the male population of the United States, there was a 56% lower mortality among the Loma Linda group, who are mostly nonsmokers, use little alcohol, use virtually no drugs of abuse, and eat more of the beneficial food groups than does the general population. So for whatever reason, we have good documentation, which is increasing within the clinical community, saying, lifestyle or health habit choices are appropriate fare for mortality assessments.

On the subject of another issue that obviously would have to be addressed if we moved more into a health habit arena is "what about the producers in the field?" Jess Mast, a very widely known and respected underwriting research executive from Lincoln National, a dear friend of mine, in an article in Lincoln's *Reinsurance Reporter* said, "When blood testing limits were introduced or brought down to $100,000, there were agents who said, 'My gosh, you're taking milk out of my children's refrigerator!'" And now, even lower limits have no detrimental impact on production. I attended 40 agent meetings in 1990 all around the world. I questioned the audiences of agents, brokers, and TPAs about their response to laboratory testing. They're no longer, in my perception, significantly opposed to lab testing. Everybody is fairly well enculturated into this process.

Which brings us to the conclusions that underwriting of health habit decisions is consumer-friendly, that the technology is available, and that it's cost-effective as you'll see when you look through the two studies by Rick Bergstrom.

I have two last comments very quickly. We still will have questions. These are two things that are bugging me. Number one, it amazes me that in the morbidity side of our business, among the health companies, I hear the comment many times that the cost of medical care is rising, that it's killing us, that it's very difficult to do business successfully. And correct me if I'm wrong, but hardly anybody in the individual and small group health insurance market does smoker versus nonsmoker pricing. Why would we voluntarily choose not to make people who use tobacco, particularly those who smoke cigarettes, to pay their own way in terms of health insurance products? Why would we allow their enormous morbidity to be downloaded onto abstainers when we have the technology to avoid doing it? I don't understand the mindset that keeps us from smoker/nonsmoker prices. We have the data. We have the technology. And it just makes good, consumer-friendly common sense to charge smokers their fair share.

In *Drug Abuse Update*, a quarterly update on drug abuse last spring 1991, the authors in that journal said, "American companies, particularly self-insured plans, are now charging smoking employees more for the added cost of their morbidity because of their voluntary decision to smoke cigarettes." And yet even though this is happening in self-insured plans, it seems not to be happening very widely in the individual and group health insurance community in the United States. I don't understand why.

My final comment has to do with when an individual misrepresents his tobacco use or, in most companies still, his cigarette smoking status, and when that individual dies during the contestable period. If there's a death during the contestable period, there are three choices that the insurance company has: (1) Pay the full value of the policy and ignore the fact that there was material misrepresentation. (2) Adjust the death benefit and send the beneficiary 85 or 80 cents on the dollar, which is what the premium would have purchased at smoker rates, which of course assumes the policy would have been issued, which it wouldn't have been! (3) Refund the premiums at an appropriate interest rate. You know that there have been two major court decisions. I don't follow the legal side as much as I should, but there was the decision with Mutual Benefit in New York and, now, more recently, the National Underwriter had an article about the New York Life decision in Pennsylvania where an individual misrepresented his smoking status and died. Best as I can tell, the score is two to nothing insurance industry over smokers who lie about tobacco use. I hope everybody in this room would agree that the appropriate position for us is, if you lie about smoking, there is no death benefit during the contestable period. We want honest answers. There are still good data to suggest that 3%, 4% or 5% of smokers do have "amnesia" during the application process. That's all I have to say.

FROM THE FLOOR: One thing I failed to understand is, do people see a value to genetic testing for companies in the future? I guess what I see is that AIDS testing is justified because it's a risk that was not incorporated into the pricing of products. But I sort of see genetic testing as something which sorts out some kind of super-preferred class. And perhaps this is beyond the scope of our insurance classifications.

DR. POKORSKI: For the next decade, it's risky to be using genetic tests or using even the information because people are not ready for it. Currently the tests are too expensive. We don't know what to do with them. The attending physicians don't know what to do with them as well. In the next decade, the tests are going to be very common. I'm often at forums and I raise the specter that people don't like to hear, but I say that your patients will absolutely insist that we use these tests once they understand that most of them will have good tests, normal tests, and they can get cheaper insurance. So I think if I had to just guess as far as the next decade, I would say that until it is over we won't use much of this. But when the medical profession starts to use them routinely, then we will start looking at them, especially for the preferred risk. So you're right on target.

MR. KOPEL: Obviously there's some implication on the pricing side also, that we really haven't discussed here, as to what the level of prices will be for those who do pass these tests.

MR. RICHARD NOEL FERREE: With a blood test you've got a signature that goes with the blood type. You can verify even after death that the blood sample did or did

not come from the insured, whereas in the saliva test, is there some sort of signature than you can verify that the test came from the applicant?

MR. GEORGE: Is there any signature on saliva that you know of that anybody has talked about some way of verifying years later? There might well be a similar type of test available on saliva as on the blood, when you get an underwriter instead of a doctor doing this. Some say you can blood type off saliva very easily as you know from watching good mystery movies.

MR. RICHARD L. BERGSTROM: Hank, what is the hang up with the FDA on those two tests?

MR. GEORGE: I don't know. I guess it wants to take a real close look at them. There's a certain amount of data that the FDA requires on any submission. It has to have an opportunity to examine the data and make the best possible decision I guess.

FROM THE FLOOR: Is there a Canadian version of the FDA?

MR. GEORGE: I'm not sure. I would suppose so.

FROM THE FLOOR: Do you know if they've passed similar legislation to that in the United States?

MR. GEORGE: I'm not aware that Canadian regulators have done any specific investigation of this or have raised any question about it. But it's not unusual in pharmacology for a drug to be approved in Canada before it's approved in the U.S.